he pages which are missing were re-
oved because they were advertisements.

TO WIN SUCCESS

In the Home Building Business Under the Conditions That Prevail Today

THE contractor must not only build houses that are good and that will give satisfaction but he must also keep his eyes open all the time to find ways to hold down unnecessary costs. The contractor who does not thoroughly investigate any material or method of building that promises to accomplish the same results at less cost, or a better result at the same cost, will soon find himself out of step in the march of progress.

"It was in this attitude of open-minded determination to find out how to build the best houses with all unnecessary costs eliminated that I first began to use the BISHOPRIC five years ago. The first Bishopric stucco house I put up, I built for myself. I found it to be a better house, actually stronger and drier, and the saving in cost of construction was marked. That was five years ago. Since then I have built several hundred houses, ranging in price from $5,000 to $12,000, in which I have used Bishopric. The results have invariably been satisfactory. I do not think it too much to say that I attribute a large measure of what success I have attained in the building business to my use of 'Bishopric.' for it has enabled me to give my customers more value for less money."

Statement by Successful Contractor

The foregoing statement was made in an interview by Mr. H. C. Stanforth, of H. C. Stanforth & Co., builders and contractors, with offices in the Oakley Bank Bldg., Cincinnati. Mr. Stanforth has made a conspicuous success in the contracting business in Cincinnati. He was a country town carpenter in Hillsboro, Ohio., ten years ago and moved to Cincinnati with no capital but his kit and tools and a large supply of grit and ability. He is now head of one of the substantial building and contracting firms of Cincinnati, doing a large business in home building in the better class residence sections of the city.

Mr. Stanforth's remark that he attributed a large measure of his success to the use of Bishopric in his home building operations called for further comment, in the opinion of the reporter, and Mr. Stanforth continued:

"I do not mean to say that the mere selection of some one method of building will by itself bring success to a contractor. But the attitude of mind in which a builder views innovations in use of materials may make all the difference between real success and merely grinding along a rut.

"When I first started using Bishopric stucco base direct to the studding, five years ago, many other contractors in my neighborhood thought I was undertaking something rash and radical that would be sure to bring me to grief.

"I went at the proposition with an open mind. I subdued my prejudices in favor of the material that I had been using and considered Bishopric solely on its merits. It seemed to me that it *ought* to do what was claimed for it. That being so, why not try it? So I did, and I found that not only was it as good as it looked, but that there were many additional advantages in its use that I did not think of at first.

Bishopric is an Established Success

"Tens of thousands of Bishopric houses all over the United States show this, and those other builders who thought I was making a mistake in 'experimenting' with Bishopric are now using it themselves in large quantities.

"I always use Bishopric stucco base direct to the studs, doing away entirely, so far as the exterior is concerned, with wood sheathing, building paper and metal or wood lath. I have used both Magnesite and cement stucco over Bishopric with equal success. While at first sight the thin wood strips of Bishopric do not look to be as strong as ⅞ inch wood sheathing, I have found that after it is applied by the broken-joint method recommended by the manufacturers, it actually makes a stronger and more rigid structure. This due to the larger number of nail bearing points and the integral-unit nature of the product. The sized fibre board background, the asphalt mastic and the dovetailed key strips being welded together in the process of manufacture, greatly increased strength is attained thereby. When the cement sets into those dovetailed keys this stout moisture-proof background becomes really an integral part of the cement wall itself.

"While I know some builders who use Bishopric stucco base with the wood strips creosote-treated, I have never found this to be necessary. I always see that the wood strips are thoroughly wet before I apply the scratch-coat. The moisture in the cement keeps the wood strips swollen while the cement sets. After the cement has set the wood strips dry out and reduce to normal leaving a space for expansion should climatic conditions cause them to swell again.

Superior Strength, Moisture-Proof and Insulating Qualities

"In addition to its advantages of superior strength, superior moisture-proof and superior qualities for dead-air insulation, I figure the cost of Bishopric as no more than wood sheathing alone. My saving through its use is about equal to the cost of building paper, metal lath, furring strips and the extra labor of application of these materials.

"I have no hesitation whatever in saying that Bishopric provides a most satisfactory background for stucco. The wooden strips, with their interlocking dovetailed keys, support the stucco between the studs at intervals of less than one inch, greatly reducing the strain of the weight of the stucco, and its consequent liability to check and crack. But more important than this, even, is the fact that Bishopric will last as long as the house itself without deterioration."

BISHOPRIC

BISHOPRIC SHEATHING—Strengthening, insulating, sound-deadening, weatherproofing unit; for exterior walls, sub-flooring and sub-roofing.

BISHOPRIC STUCCO BASE—Interlocking dovetailed key, insulating and waterproofing unit—creosote treated and not treated—for exterior.

BISHOPRIC PLASTER BASE—Interlocking dovetailed key, insulating, moisture proofing and sound-deadening unit; for interior plaster walls and ceilings.

THE BISHOPRIC MFG. CO.

3 Este Ave., Cincinnati, Ohio

Factories: Cincinnati, Ohio, and Ottawa, Canada

National Builder

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NATIONAL BUILDER

Volume 64 | Chicago, January, 1921 | Number 1

The Situation

CONTEMPLATED building projects of all classes in all districts of 25 northeastern states, January 1 to December 1, 1920, according to the Dodge reports, amounted to $4,527,245,933. Of these contracts were awarded amounting to $2,466,-162,000, leaving a balance of $2,961,083,933 unfilled projects. Contemplated residential buildings head the list with projects amounting to $977,930,435, and contracts awarded of $542,414,985, leaving a balance of unfilled projects of $435,515,450 in these sections alone.

Looking back over what has happened to the building industry and the New York and Chicago investigations of practices which it is asserted have ramified everywhere, there is assurance in the thought that the insanity of "getting while the getting is good" has displayed its consequences early enough for remedial measures to be applied.

The costs of building which have caused buyers to withdraw from the market and bankers to withhold loans in what they deemed inflated construction prices is indicated in the following conservative tabulation of the comparative costs for constructing a small dwelling.

STATEMENT PREPARED BY GEO. F. GREEN, ARCHITECT, FOR J. J. & T. J. GREEN COMPANY. KANSAS CITY, MO., WHO CONSTRUCT LARGE NUMBERS OF MODERATE PRICED HOUSES

Comparison of Labor and Material Prices on a Queen Anne House, 20 ft. 6 in. by 26 ft.

Note: The 1920 prices are by no means the peak, as most of the contracts were let early in the year.

	1914		1920		Per Cent of Increase	
	Labor	Material	Labor	Material	Labor	Material
Excavation	$ 19.75	$..........	$ 62.50	$..........	216	.....
Foundation	38.50	71.50	90.00	189.00	135	165
Cement work	29.74	44.60	60.00	125.00	100	255
Brick work	24.80	27.00	51.10	75.00	106	180
Mantels	....	26.00	....	65.00	.....	160
Lumber	....	401.55	....	1,114.38	.....	180
Millwork	....	190.00	....	580.81	.....	205
Carpenter work	265.00	....	605.00	....	130	.....
Miscellaneous labor	15.00	....	50.00	....	233	.....
Hardware	....	32.75	....	91.40	.....	180
Sheetmetal work	....	13.85	....	52.50	.....	280
Lathing and plastering	57.20	67.60	121.21	209.38	110	210
Stucco	22.50	65.00	60.00	122.50	166	105
Plumbing contract	....	225.00	....	618.50	.....	175
Electric wiring contract	....	20.00	....	53.25	.....	165
Heating contract	....	57.50	....	158.50	.....	175
Painting	57.50	27.50	159.00	108.50	176	295
Paper hanging	20.00	17.50	38.50	48.50	93	180
Shades	....	11.00	....	29.00	.....	165
Lighting fixtures	....	25.00	....	58.50	.....	135
Screens	....	24.00	....	55.25	.....	130
Grading and sodding	25.00	....	55.00	....	120	.....
Insurance	....	21.00	....	83.20	.....	295
Permit, water, misc., etc.	....	24.40	....	89.10	.....	265
	$577.99	$ 1.391.75	$1,352,31	$3,927.27	133½	190½
Total Cost	....	19,691.74	....	5.279.58	.....	173

SCHEDULE OF RATES OF LABOR

	1914	1920	Percent of Increase
Common labor, per hour	$ .25	$ .60	140
Stone masons, per hour	.50	1.00	100
Cement workers, per hour	.40	1.00	125
Plasterers, per hour	.50	1.00	100
Bricklayers, per hour	.50	1.25	150
Carpenters, per hour	.40	.75	87½
Painters, per hour	.40	.80	100
Teams, per hour	4.00	9.00	125
Average increase			116%

Coal operators admit that "outrageous" prices have been charged for coal, this being largely due to transportation difficulties, which have added to the cost of brick, cement, etc. The prices of building materials are being reduced by manufacturers as normal practices are being restored.

Dealers in general commodities which affect the cost of living and consequently the wages of labor, are naturally slow in responding to the call for lower prices. A just exchange value between the producer of foodstuffs, the manufacturer of materials, the distributor and wage earners is the problem before the country. Geo. M. Wilber, of Marysville, Ohio, speaking before the Chicago Chamber of Commerce, said:

"The farmer today receives only 14 cents for the hide of a calf which enters into a $12 pair of shoes, and the skilled workman gets $1.60 for making them. While apples are rotting by the thousands on the ground in Ohio at the present time, they are selling for 10 cents apiece on the fruit stands in Chicago. Cabbages are a drug on the market, and all I could carry into a drug store in your city would hardly buy me one soda. Virginia tobacco of good grade is selling as low as one cent per pound, and several thousand sheep recently sold at the Chicago stockyards brought the shipper only 34 cents per head."

This condition affects labor vitally, and production costs must remain comparatively high until exchange values become more equalized. The farm tariff bill has passed the house and now goes to the Senate. This, if finally passed, may give the farmer more dollars which he will probably have to pay back for what he requires from producers of other goods.

Buyers have been largely responsible for bidding up the price of building materials, as well as other commodities. The reductions that have been made in building material, the more conservative attitude of labor, indicate a general if cautious revival of building. As the movement accelerates it is believed that there will be danger of competition for material and skilled and unskilled labor to drive prices upward, and that it will be advantageous to those who can find the means to build as early as possible any further recession in prices not promising to be considerable enough to offset the conditions that bid fair to develop later in the year.

Construction in Its Entirety

Excerpt of an Address by General R. C. Marshall, Jr., Delivered in Los Angeles, California, December 4, 1920, at a Representative Banquet

CONSTRUCTION in this country, as I believe in other countries, has always been looked upon in its elements. None of us, I believe, has a settled conception of what those elements are. We are certain of some of them—we know that they have architects, engineers, contractors, sub-contractors, labor, material manufacturers, equipment manufacturers, material dealers, insurance men—and then we begin to stop. What are the elements of construction and is construction a single industry? I think that in addition to those things that I have enumerated, that perhaps investment bankers, as distinguished from other bankers, are a real part of construction; a real part constituting one of its elements perhaps as much as any of the other parts. In my view, the reason that construction has not occupied its proper place in the economic plan of our country is because we of the construction world have looked upon it in its elements and not in its entirety.

At the beginning of the war, we had construction work to do. Was there any such thing as a construction organization? There was no such thing. There were engineers, architects, contractors, sub-contractors, labor and manufacturers, but there was nothing to represent construction collectively in all its elements. We had before us a construction program which had to be done in a fairly definite length of time. Construction in war time, as in times of peace, must precede all progress, and is a condition precedent to progress. As I have said, we were confronted with the fact that there was no such thing as construction *as an industry*. There was no such thing as a leader of construction. Fortunately there were gathered together at Washington a number of men who had rather large ideas as to what should be done, and out of it grew the policy of the War Department that led to the construction that was done. Since that time it has been my effort constantly to bring this fact prominently before the eyes of all the elements of construction—what they need more than anything else is a construction organization in which all of the elements will be represented and in which all of the elements will take care of their several correlated problems as a unit.

Co-operation is a word that is much used and much abused, but I do not know how else to express it. If the contracting industry is to be a cohesive industry, there must be co-operation between its several elements, and those several elements must take care of their friction between themselves and not before the public. For instance, we are constantly confronted with the fact that the terms of contracts are such that contractors think that they are laboring under a hardship. The engineer says that "exactions which the contractor is working under enable me to control him." All that the public knows is that friction exists between the two, and we know that because of these conditions and

Photo by Clinedinst, Washington, D. C.

General R. C. Marshall, Jr., Manager, Associated General Contractors of America

menaces, the contractor is compelled, in self-defense, to charge more for his work. The hard terms of contracts are things that have grown up out of the ages. There has been no voice on the one side to be heard, no collective voice, and the consequence is that the full effect of those terms has not been brought to the realization of all the parties at interest.

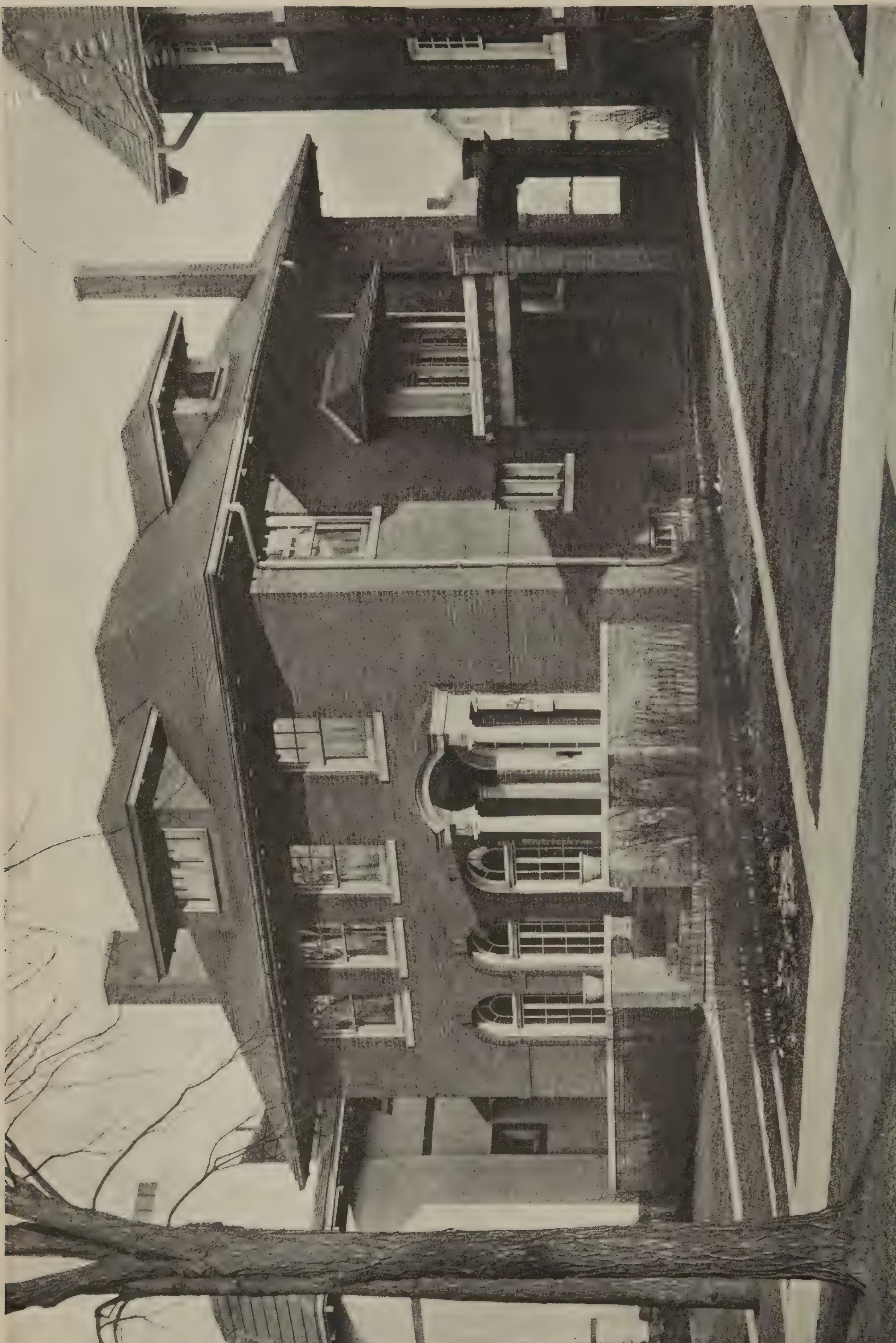
Some two years ago there was a meeting at Atlantic City, at which contractors, among others, were present—a meeting of the Chamber of Commerce of the United States. At this meeting a number of construction matters came up. The general contractor found that every other element of construction was organized and was voicing the collective opinion of its organization, whereas he was voicing an individual opinion. Shortly after this an effort was made to form an association that would be all inclusive in construction—now known as the Federation of Construction Industries. Here again the general contractor found himself in the same position and those general contractors who were present were so impressed with the fact that organized effort was producing results that they determined that general contractors should have an organization. So two years ago the Associated General Contractors was formed for that purpose. What was the ideal of these men? Their ideal is briefly expressed in the three words that the Association constantly uses—"SKILL—INTEGRITY—RESPONSIBILITY."

There are one hundred and six national organizations pertaining to construction. The general contractors found that they were not organized to meet any of the efforts that these one hundred and six other organizations were producing.

According to Dodge's reports, the awards of contracts for this year up to September 1st, in the northwest quarter of the United States, were two billion dollars. If this is reduced to a per capita basis and applied to the whole country, you will find that the amount of contracting business done this year is between four and five billion dollars, making it the second largest business of the country—agriculture being first—railroading third. This being the case, who is responsible to the public for the expenditure of this vast sum? Who is the financial agent of the country for the expenditure of this money? Most of it passes through the hands of general contractors. What then is his duty to the country and what place should he occupy in its economic life? I do not think I have to answer this question and I am sure that there is no one here who will differ from one another very much in the answer to it. The contractor is the man through whose hands this money passes; it is his duty to the country that he should know how and why it is expended. If he doesn't, the country will justly hold him up to contumely, as it has in the past. His responsibility is such that there is but one way that he can meet it; that is that he should be so organized that he will present this question to the country in all of its true aspects. I am not putting this proposition necessarily on a high moral plane, although I am not belittling such, but as a matter of selfishness, if there is no other reason—as a method of getting that confidence from the public which will result in being able to conduct this business in the way it should be conducted. There is only one plane on which general contractors can successfully organize and that is the highest plane.

(Continued on page 66)

RESIDENCES



A House in Detroit. B. C. Wetzel & Co., Architects

See working drawings in detachable blueprint insert in this issue and descriptive article on opposite page

A House in Detroit

B. C. Wetzel & Co., Architects

See Complete Working Drawings in Detachable Blueprint Insert in this Issue

THE high cost of living begins to show evidence of having done us at least one good turn which,—if we continue to recognize its valuable qualities,—will eventually more than offset the evils attendant on high prices. We are beginning to look askance at every commodity that does not show real worth. We are demanding that purchases represent value from a standpoint of efficiency as well as with respect to practical and economic qualities and fitness to serve our individual needs. The purchasing power of the dollar rather than its spending quality is again uppermost in the mind of the average buyer.

The application of this tendency to building is reflected by the attention that clients now give to the practical solution of their problem. A few years ago the average client had a more or less vague idea of what materials the outside walls were to be built of, and whether he wanted a two-story house or a bungalow. Of everything else his understanding was hazy and remained so until he was settled in his new home. About that time he usually began to realize that the house didn't suit at all, that it cost too much and he entertained a settled conviction that as a planner the designer was a good wood butcher.

The average client of today is a different proposition. At first he may not know just what style he prefers nor the exact arrangement of the rooms, but before the contracts are let he will know the exact purpose and size of every space that is provided, and furthermore, will demand that each space serve a definite purpose exactly suited to his family's individual requirements. In other words every available foot of space must have a useful purpose and all superfluous space and materials must be eliminated. In past years careless designers have been able to make wasted space less noticeable by giving it some flossy name such as "music room," "dressing room," or the like. There is evidence, however, that clients are no longer willing to pay for a designer's carelessness or inefficiency and are demanding a higher degree of skill than ever before.

The house which forms this month's supplement is a good example of economical planning and the full utilization of space in a house of moderate size. It was designed for Mr. Robert C. Yates, of Detroit, by B. C. Wetzel & Co., architects, of that city.

The exterior walls are of brick, the roof and sides of the dormers are slate, and a tinned deck is formed at the peak of the main roof. The sills and copings are of stone, all other trim, including the entrance, being of wood. The foundation walls and basement floor are of concrete and the terrace has a reinforced concrete floor slab.

The street elevation is quite simple, but any feeling of bareness is overcome by the arched French windows and the very attractive design of the entrance. The brick belt course midway up the walls has the effect of reducing the apparent height of the building.

The side elevation shown in the photograph is by no means so pleasing as the front. The roof of the bay window is too heavy in appearance, the porte cochere is rather out of place on so small a house and the spindly chimney near the rear corner should be thicker all around.

The basement contains a fuel room, fruit room, heater room and laundry, all separated by sheathed partitions. The remainder of the basement instead of vaguely being designated as "storage space," has been divided into a hall and a billiard room, thus converting space that is ordinarily unused, into a pleasant recreation room that may be enjoyed by the family and its guests. The billiard room contains a fireplace and is finished with plaster.

Of course it is not intended to imply that every house should have a billiard room in the basement. It is, however, well to call a client's attention to the possibilities of utilizing a portion of the basement for such purposes or for use as a play room for children, a gymnasium or the like. I once knew a sportsman who had a rifle range in his basement and there are numerous houses in the southwest in which a secondary living room in the basement is found highly desirable during extremely warm periods.

There is a small vestibule at the entrance to the first floor and beside it is a roomy coat closet. The living room, dining room and sun porch are connected by wide openings with glazed doors. These, together with the French doors to the terrace make the rooms appear much larger than they really are.

There is a well equipped pantry containing built-in cupboards and an outside-icing refrigerator. The kitchen opens onto a rear porch and also into a small rear hall which has a grade-line entrance. The location of a downstairs toilet in this hall is particularly good as it is convenient to the kitchen as well as to the front portion of the house. The rear hall also contains a coat closet that is very handy for auto robes, umbrellas, rubbers and other paraphernalia. In some families this closet would be considered more useful as storage space for groceries, vegetables and other bulky articles.

The stair to the second floor is of a combination type with a back stair joining the main one at the landing. The second floor contains four large bedrooms, a sleeping porch and a bath room. Each bedroom has a large closet and there is a linen closet in the hall. The bath room has a shower in addition to the usual fixtures. A door from one bedroom leads onto a balcony that is useful for airing bed clothing.

Even the attic of this house is put to full use and contains a large bedroom and bath room for the maid. It also provides a large closet for storage purposes. Additional storage space is made available by doors leading to the roof space.

Taken in all this house is based on a highly efficient type of plan that fully provides for the owner's comfort and method of living.

Building Conditions in Springfield, Ohio

Recently, in conversation with a representative of NATIONAL BUILDER, C. E. Hansel, manager of the Chamber of Commerce of Springfield, Ohio, and Arthur R. Altick, secretary of the Springfield Real Estate Board, declared that Springfield is 1500 houses short of what it needs and is falling behind about 100 houses a year. It was estimated that the number of houses now being built annually is about 150, while it would require the building of 250 a year to keep up with the demands of an increasing population, without doing anything to offset the present deficiency.

They asserted however that Springfield is, in this regard, better off than most other cities with a population in excess of 65,000 (the population of Springfield) and that most of the houses built during recent years have sold for from $4500 to $5000.

Most of the recent building, industrial as well as residential, has been financed by the building and loan associations. The bank rate on mortgages is now 7 per cent, and they will loan only up to about 33 1/3 of the value of the property, and "money is hard to get at that."

Said Mr. Altick, "I look for a good lot of building in the Spring."

What Is a Fair Rental?

By Luther Conant, Jr.

A Summary Prepared from Data Compiled by the Research Department of the Housing Company, Boston, Mass.

WHAT is a fair rental for dwelling-house property?

A rule of thumb has often been laid down that a dwelling house should return a gross rental of 10 per cent of its value. A vast amount of dwelling house property has been rented on this basis, or less. Yet it is certain that, by and large, a gross rental of 10 per cent will not return even a savings-bank rate of interest to the owner. In some cases it will return practically nothing.

Some rather careful calculations of the cost of operating dwelling-house property indicate that instead of a gross rental of 10 per cent, a gross rental of at least 13 per cent, and frequently of 15 per cent or more, is necessary to return a yield at all remunerative.

One calculation of this sort, prepared by the United States Housing Corporation, places the normal cost of operating and maintaining ordinary dwelling-house property at nearly 8 per cent, a figure which, in view of the general advance in taxes, supplies, and labor during the past few years, should be increased at the present time. The operating costs for apartment-house property are considerably higher than 8 per cent.

The United States Housing Corporation's figures, which represent the median experience as reported for the period 1913-1918, and which should be taken as a broad basis rather than as a specific formula, are as follows:

Factors	Pct. on Investm't
Maintenance	1.4
Service	.5
Insurance	.2
Taxes and Assessments	1.4
Vacancies and Bad Accounts	.7
Depreciation and Obsolescence*	3.0
Administration	.5
Total Expense	7.7

*Estimated and assumed.

On this basis a gross rental of nearly 14 per cent would be needed to return even 6 per cent on the investment. But it should be clear that at the present time a 6 per cent return does not adequately compensate the owner for the burden and risk of maintaining such property.

Mr. William C. Benkert, former president of the Philadelphia Real Estate Board, has placed the operating cost of dwelling-house property at 7.1 per cent, as follows:

	Pct.
Taxes and Water Rates	2.5
Vacancies	1.0
Repairs	1.0
Insurance	.1
Management	.5
Depreciation and Obsolescence	2.0
Total	7.1

The allowances for depreciation and obsolescence used in the preceding calculations may be accepted as conservative.

Practically no reliable estimate has placed the operating cost of dwelling-house property at less than 7 per cent.

Obviously, therefore, the old rule of thumb of a 10 per cent gross rental should be discarded. The foregoing calculations of operating costs suggest that a gross rental of 13 per cent is a *minimum* economic return on such property.

A gross rental of 13 per cent means that a house and lot worth $8,000 should rent for $1,040 a year or, roughly, $87 per month; a gross rental of 15 per cent would mean, for such a house, a rental of $100 per month.

The rental should be related to the fair current value of the property, not to its cost, which may be more or less than its value. Depreciation and obsolescence charges are properly to be computed on the original cost. But the rental must take account of the value. Any attempt arbitrarily to regulate the rental on the basis of a lower original cost necessarily means that the competition of such rentals will discourage the building of new houses on which a similar rental would not yield an economic return. The capitalist who must face such competition is forced to look to other fields of investment.

In the case of an owner occupying his house these operating costs can be substantially reduced. Thus, the allowance for vacancies can be entirely eliminated, while various other items can be modified. In the case of an "owner's rental," so called, the operating costs might not exceed 5%.

The country today is faced with a shortage of homes for at least one million families. The population is congested beyond the highest point ever previously reached. There are at present approximately 121 families for every 100 houses, against an average of about 115 families per 100 houses in 1915, and 112 families for every 100 houses in 1900. In view of the rapid influx of immigration, this congestion obviously must increase unless the construction of houses is speedily resumed on an extensive scale.

The question arises, however: How can such construction be hoped for if the landlord cannot secure a fair return on his investment? The simple fact is that a community cannot expect houses to be furnished unless such housing will return a reasonable profit to the builder and to the owner who purchases for investment. When an income of 7%, 8%, or more, can be secured from gilt-edge securities, it is unreasonable to expect that business men will undertake the burden and expense of building and operating dwelling-house property for 2, 3 or 4 per cent, which fairly expresses the return in a large number of cases.

Undoubtedly, there have been many instances of flagrant profiteering in rents, and no excuse should be offered for a greedy landlord or — and he is, perhaps, more often the real culprit—a grasping sublessor. But the investigations of nearly all official commissions agree that, in a vast majority of cases, increases in rent, instead of being extortionate, have been moderate; in many cases they undoubtedly have been inadequate. In the face of sensational increases in building costs and heavy increases in operating expenses, rents in general have risen very slowly. Thus, reports of the United States Bureau of Labor Statistics show that, while the cost of living as a whole increased 97% between 1913 and December, 1919, the average increase in rents was only 30%. Likewise, studies by the National Industrial Conference Board show that, whereas the increase in cost of food between July, 1914, and July, 1920, was 119%, that in clothing 166%, and in sundries 85%, the average increase in cost of shelter was only 58%.

These figures reflect one of the fundamental factors in the present housing crisis, namely, a stubborn resistance to any increase in expenditure for one of the prime necessaries of life, shelter, in the face of most extravagant expenditure for such articles as silk shirts, silk stockings, rugs, and a hundred and one other luxuries. It is axiomatic that capital seeks the maximum rate of return, and so long as it can command double the return in the production of luxuries that it can secure through the production of housing, the present housing acts, new city ordinances, or court rulings, shortage will be unrelieved. In each case the cure for an undesirable situation is really in the hands of the consumer.

That houses will be built when the financial return is adequate is shown by the fact that, although housing in many localities came almost to a standstill, the erection of garages reached unusual proportions. Thus, whereas in 1919 only 33 tenement houses were built in Boston, 606 garages were erected at a cost of over $5,000,000. Building statistics of other cities for the current year show similar conditions. Had the erection of dwellings offered the same rate of return, there can be no doubt that builders would have been equally ready to undertake their construction.

This, then, is the crux of the housing problem, and it will not be solved permanently by any number of new legislative It will be solved permanently only through such a readjustment of rentals to real estate values as will again automatically attract capital to the building industry. So far as this readjustment can be effected by a reduction in building costs, this is highly desirable. But the readjustment must be made. And it will be made most effectively and with least friction if the tenant will distinguish between rents which are exorbitant and those which are reasonable.

A Colonial House

By Charles Alma Byers

SET in its well-planned grounds, with fine, well-grown trees for a background, the two-story house shown here presents a most pleasing appearance. Of modified Colonial style, it is simple in structural lines, which helps to endow it with stateliness and dignity, and yet it is home-like and attractive. Note especially the spacious veranda which extends across the entire front, with its equally roomy and inviting balcony above, and, further, that there is also a small and more secluded porch, with balcony, on one of the rear corners. The latter, incidentally, is accessible directly from both the dining-room and the breakfast room and each of the balconies, by means of glass doors, may be entered from a second-floor bedroom. And in addition to these outside features there should also be noticed the little side porch which provides entry to the ground floor from the automobile driveway.

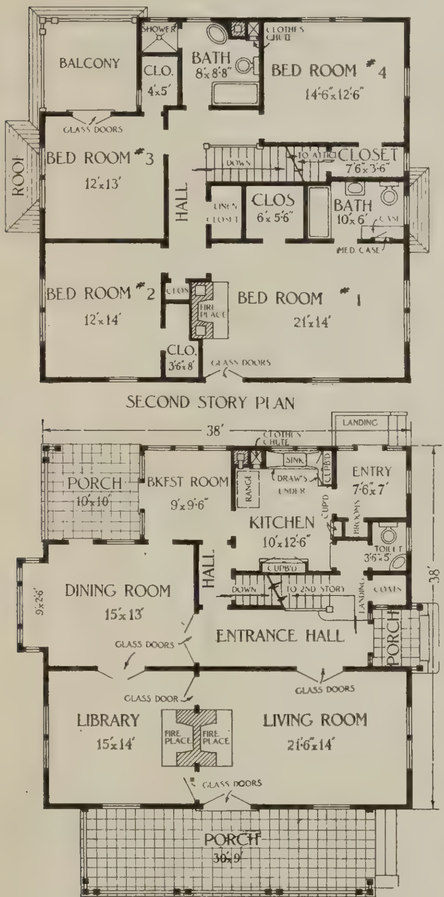
Structurally considered, the outside walls of this house are of narrow re-sawed siding, which, including all trimming material, as well as the railings of the porches and balconies, is painted white. The roof is shingled and painted a bright green, to match the green shutters at the windows, and the porches are floored with red cement, marked off into tile-like squares, while the massive chimney that appears through the roof is of red brick. The color scheme, in brief, is such as to prove delightfully effective with liberal garden planting.

The accompanying floor plans show the arrangement of the interior. Particular notice, however, should be called to the liberal use of glass doors, the several built-in features, the numerous well-placed closets, and the fact that a single chimney accommodates a fireplace in each the living-room, library and an upstairs bedroom.

In finish, the interior is exceptionally attractive. In the main rooms the Colonial style is effected with charming results, and in the other rooms the finish is equally pleasing and attractive. In the living-room, library and dining-room the woodwork is treated in old ivory enamel, with mahogany

A Colonial house

trim, and in the little breakfast room and some of the bedrooms the style is also old ivory, while in the remaining divisions, including the bathrooms and kitchen, the woodwork is plain white. The walls of all principal rooms, including the sleeping



Floor plan of a Colonial house

rooms, are papered; in the bathrooms they are tiled in wainscoting effect, and in the kitchen they are finished to the top of the windows and doors with a smooth, hard plaster coat which is enameled like the woodwork. Hardwood floors prevail almost throughout, but the floors of the bathrooms are naturally of tile.

There is a basement the full size of the foundation, and a roomy, unfinished attic, with inside stairways to each. The house is also equipped with a furnace. It is located near Los Angeles, Calif., and the plans were prepared by E. W. Stillwell of that city. The present-day building cost is estimated to average from \$12,350 to \$15,000, entirely complete.

Wooden Fences

Wooden fences seem to be coming into favor again in many portions of the country. They differ, however, from the old type built of plain posts and pickets, and in most cases take on a more decorative character.

Trellis designs are quite popular for such use and the posts frequently form a portion of the design. Beautifully designed posts were used in old colonial work and offer many suggestions for the design of such members.

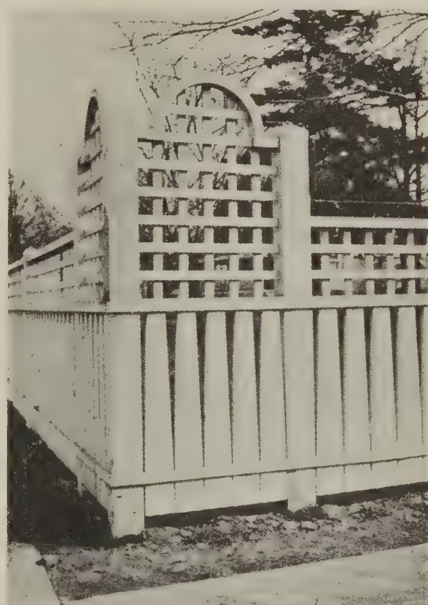


Fig. 1—A fence corner at Cleveland, Ohio

To assure permanence the posts should be set in cement footings extending below the frost line. Whether or not cement footings are used, the ends of the posts below the grade line should be well treated with creosote or other preservative.

White or colonial yellow are the favorite colors for fences, but when selected with good judgment, other colors may be used with good effect.

House Problem in Des Moines

The highest authorities on housing matters in the City of Des Moines, Iowa, tell the National Builder that the shortage of houses in that city is about 3,000. The population of the city is about 130,000, a gain of about 30,000 over ten years ago.

But in the past 15 months, there has been more house building in Des Moines than in any other city of the Middle West. During that time about 1,500 houses have been built, many of them in groups and for speculative purposes. It should be added, however, that quite a large number of these houses are unsold and unoccupied. This speculative building came to a rather abrupt end about the middle of the summer, due to the money stringency.

The housing commissioner of the State of Iowa informs the National Builder that he estimates the shortage of houses in the State at about 35,000. This he says is a conservative estimate. Some of the real estate dealers in the State that have worked on the shortage of houses tell the commissioner that the shortage is not less than 50,000. And, as very few houses are being built, and the population continues to grow, the house shortage in the state is steadily becoming worse.

Fig. 2—Old colonial house with decorative fence posts, at Salem, Mass.

Fig. 3—A trellis fence with an elaborate gateway, at Houston, Texas

Two Moderate-Cost Suburban Residences of Concrete Block

THE accompanying illustrations show two modest dwellings of concrete block from the board of Ross and MacDonald, architects, Beaver Hall Hill, Montreal. Both were planned to be within the financial reach of the worker who buys his home at the rate of $100 per month. They are attractive and have the advantage of low maintenance. Both were designed to occupy rather narrow inside lots.

Foundations may be built either of concrete block or of monolithic construction, depending upon which proves the most economical. If of concrete block, they are to be plastered inside and outside as shown in an accompanying sketch. First floor walls are of flat faced granite surfaced concrete block laid in white cement mortar, while the upper walls are of flat rough surfaced block providing a base for a portland cement stucco coat a few shades darker than the granite surfaced block. The block in the upper walls are flush with those below, allowing the stucco coat to protrude about ½ inch beyond the granite surfaced wall.

At the juncture of granite surface block with the stucco wall, a pine strip is run around the wall to produce a definite line

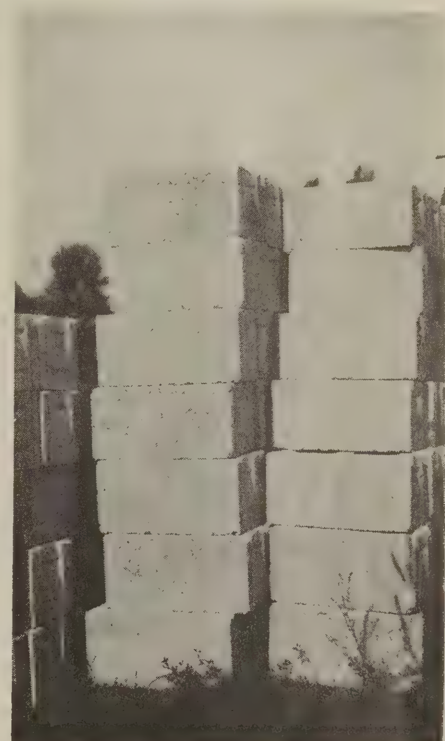


Figure 3—Flat rough surface concrete block specified for basement and stucco covered walls of the two residences

of demarkation between the two materials. In House A a wide (8-inch) panel board is used for this purpose, corresponding to the vertical and diagonal panel boards used on stuccoed portions of the surface. These panel boards are attached by nailing to wooden plugs placed in the mortar joints. Panel strips are put up before applying the stucco. The chimneys are of stucco on brick, with fire clay flue lining and concrete caps. Precast double sills and lintels are used, as shown in the sketches.

The roofs are of gray slate on ordinary wood frame construction covered with heavy water-tight roofing paper. The area under the eaves is protected against fire

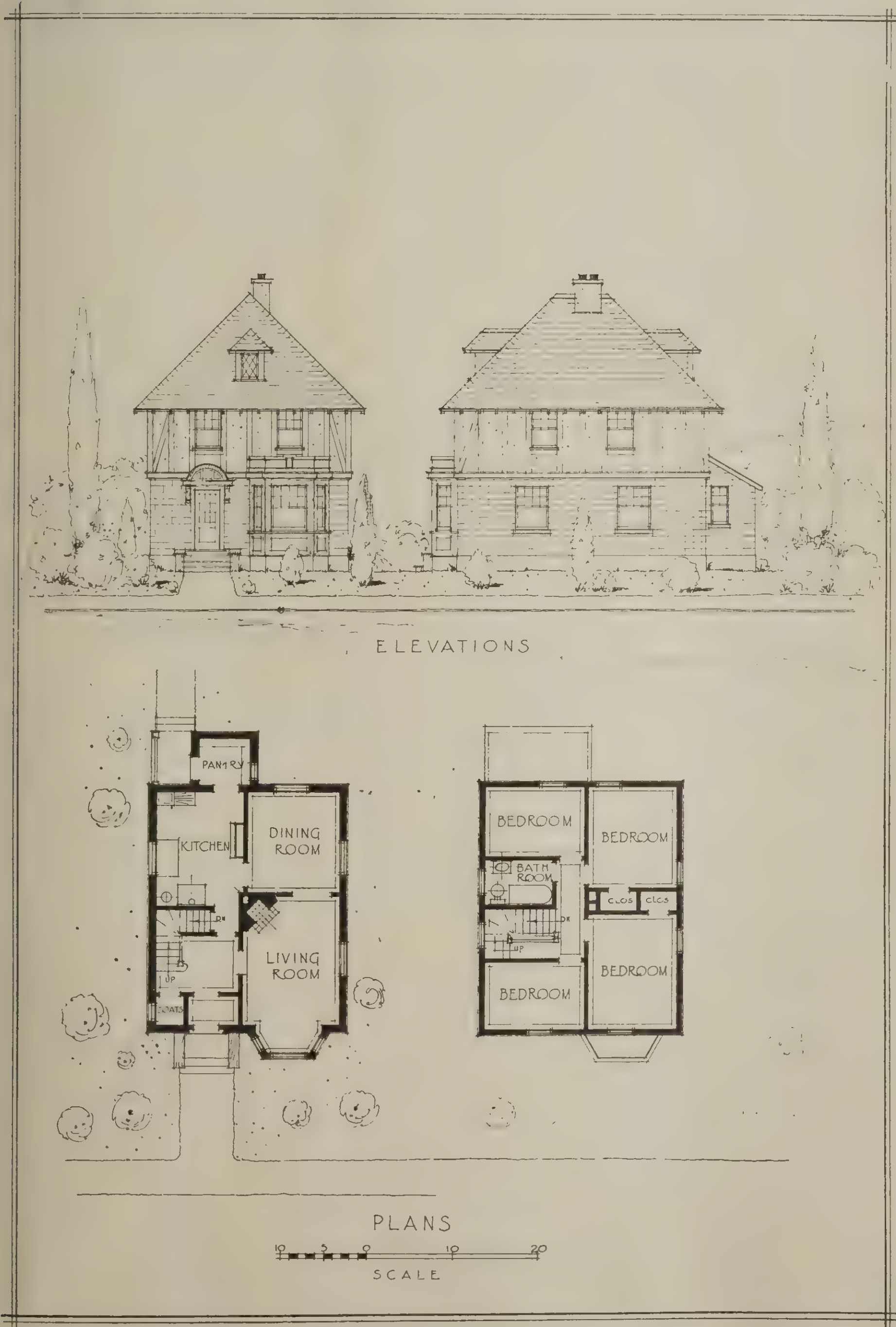


Figure 1—Seven-room house, concrete block and beam-and-stucco surface, with slate roof

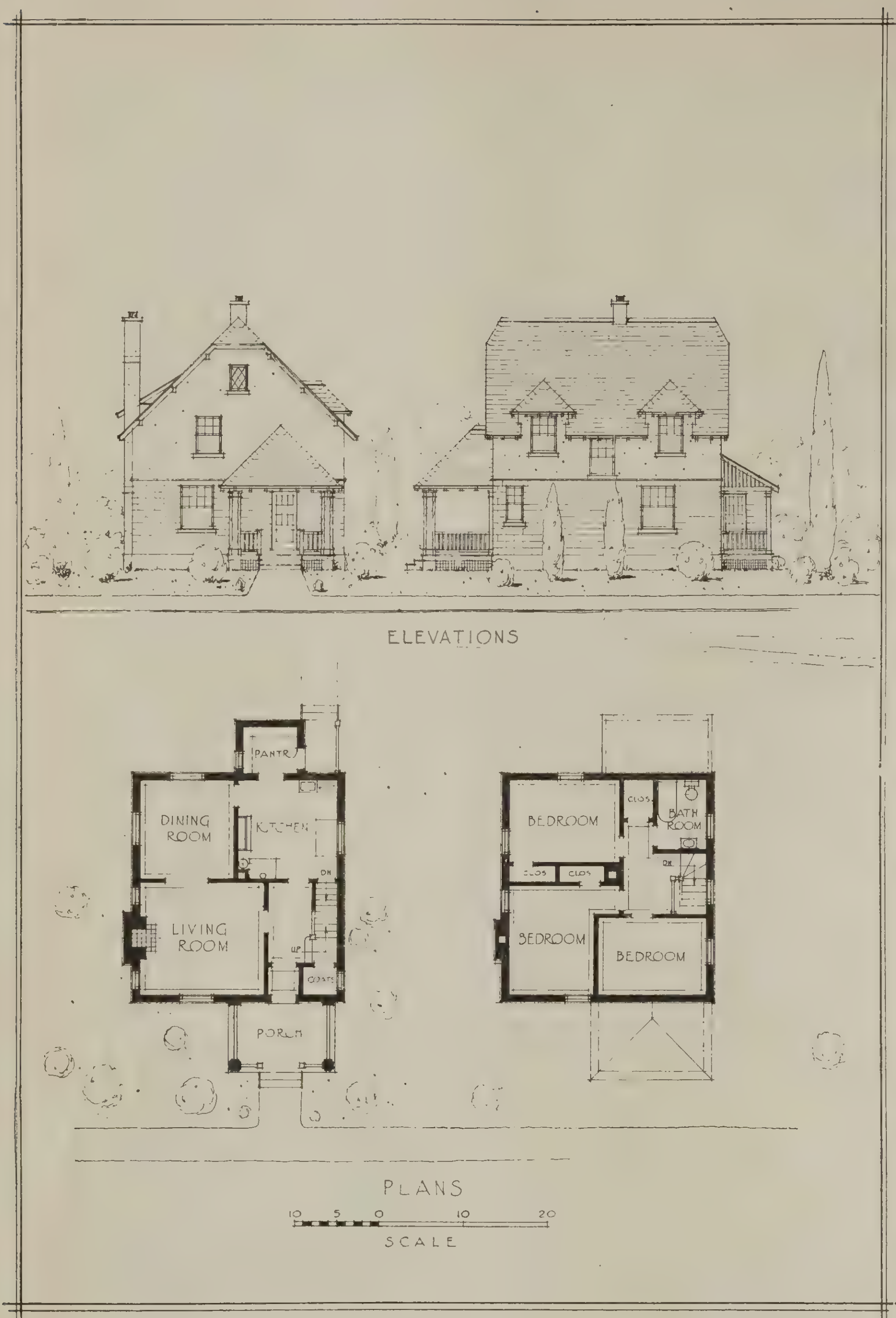


Figure 2—Six-room two-story house with open porches and gabled roof. Walls of concrete block, using both granite block and stucco surfaces

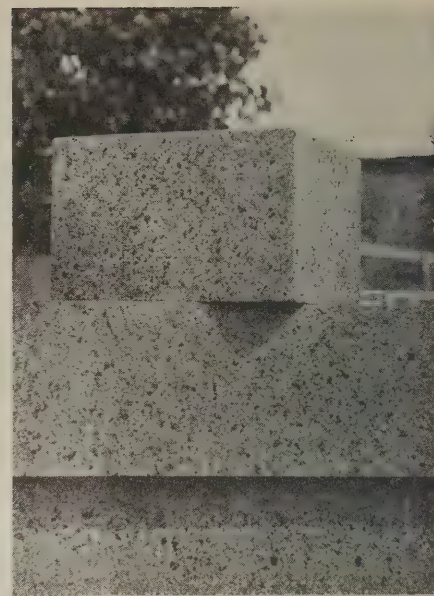


Figure 4—Flat granite surface concrete block, used for first floor walls of houses shown in Figures 1 and 2

	If 8 by 16-in. Block Are Used. Flat Rough Surface	Flat Granite Surface	If 9 by 24-in. Block Are Used. Flat Rough Surface	Flat Granite Surface
Foundation walls	585	......	*345	......
First story walls	......	882	......	535
Upper walls (for stucco surface)	775	......	510	......
Total flat rough block	1360	......	*855	......
Total flat granite block	......	822	......	535

*If 9 by 24-inch double wall Hydrostone is used foundation to grade, add about 325 flat rough surface block.

House B (Fig. 2) has overall dimensions 28 feet by 25 feet 6 inches. The living-room is a little wider than in House A (15 feet by 13 feet 6 inches) and the dining-room same size as in House A. There are three bedrooms, bath and large closet, on the second floor. Approximately the following quantity of concrete block are required for the walls:

	If 8 by 16-in. Block Are Used. Flat Rough Surface	Flat Granite Surface	If 9 by 24-in. Block Are Used. Flat Rough Surface	Flat Granite Surface
Foundation walls	612	......	*366	......
First story walls	......	964	......	604
Upper walls (for stucco surface)	830	......	560	......
Total flat rough block	1442	......	926	......
Total flat granite block	......	964	......	604

*If 9 by 24-inch double wall hydrostone is used foundation to grade, add about 340 flat rough surface block.

by means of three coats of portland cement stucco on metal lath. Frame construction is used for the porches, with concrete block piers and concrete floors and steps. The canopy over the front entrance to House A is particularly attractive.

House A (Fig. 1) has a plan area 29 feet by 23 feet exclusive of several minor projections. On the first floor are located a living-room (15 feet by 11 feet 6 inches) with fireplace and bay, a dining-room (11 feet by 12 feet), kitchen, entry and stair hall with coat closet. The room marked pantry may be used simply as a rear entry, equipping the kitchen with the necessary closets and shelves so that a pantry will not be needed. Upstairs there are four bedrooms, ranging in size from 13 feet 6 inches by 10 feet 6 inches down to 11 feet 6 inches by 8 feet. The bathroom is also conveniently located on the second floor. The type of roof gives plenty of attic space, affording storage room and play room for the children.

The walls of House A require approximately the equivalent of the following quantity of full size concrete block:

SMALL HOMES

A Bungalow with Colonial Details

By Arthur F. McCarty

THE house illustrated is one of eight designed, built and sold by the writer as part of a real estate development in Salina, Kans. The main dimensions of this bungalow are 28x41 feet, exclusive of the porch, which is 8x20 feet in size. The exterior is covered with 10-inch clear fir shiplap, used to get the wide-siding effect, and was applied with a double lap by dropping the shoulder of one lap down on to the shoulder of the board below. This method added to the tightness and prevented the flat surface usual with shiplap applied in the usual manner.

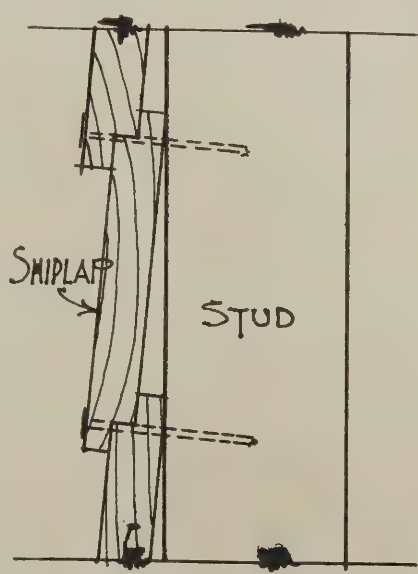
Bungalow with colonial details

The porch piers are of rough red brick, called Harvard Mats. The Colonial window in the gable of the porch is effective, as is also the lattice. The house is painted white, with a greenish gray roof of composition.

The floor plan of this house has been much admired. The buyer of a bungalow is hard to please in the location of rooms, as he seems to want them all on the south side. Here there is a living room of fair size, and two of the bed chambers, all on the south side. The less important rooms, dining-room, kitchen and smallest bedroom, are on the north. It will be observed that ventilation is cared for to an unusual extent, the windows being many and large, all 12-light except the pair of casements in the dining-room bay, over the sideboard.

The living- and dining-rooms and the three bed chambers and the hall are all finished in birch. This was stained brown mahogany and finished dull. The floors are oak. The decorations chosen consist of Colonial papers, and the electric fixtures are in Colonial designs in silver finish. The doors were made to order and are of birch, with two tall panels.

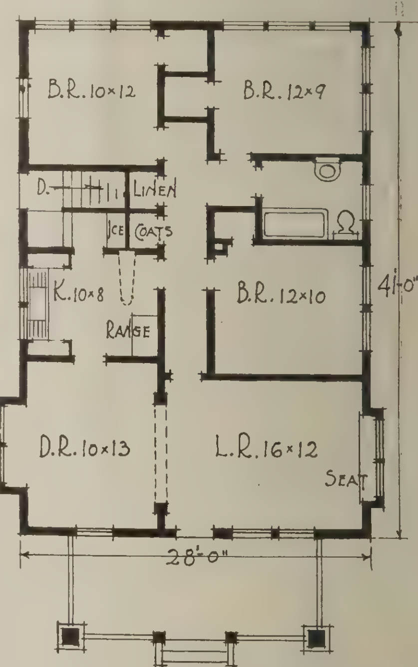
The kitchen and bathrooms are in white enamel, with painted walls. That of the kitchen is buff. The location of the refrigerator is a feature, with the grocery-receiving shelves above it. These are at the head of the grade stairs, and deliveries of ice or groceries are made without entering the kitchen. The ice water drains to the sewer. The two built-in cabinets, on either side of a double window, with the sink and two porcelain drains below the window, make a compact workshop. Everything is in easy reach, and there are plenty of shelves and drawers in the cabinets. A folding ironing board in the wall completes the handy kitchen, which has an oiled yellow pine floor.



Showing application of siding

The basement is the full size of the house, and is divided equally into three parts. The front third is the coal and kindling room. The middle third is cut in two, one room for the furnace and the other for the laundry, which has sink and hot and cold water taps. The furnace heats the water in winter, and in summer a copper coil gas heater does the work cheaply. The rear third was left unfinished, but having two windows will make a splendid gymnasium or children's playroom whenever the owner gets ready for it. The rest of the basement is floored with cement.

This house is on a lot 41x120 feet in size; there is a garage for one car; the place was sold complete with walks and cement driveway for $6,750, of which 15 per cent was profit. A building and loan



company carries $3,000 in a first mortgage. The buyer paid $2,000 down, and is paying the balance at $18 per month with interest at 9 per cent per annum. It is on a paved street, and is thoroughly modern.

Building Material Prices Are Reduced

Sweeping reductions in prices of roofing, paints, linoleums and related products have just been put into effect by the Certainteed Products Corporation, makers of prepared roofing, and the largest manufacturer of its kind in the world. The reductions in some cases amount to as much as 50 per cent.

A Job of Remodeling

A remodelled house at Jamestown, N. Dak. Gilbert R. Horton, Architect; Jorgensen-Klarquist Co., contractors

IN much the same way that it is hard to make the average citizen see an attractive building in a quantity of wood, brick, lime and sand it is hard to make him see the possibilities of remodelling of an old house. The vision and taste of the architect and the skill of the builder work transformations that must be shown to Mr. Citizen before he can be convinced.

An example of such a transformation is shown in the accompanying illustrations. The unattractive habitation at Jamestown, No. Dak., has been transformed into an attractive home-like residence.

G. R. Horton was the architect, and the Jorgensen-Klarquist Co. were the contractors. Work on the building included excavation of the basement, concrete walls to grade, a brick veneer of texture brick laid up in garden wall bond above grade, above veneer metal lath and stucco. All frames and windows were changed, and asphalt shingles placed on the roof. The building has very complete plumbing and is equipped with gas stoves. It is heated with steam from the Central Plant.

The cost of the remodeling including the heating, plumbing and wiring was $8,000, which is admitted to be very high, but as the building is located in the fire limits it had to be constructed to comply with the building ordinance for buildings in fire districts.

Saving Money Through the Architect

"A man should know the cost of doing work himself or obtain the help of an architect, even if he is only going to have his house painted," said an Iowa architect to a writer for NATIONAL BUILDER.

"I had an illustration of that just before the war. I bought an eight-room house and had to have it painted within and without. I preferred to have it done by a local painter, and I asked one for an estimate on the work. He made an estimate of $510. That was before the war, remember, when prices were way down, compared with what they are now. I called him in and told him just how many spaces there were on the outside and how many lineal feet on the inside, and asserted that his bid should be about cut in two. He was surprised that I knew what the work should cost. I told him I would give him till after dinner to bring me the right figures on the job. He was back promptly after dinner, and we signed the contract for $253."

House at Jamestown, N. Dak., before remodelling

A Country Cottage

THE automobile is largely responsible for the growing popularity of country cottages. The country has become the front yard of the city, and the town dweller has not been slow to avail himself of the opportunity to replace the noise and grime of the city with the restful surroundings of nature.

Another factor that is influencing the popularity of country cottages is due to boxes along the porch forms the only decorative feature of the exterior.

The plan is complete and contains all of the modern conveniences of a tower house. In fact there is no reason why this house should not be built in a town, provided that it be placed on a large lot containing plenty of trees and shrubbery.

A wide porch extends across the front and is fitted with windows so that it may contains a wide row of casement windows.

The service quarters are placed in a wing at one corner of the building. This contains the kitchen, which has a built-in refrigerator and cupboard, and opens into the rear entry. The entry has a grade line entrance which also serves the stairs to the basement. The service wing also contains the maid's room which has a private toilet and a large clothes closet.

Cottage at Lake Minnetonka, Minn. Dale C. Swain, Architect

the fact that every modern convenience of the city home is now available to those in even the most remote districts. Individual electric lighting and power plants; gas fuel plants; water systems and so forth, have reached the point of perfection that they may be installed at reasonable expense in any home. Thus the country cottage has extended its usefulness until it has in many instances become a year around home instead of serving for a brief residence through the summer season.

The accompanying cottage is located on Lake Minnetonka, Minnesota, and was designed by Dale C. Swain, architect. It is a plain and unassuming design of the bungalow type and its stucco walls and green roof blend with the surrounding landscape in a pleasing manner. The wood trim is stained and together with the long flower

be used throughout the year. French doors open from the porch into both the living room and dining room. The living room obtains light and air from each end, and at one end is a wide fireplace. A wide cased opening is placed between the living room and the dining room, and the latter

A door from one corner of the living room leads to a small hall which leads to the family bedrooms and bath room. A linen closet and a clothes chute are provided in the hall. The owner's bedroom is located in one corner of the main building and contains a large closet. The bath room and the other bedrooms are in a wing containing the sewing quarters.

Tight Houses

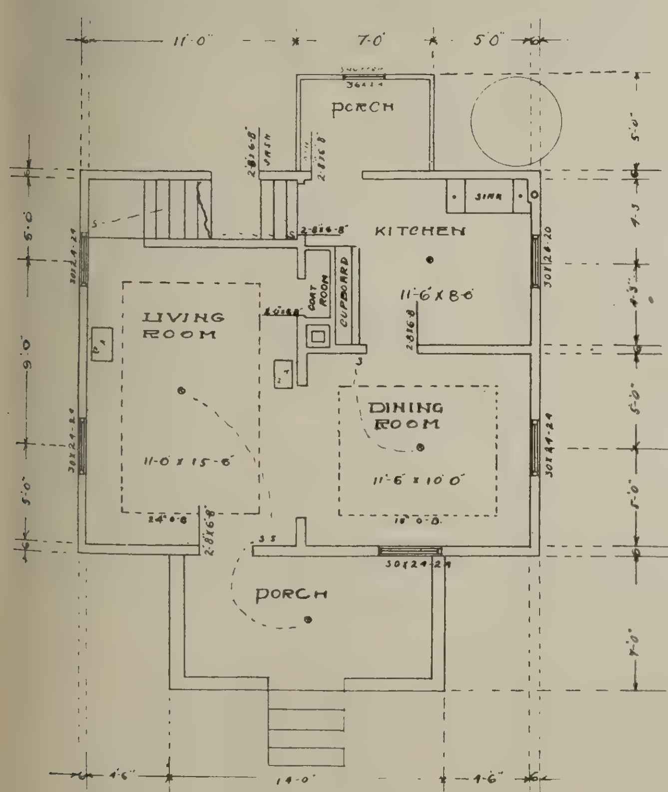
A tight house means a warm house—usually; but no house will be warm where there is infiltration of cold air. This infiltration is largely through the window and door crevices. Weather-stripping is one of the solutions, a small investment that pays big dividends to the customer and is always a profitable job to the enterprising builder.

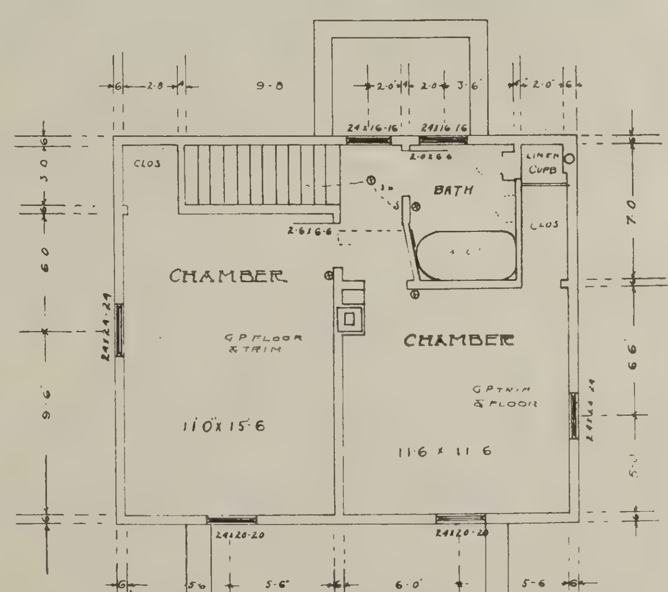
Overcoming House Shortage in Jackson, Michigan

JACKSON, Michigan, now has a population of about 47,000, and a house shortage of about 1000 homes. Three years ago, the Jackson Chamber of Commerce took up the matter of securing more houses, and, as a result, the Jackson Co-operative Realty Company was organized with a capital stock of $50,000. In 1916 this company built 45 houses which they rented at from $16 to $22 per month. Herman R. Graf, an architect of Jackson, drew the plans and had the general supervision of operations, as he has had ever since.

Last year 56 houses were built, and contracts have now been let for ten houses

Showing the central houses in a panoramic photograph. Architect Graf is in the foreground. The right and left panoramic views of the houses appear on the page following





Typical floor plans of the development of the Jackson Co-operative Realty Co.

Right-hand view of panorama of housing development at Jackson, Mich.

Left-hand view of panoráma of housing development at Jackson, Mich.

more, making a total of 111 houses constructed or arranged for to date. But Mr. Graf asserts that the interest stirred up by the building operations resulted in many others going into house building, so that the total number of houses erected during the first 12 months of the company's existence was 817. These first houses cost around $1600 to $2500, and the same kind of houses are now costing around $3500 each.

The capital stock of the company has been increased to $200,000; and the houses are now being sold on the basis of ten per cent down and one per cent a month on the balance. The capital stock subscribed is expected to pay 6 per cent, but it is to be used as a revolving fund. But due to a rise in values of the first houses before being sold, they increased in value to such an extent that a dividend of 24 per cent was declared last year, a rather unusual proceeding with a housing association.

There were 950 houses built in Jackson last year, a large part of which, Mr. Graf says, were due to the interest created by the co-operative company.

The increase of labor population has, however, been such that Jackson is still in need of 1000 more houses.

Building in Philadelphia

Building in the city of Philadelphia is almost at a standstill at the present time, and conditions are growing worse. Building during the month of November maintained the low level. Seven hundred and ninety-two permits were issued, covering 847 operations at a total estimated cost of $2,303,445 during November. This compares with 1013 permits, 1082 operations, at a total estimated cost of $2,590,865 during October, the preceding month. Compared with November, 1919, this year's record falls far short, 937 operations having been undertaken that month at a total cost of $9,468,620. To date this year only 1235 homes have been erected or are now under way, and it is evident that the city wi end the year with approximately only on quarter its normal housing requiremen fulfilled. Prior to 1917 the average numb of dwellings erected was 7150. The ave age for 1917, 1918, 1919 and 1920 is 255 a falling off in average of 4600, whic makes a total falling off the past fo years of 18,400. Allowing that there wa a surplus of dwellings prior to 1917 c probably 6000 or thereabout, if there we 12,000 erected now, in addition to yearl average, the 12,000 being properly distri uted would take care of the situation. A though many new houses are being erecte the housing situation is far from adequat to cope with the ever-increasing populatio of the country's third largest city.

YOU'D HARDLY RECOGNIZE TH PLACE

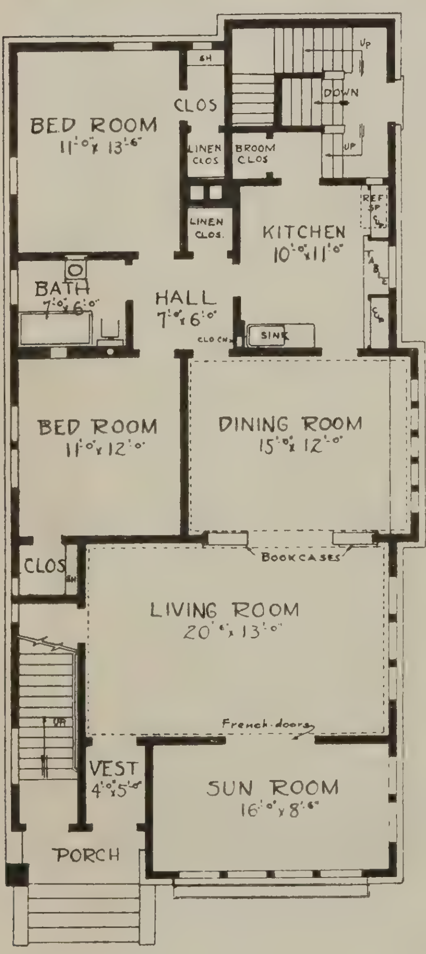
(From the Bloomington Pantagraph)

F. D. Wickery is having his house re modeled by having a new chimney put on i

APARTMENT BUILDINGS
APARTMENT HOTELS

A Two-Apartment Building

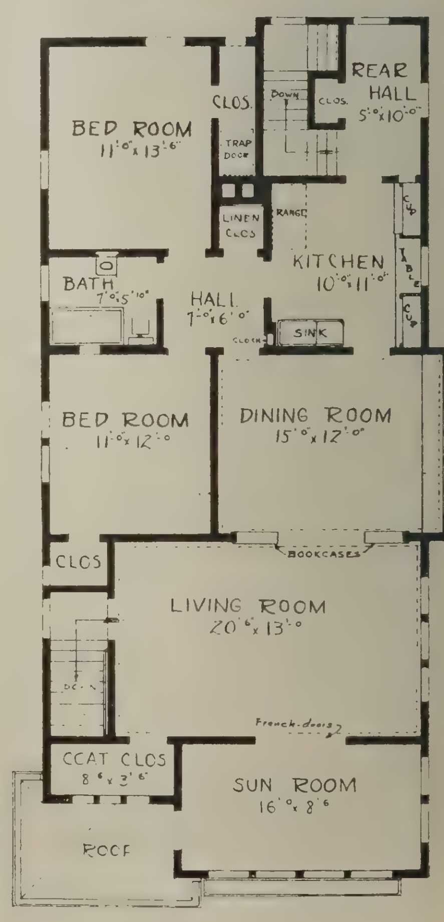
A Two-Apartment House. Dale C. Swain, Architect, Minneapolis, Minn.



A TWO-APARTMENT or duplex house represents one of the most profitable realty investments that can be made. Such buildings are suitable for either small towns or large cities, and if properly built and maintained provide a constant and sure source of income to the owner.

In most buildings of this type the owner lives in one apartment and rents the other; in other cases two families have joint ownership in the building. Then there are the cases in which the building is built purely as an investment proposition and both apartments are rented. In any case the economic advantage of having two dwellings under the same roof and on the same foundation is clearly evident. It does not require demonstration to convince one that a single building of this type is cheaper in both first cost and in upkeep than are two separate cottages.

A common error in building houses of this type is to build them too cheaply. Low cost is of course important in any building built for investment purposes, but low first cost does not always result in future profit. If the construction and materials are shoddily cheap the upkeep costs will often wipe out profits, and in fact show as a loss within a few years. Even the most careful tenants are not concerned with preserving the appearance or usefulness of apartments that are of an unduly cheap character.



Shoddily built apartments result in excessive repair bills and the loss of desirable tenants, the two factors that may almost invariably be held to account for lack of profit to an owner.

The two-apartment shown by the accompanying illustrations is located in Minneapolis, Minnesota, and was designed by Dale C. Swain, architect of that city. It is 26 feet wide by 56 feet deep.

The construction is of hollow tile, stuccoed, with a brick base and concrete foundation. Each apartment contains five rooms, a bath room and a sun porch. There is a double garage in the rear, and a full basement contains separate heating plants, laundries and so forth.

There is a common entrance porch with one door leading to the second story stairs, and another to the first story vestibule. The vestibule leads directly into the living room, and the living room, dining room and sun porch are connected by wide openings. Two bedrooms and a bath room open from a hall which also opens into the kitchen and the dining room. The hall contains a linen closet and a clothes chute leading to the basement. The kitchen contains a built-in table and cupboards and an outside icing refrigerator.

The enclosed rear porch is a good feature of this house and should be more generally provided. Such porches are more likely to be kept clean and the offer protection from vagrant animals,—two-legged and otherwise,—as well as conserving heat in winter. A grade line entrance leads to the porch which contains the back stairs and the stair to the basement. A convenient broom closet is located on the porch.

The second floor plan practically duplicates that of the first floor. A large coat closet opening from the living room and a larger rear porch on the second floor are the only important differences.

A New Angle to Apartment House Design

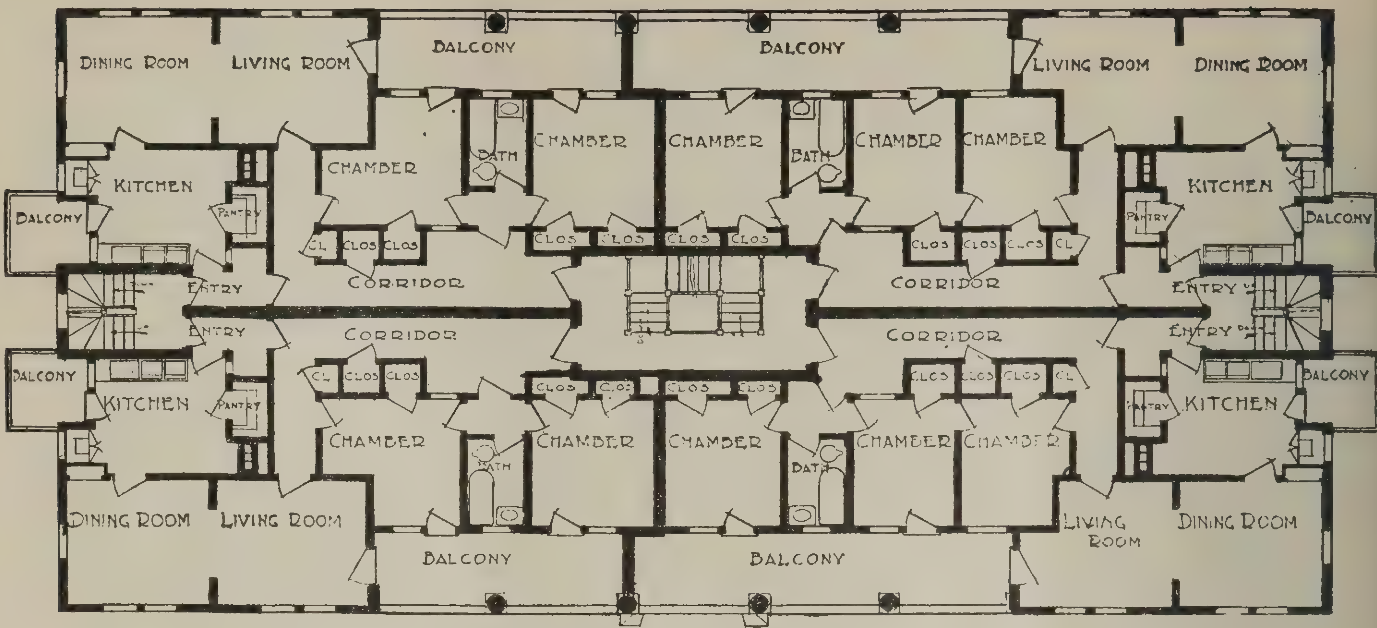
THE back yards of apartment houses usually run to one of two extremes. They are either an eyesore to the neighborhood or are conspicuous by their absence. In either case a bad influence is created and it is time that designers and owners of apartment houses should recognize the fact and make a sustained effort to correct it.

The apartment houses at Forest Hills, Mass., designed by Kilham & Hopkins, architects, for the Boston Dwelling House Co., offer a conspicuous example of the results that may be expected when an effort is made to overcome the unsightly back yard features that are commonly ignored by designers as well as owners.

In these apartment houses the rear elevations are the same as those along the street front. Grass and shrubs replace the bare waste of the usual back yard, and brick walks and garden seats replace the depressing influence of tight fences and piles of junk.

The economic value of such a treatment is self evident, as there is no objection to the principal rooms overlooking the rear.

View of co-operative gardens in the rear of the apartment houses



The plan, therefore, becomes much more flexible and permits a more desirable arrangement than is possible where all of the principal rooms must be on one side only.

The buildings as a whole offer a refreshing contrast to the many "flashy" designs that are so often associated with this type of building.

The long porticos flanked by the plain projections at each end give interest to the facades without resulting in loss of dignity. The planting adds immensely to the charm of the buildings which might otherwise have a somewhat severe appearance.

A typical plan of the first and second floors is shown. Each floor contains two six-room and two five-room apartments. Each apartment, as well as the stairs, are surrounded by masonry walls to reduce the fire hazard.

The arrangement of the apartments are in accordance with modern practice, with the bedrooms and bath grouped at one end and the living-room, dining-room and kitchen at the other. This makes a much more desirable arrangement than the old method of placing the bedrooms between the living-room at one end and the dining-room and kitchen at the other. The generous number of closets is no doubt appreciated by the tenants whose needs in this respect are often ignored.

The entire group of apartments covers an area of six blocks and comprises a very distinct improvement to the neighborhood.

National Board for Jurisdictional Awards

The National Board for Jurisdictional Awards at its December meeting rendered the following decisions:

Metal Floor Domes

In the matter of the controversy between the Sheet Metal Workers, Lathers and Carpenters over metal floor domes, it is decided that the placing of metal floor domes, whether temporary or permanent, whenever supported by wood props or other wood supports and used as forms for concrete construction, come within the jurisdiction of the Carpenters.

Electrical Work on Elevators

In the matter of the dispute between the Elevator Constructors and the Electrical Workers on the question of all electrical work on elevators, it is agreed that the electrical work involved in the installation of signal systems, fans, telephones, electric light fixtures and illuminated thresholds and electrical interlocking devices except on automatic elevators, and feed wires to the controller is awarded to the Electrical Workers.

Hollow Metal Doors and Trim

In the matter of the controversy between the Sheet Metal Workers and Carpenters over hollow metal doors and trim, it is decided that the hanging of such doors, except sliding doors, the installation of the door frames, the placing of the trim around door or other openings and the placing of all other metal trim, is the work of the Sheet Metal Workers whenever the metal is of No. 10 gauge or lighter.

Hollow Sheet Metal Window Frames and Sash

In the matter of the controversy between the Sheet Metal Workers and the Carpenters over hollow sheet metal window frames and sash, it is decided that the setting of hollow metal window frames and the hanging of hollow metal sash, when such frames and sash are made of No. 10 gauge metal or lighter, is the work of the Sash Metal Workers.

Metal Forms for Concrete Columns

In the matter of the controversy between the Sheet Metal Workers, Carpenters and Iron Workers over metal forms for concrete columns, it is decided that the setting up of such forms of No. 10 gauge metal or lighter is the work of the Carpenters, and when heavier than No. 10 gauge it is the work of the Iron Workers.

It might be noted that the decisions of the National Board in re hollow metal doors and trim and hollow sheet metal window frames and sash were rendered by the board notwithstanding the refusal of the carpenters to be present or to be represented.

These two matters were first set for hearing at the meeting of the board last March and was postponed by request of the carpenters until the May meeting. At the May meeting the matter was again postponed at the request of the carpenters until the August meeting. At the August meeting it was again postponed until the December meeting, at which time the carpenters again insisted on having the matter further postponed. The board after matured deliberation, however, ordered the hearing proceeded with, with the result as above noted.

The Chicago grand jury is working on the theory that high building prices have been caused by a monopoly by building organizations. It is asserted that an artificial wall has kept all but Chicago-made articles off that market.

Apartment Hotels

THE apartment hotel saw its first development in the tourist centers of the West Coast. They were the outgrowth of a need for living quarters that would offer a compromise between the service rendered to transients by hotels and the accommodations offered to permanent tenants by apartment houses and flats. Briefly, the problem was to provide living quar[illegible] permit cooking and so forth to be done; keeping in mind the fact that the tenants would not be subject to long leases. The apartment hotel offered such a compromise between the hotel and the apartment house and speedily grew in favor.

Fig. 1—Apartment Hotel at Oak Park, Ill.

As the servant problem became more acute and building costs began to rise, the need for more compact apartments become apparent throughout the country. The old type of 6- or 8-room apartment required a large outlay of money without a corresponding return (until lately) in rent. Many tenants objected to them because of the expense of furnishings coupled with the cost of the hired help that was almost a necessity in the household work. Therefore the apartment hotel idea began to gain followers throughout the country and at the present time this type of building is rapidly growing in favor.

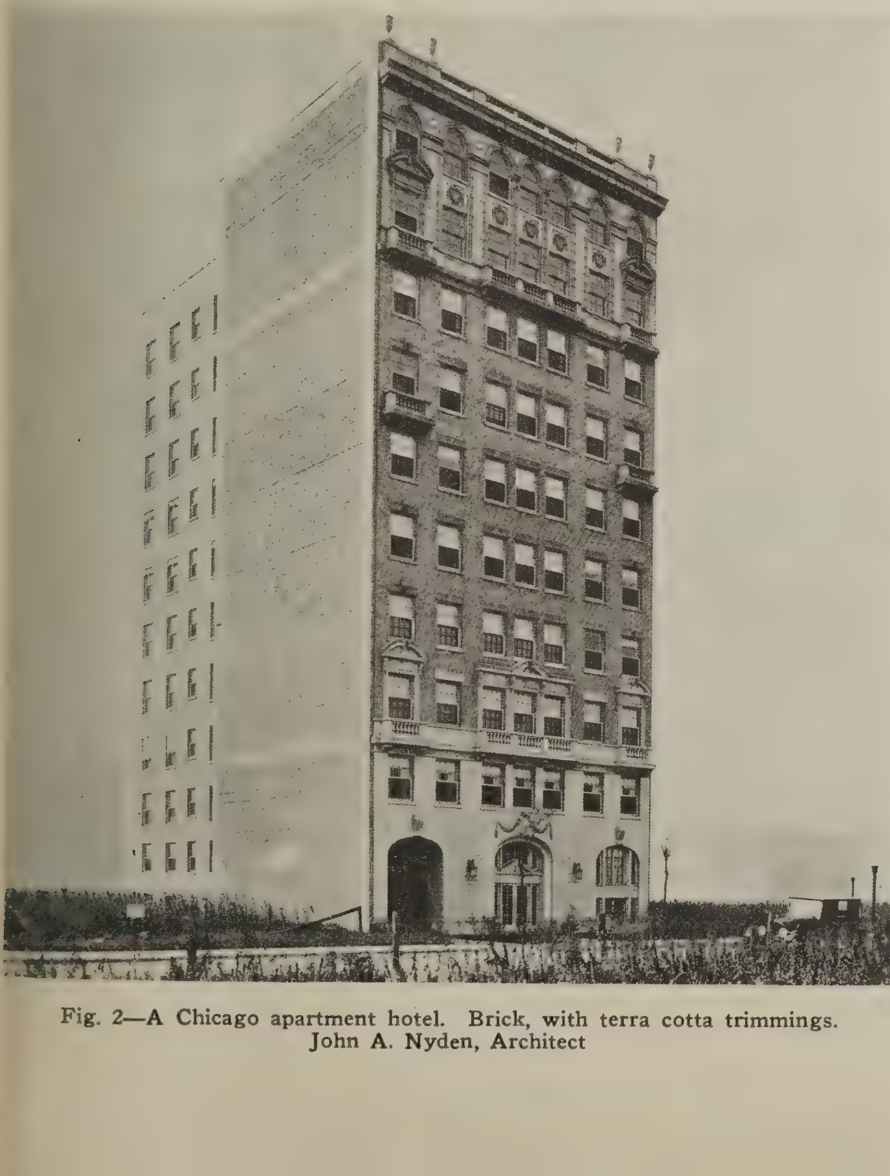


Fig. 2—A Chicago apartment hotel. Brick, with terra cotta trimmings. John A. Nyden, Architect

Of course the apartment hotel with its restricted space will not entirely supplant the regular apartment house or flat building. There are, however, a sufficient number of people—such as young married couples, elderly people, families without children, business women, students and so forth—to create a genuine demand for the more compact type of apartment offered by the newer type of building.

The apartment hotel is divided into suites which usually contain one, two or three rooms with bath. In most cases a combination kitchenette and dining alcove are provided for each suite, but sometimes this feature is omitted, at least in a portion of the suites. In some apartment hotels the suites are let completely furnished, in others the tenant provides his own furniture. This, of course, depends largely on local custom and demand.

There is no fixed size nor degree of expenditure for apartment hotels. They vary from the two-story building of modest character, to the skyscraper of many stories with luxurious equipment and furnishings. In the larger examples every convenience and service of the modern hotel is available to the tenants, and the rentals charged sound like a clearing house statement.

The arrangement of the suites or units, however, is similar for both large and small apartment hotels. Compactness is of course a prime essential and has brought forth much ingenuity in making one or two rooms perform practically all of the services of a half dozen.

The manifold services that apartment hotel rooms are called on to supply have been made possible only through the perfection of space-saving equipment. Built-in features that may do double duty or be entirely concealed and put out of the way when not in use, play an all-important part in making such living conditions practicable and agreeable.

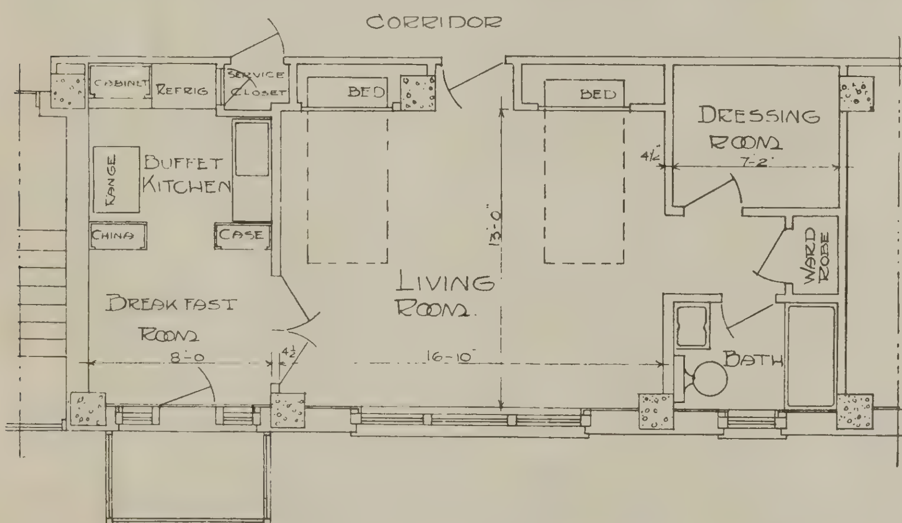
Tables, ironing boards, and even telephone stands and seats are now built so that they may be folded into a shallow wall cabinet. One of the latest developments is the cabinet or buffet kitchen. These are built of steel and may be entirely hidden behind folding doors when not in use. They are only a couple of feet deep by six or eight feet wide, and contain every essential of a complete kitchen—sink, stove, refrigerator, kitchen cabinet and all. They may be had in several styles, some of which include a service door opening into the hall so that deliveries may be made when the tenant is absent. Some also have the outside icing feature for the refrigerator.

Fig. 3—The "Linden," Oak Park, Ill. Brick, with cement stone trimmings. J. S. Van Bergen, Architect

Few apartment hotels provide a laundry for the use of tenants. Some of them, however, have combination sinks and laundry tubs so that a few pieces may be rubbed out. A drainboard covers the tub when the latter is not in use.

Wall beds are another of the modern developments that have made apartment hotels practicable. By their use the living room by day becomes a bed room at night, thus accomplishing full 24-hour service. There are several types of wall beds on the market, but the basic principle of all is the same; that is, to provide a comfortable, safe bed that may be whisked out of sight without much exertion, thus making the room quickly available for other uses.

One type of wall bed is mounted on an oscillating arm and folds up against a wide door. The door is then turned and the bed swings into a shallow closet. Another type of wall bed is mounted independently of the door and may be folded up and



Typical apartment hotel suite

Fig. 5—When the doors are opened the kettle begins to sing

Fig. 4—A buffet kitchen is entirely concealed when the doors are closed

Fig. 6—This type of wall bed may be rolled to any part of a room

Fig. 7—Another type of roller mounted wall bed does not fold up

Fig. 8—The bed in Fig. 7 looks like this when not in use

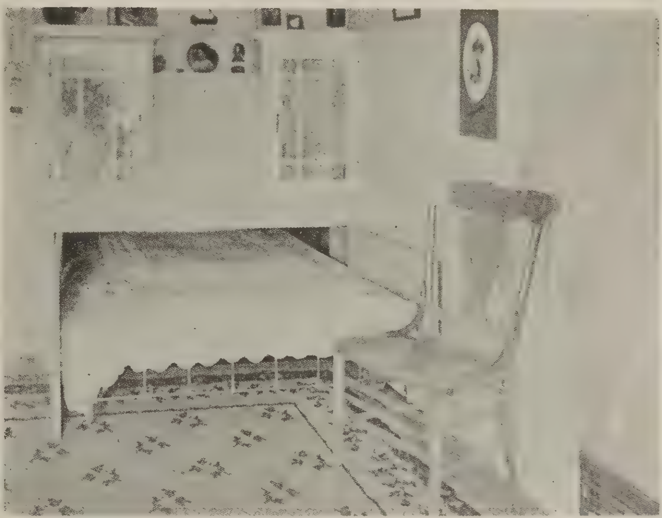


Fig. 9—Or it can be entirely concealed by a feature like this

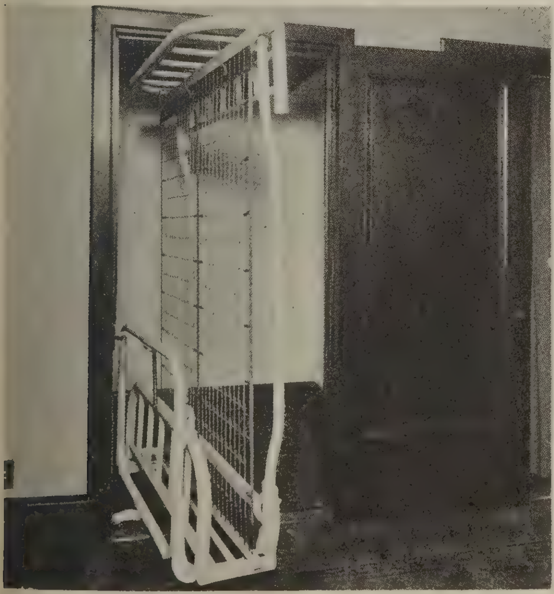


Fig. 10—This type swings out of a recess or closet into position

Fig. 11—Pivoted on a door, buffet or bookcase with a dressing nook in the recess, this type is popular

swung into the closet without closing the door. Then there is a type mounted on rollers so that it may be rolled from the closet to any portion of the room. There are two styles of this bed, one of which has rollers at one end and may be folded up when not in use, the other does not fold and has rollers under each leg—caster style. For concealment the latter style requires a wide, low space rather than a closet.

In many cases garbage incinerators are provided for the disposal of garbage. Chutes lead from each floor to the incinerator in the basement so that waste is easily disposed of in a cleanly manner. In other cases the tenants are supplied with waxed paper bags to contain the garbage. These are collected at intervals by the janitor.

Dumb waiters are almost a necessity in such buildings. Each dumb waiter may be arranged to serve two suites on each floor, or may open into a hall or passage serving a larger number of suites on each floor.

Elevators are necessary if the building exceeds three stories in height. The automatic type of elevator that does not require a regular operator is popular for use in such buildings.

It should be borne in mind that storage facilities for such unsightly articles as brooms, mops, trunks and so forth must be provided, as the average suite offers about as much privacy as is enjoyed by the well-known goldfish. Every nook and corner are exposed to the gaze of the visitor or guest and there are no natural means of concealment such as are offered by a large apartment.

The accompanying plan shows a typical layout for an apartment hotel unit using twin beds. The suite is complete, with living-room, buffet-kitchen, breakfast-room, dressing-room and bath. The kitchen and the breakfast-room are really one long room, separated only by the china cases which do not extend to the ceiling. The service-closet between the corridor and kitchen is characteristic of apartment hotel suites, but is frequently larger than is here indicated.

Concrete Block Foundation Walls

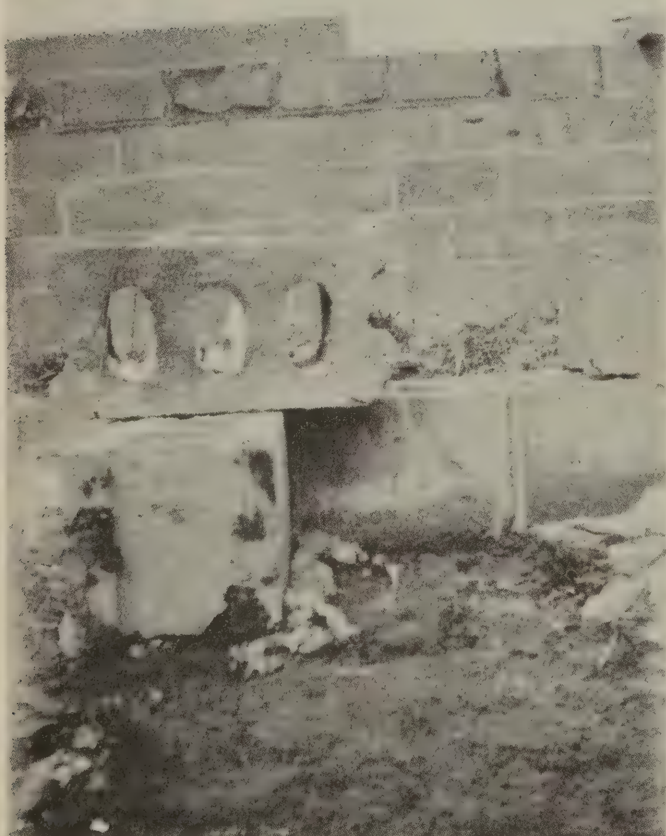


Fig. 1—A concrete block wall lays up rapidly and no form-work is required

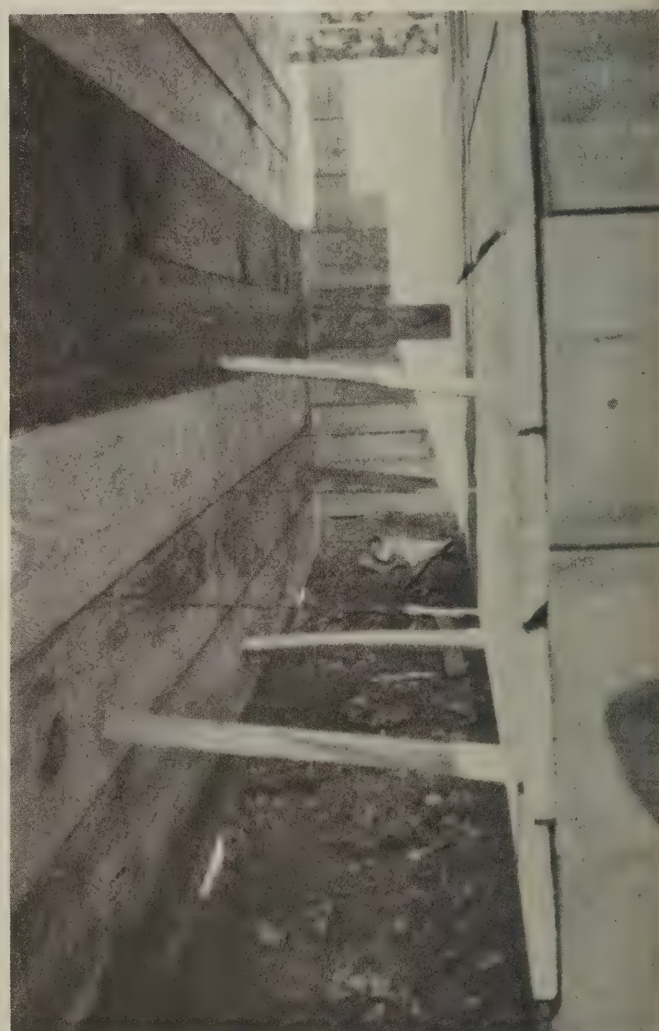


Fig. 2—Expensive form-work is quite an item, especially when used for small foundations

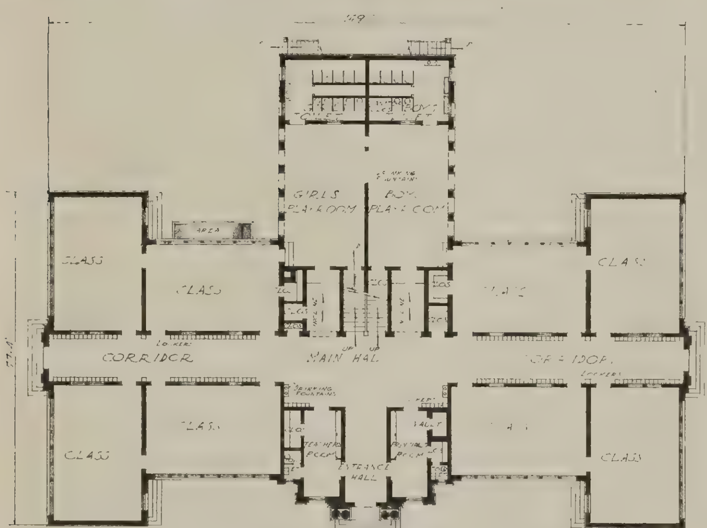
One advantage of concrete blocks as compared to solid concrete for foundation walls is due to the fact that form work is not required when blocks are used.

Considerable objection to the use of concrete blocks for foundations has been caused by the fact that walls built of them have been too porous and likely to allow water to penetrate the basement. This fault is due to poor materials and workmanship and not to the mere fact that concrete blocks have been used and may be avoided by the use of first class blocks properly laid up in cement mortar. Ease of construction often leads to neglect of details.

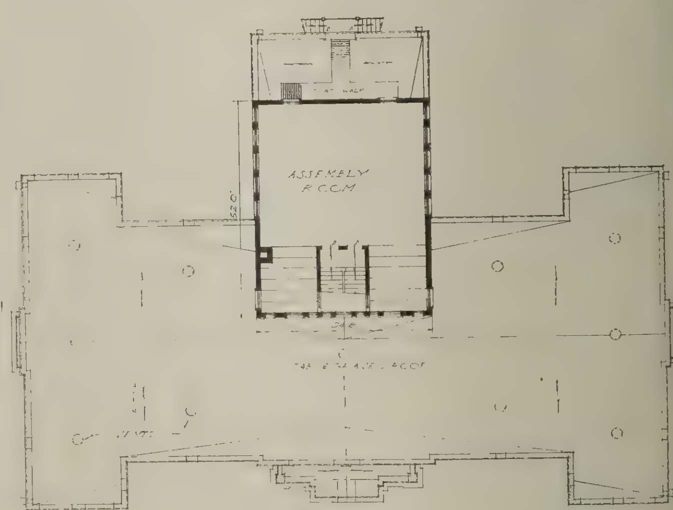
SCHOOLS AND CHURCHES

A One-Story School

The James F. Helms school, Houston Heights, Texas. Fred C. Teich, architect



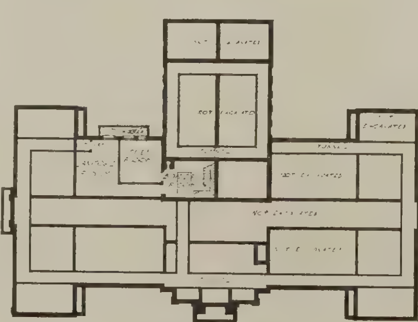
FIRST FLOOR PLAN



SECOND FLOOR & ROOF PLAN

THE chief advantage claimed for the one story school as compared to the "upstairs" type, lies in the comparative freedom of the former from the fire and panic hazards of the latter. Also the danger of falling on stairs is removed, and children are said to be more contented when they can view the surroundings from ground floor windows.

Against these claims may be set down the added cost due to the increased ground area required by a one story school. This, however, becomes a really serious consideration only in cases where land values are high or where the available property is confined to a restricted space.



Many experienced authorities claim that the lighter construction of one-story schools overcomes any tendency toward greater cost of construction and that heating and ventilating problems are no more difficult nor expensive than for corresponding "upstairs" schools. It is also pointed out that frame construction may be used for one-story schools where masonry is required for the "upstairs" type.

The accompanying illustrations show a one-story school at Houston Heights, Texas, designed by Fred C. Teich, architect.

The exterior walls are of hollow tile faced with brick. The trimmings, including the columns at the main entrance, are of cast cement stone. The roof is of felt and gravel and all windows are of wood with wood muntins. The floors are of concrete laid on earth fill, with reinforced concrete slabs over the heating plant, ducts and so forth. The interior partitions, roof framing and so forth are of wood construction.

There are eight class rooms, each 21 by 32 feet in size and lighted by windows in one wall. Coat rooms are omitted in the class rooms and individual double-deck steel lockers in the corridors are used instead. This scheme simplifies the class room arrangement and ventilation. The class rooms and the corridors are provided with galvanized iron roof ventilators. The space between the ceilings and the roof is ventilated by metal grilles placed in the exterior walls. The corridors and class rooms have cement wainscots and the corridors are lighted by means of borrowed lights in the partitions.

The exit facilities are excellent. The class rooms open into wide corridors with doors at each end. At the center they are connected by the main hall which also has exits on two sides. In addition to this, all but two of the class rooms have direct outdoor exits, and each pair of class rooms has a communicating door for emergency use. Thus each class room has at least three means of exit, two of them have four, a quite unusual and desirable feature.

The main entrance hall opens into a teacher's room on one side and the principal's room on the other. Each of these rooms has a large bookcase, a private toilet and a large closet. The principal's room contains a fireproof vault for records and so forth.

Drinking fountains, vacuum cleaner outlets, the main panel board, fire hose cabinets and the fire alarm system are located in the main hall or the corridors.

Two inclined passages lead from the main hall to the playrooms. A janitor's closet opens from one of the passages. Additional closets open from the main hall, from the boy's playroom and from two of the class rooms. These closets are useful for storing supplies and equipment.

Two open air playrooms,—one for girls and one for boys,—separated by a brick partition, are located at the rear portion of the building. Each has a cement floor and is provided with drinking fountains. Open air covered playrooms have found much favor for the use of small children, and for larger ones too during bad weather.

The playrooms in this school also serve as covered passages to the separate toilets which are placed at a distance from the class rooms. This scheme of isolating the toilets also has value in simplifying the ventilation problem. In each toilet room the water closets are arranged in two lines, back to back, with an enclosed passage between so that repairs and adjustments may be readily made. The boys' toilet contains trough urinals and a janitor's closet in addition to the water closets and lavatories.

The school auditorium is placed above the playroom. Thus this portion of the building is two stories in height which obviously is in opposition to the principles underlying the one story school idea. In this instance, however, the auditorium is provided with four means of exit, the two at the rear being direct exits to exterior fire escapes, and the two at the front leading to the main hall. Also the playrooms beneath should not contribute to the spread of fire, so that the auditorium may be considered relatively safe from fire hazards. In any event this scheme no doubt simplifies the plan.

The auditorium is well lighted and ventilated by large windows in three walls. Banks for raised seats are provided on each side of the main stairs at the rear of the auditorium.

The heating plant, fuel room and janitor's work room and toilet are located in a small portion of the basement, excavated for this purpose. These rooms are reached by a stair from the girls' playroom, and are lighted by windows in a wide area. The passage between the boiler room and workroom is lighted by borrowed light from the fuel room.

Street Entrances

Entrance gateways are often used with the intention of adding distinction to a street. If well done they are no doubt effective for this purpose, but if cheaply constructed and poorly designed they cheapen rather than improve the appearance of the neighborhood.

Fig. 1 shows one of the two pylons that mark the entrance to a residential street in New Orleans. The pylons are well designed masses of cut stone and brick, some six feet square and 16 or 18 feet high. A niche with a fountain features one face, and a curved wall with a seat forms a part of the design.

Fig. 2 shows an entrance to a street in Chicago. Here the scale of the design is poor and lacking in impressiveness. In fact, the character of the neighborhood does not suggest a need for such features and their omission would be beneficial.

Fig. 1

THE INCORRIGIBLE 'OPKINS

Foreman—'Ere, do you know 'Opkins carries twice as much as you at a time?

Workman—Yus. I've told 'im abaht it, but 'e *will* do it.—*Windsor.*

Fig. 2

A Modern School Building

THE problem of schoolhouse design grows more and more complex. Not so long ago a school design involved only the class rooms, perhaps an office for the principal, and maybe a heating plant and toilet facilities. Except in a few of the larger cities there were no rules nor any restrictions governing the planning and the construction of such buildings. In fact, anyone could—and frequently did—design a schoolhouse. The result was no better nor worse than could be expected under such conditions. Fire traps were the rule, unsanitary conditions were ignored, and the efficiency of the students and instructors was handicapped from beginning to end.

Of course we have much further to go in the development of schoolhouse design, probably a "standard design" for such buildings will never be evolved, but we are beginning to recognize the scope of the problem and realize its importance.

The growth of community organizations with the consequent need of suitable meeting places for their use has led to the introduction of another factor in the problem of schoolhouse design. A school does. or should, reflect the spirit of its community, and it is fitting and logical that it should house the public gatherings and activities of the neighborhood. By such use the public service of the school is enlarged and the building is rendered useful during periods when it would otherwise remain idle.

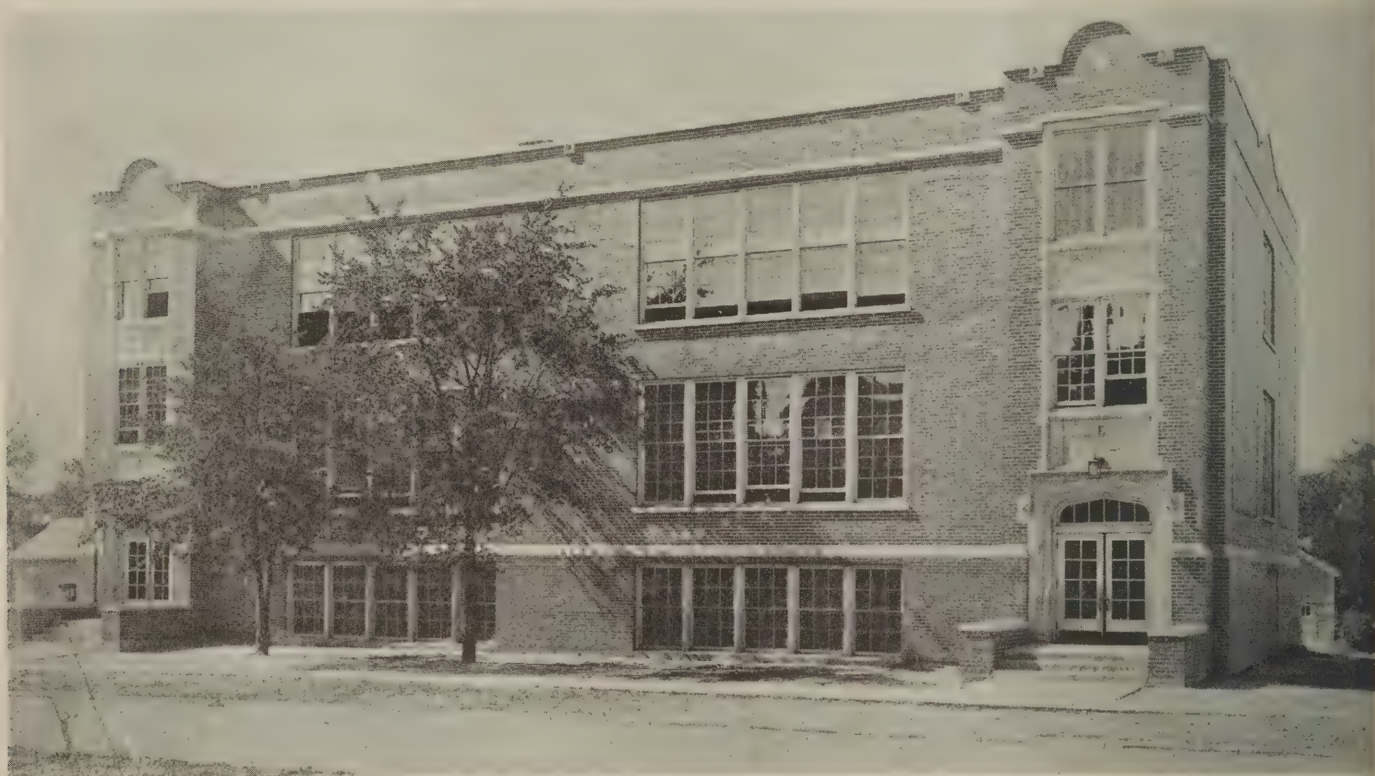
James R. and Edward J. Law, the architects of the Longfellow School at Madison, Wis., which illustrates this article, recognized the need of a community gathering place and provided for its incorporation in the design. In this case the community room or social center is combined with the play room, thus serving a double purpose. The community room, although not extremely large and lacking the stage usually considered necessary, serves the needs of the neighborhood under ordinary conditions. An auditorium in a nearby high school is available for the larger and more elaborate meetings and activities.

The exterior design of the building is clean cut and decisive. The walls are of brick with stone trim, sparingly used, resulting in a dignified appearance that is often lacking in so many buildings where the trimmings are used more lavishly, causing a "spotty" effect that is disagreeable and at the same time unduly expensive.

The building is planned so that it may be doubled in size by adding to either end when the need for such expansion arises. This is a point that is frequently overlooked, and its importance demands that it should receive more consideration by designers.

The basement may be said to have three levels, of which the heating plant occupies the lowest. This portion is entirely under ground and is reached by a stair from the fan room. The extra space gained and the attendant simplification of the plan is held to justify the slight additional cost of placing the heating plant in this location.

The next level is occupied by the social center and play room which is reached by means of short flights of steps near each end of the corridor. The remainder of the rooms are located on a level with the corridor.



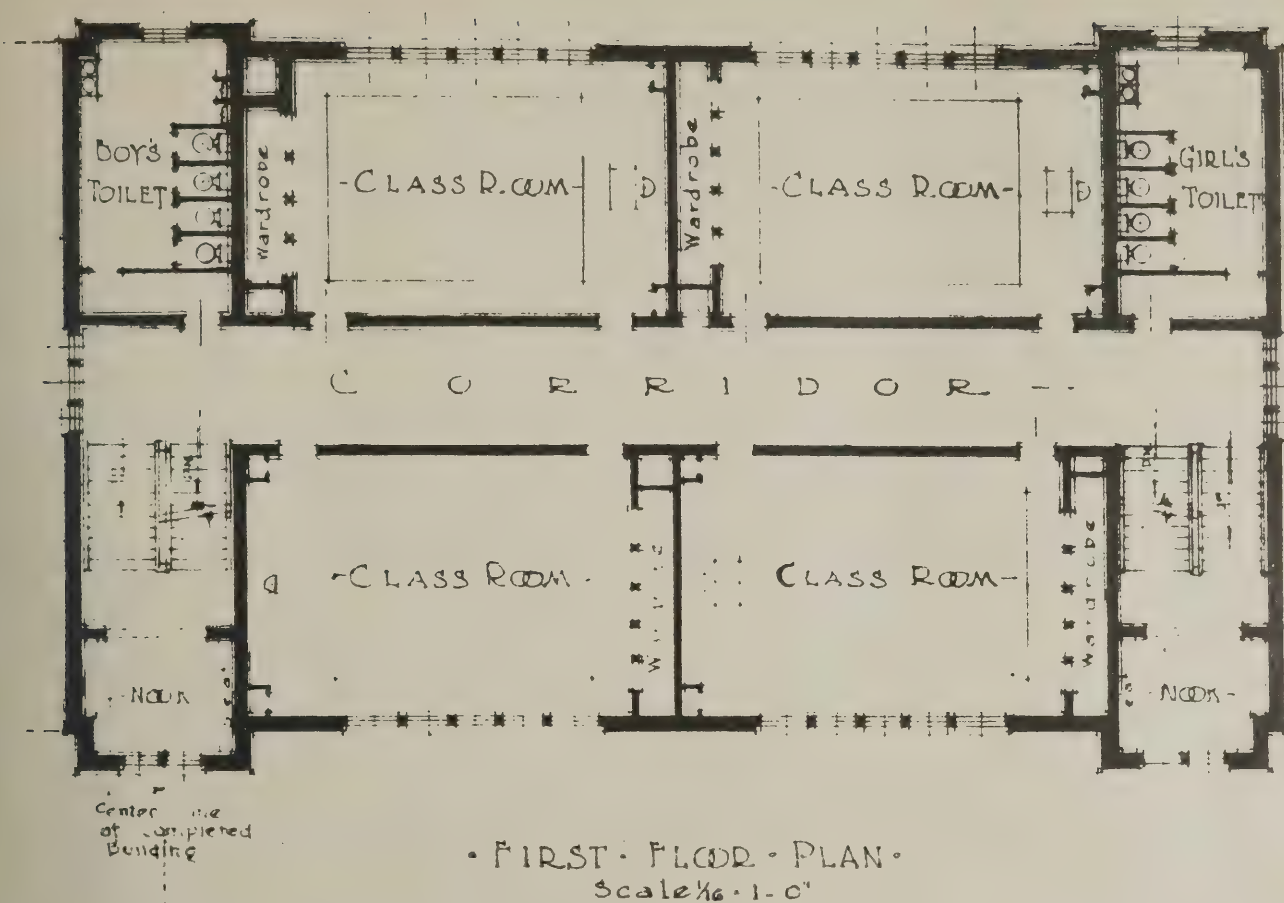
School building at Madison, Wis. James R. and Edward J. Law, architects

The manual training room is a large, well-lighted room along the front of the building. It opens into a space that is used for the storage of lumber.

A girls' dressing room with showers is located in one corner of the basement, and a boys' locker and shower room is provided under one of the stair halls.

Four class rooms and a toilet room for girls and one for boys are provided in each of the upper stories. Each class room contains a large wardrobe across one end and is lighted by the unilateral system with windows on one side only.

Study nooks are placed at the stair landings between the first and second floors. The principal's office and the teachers' rest room are over the study nooks and are reached by a short flight of steps from the second floor corridor.



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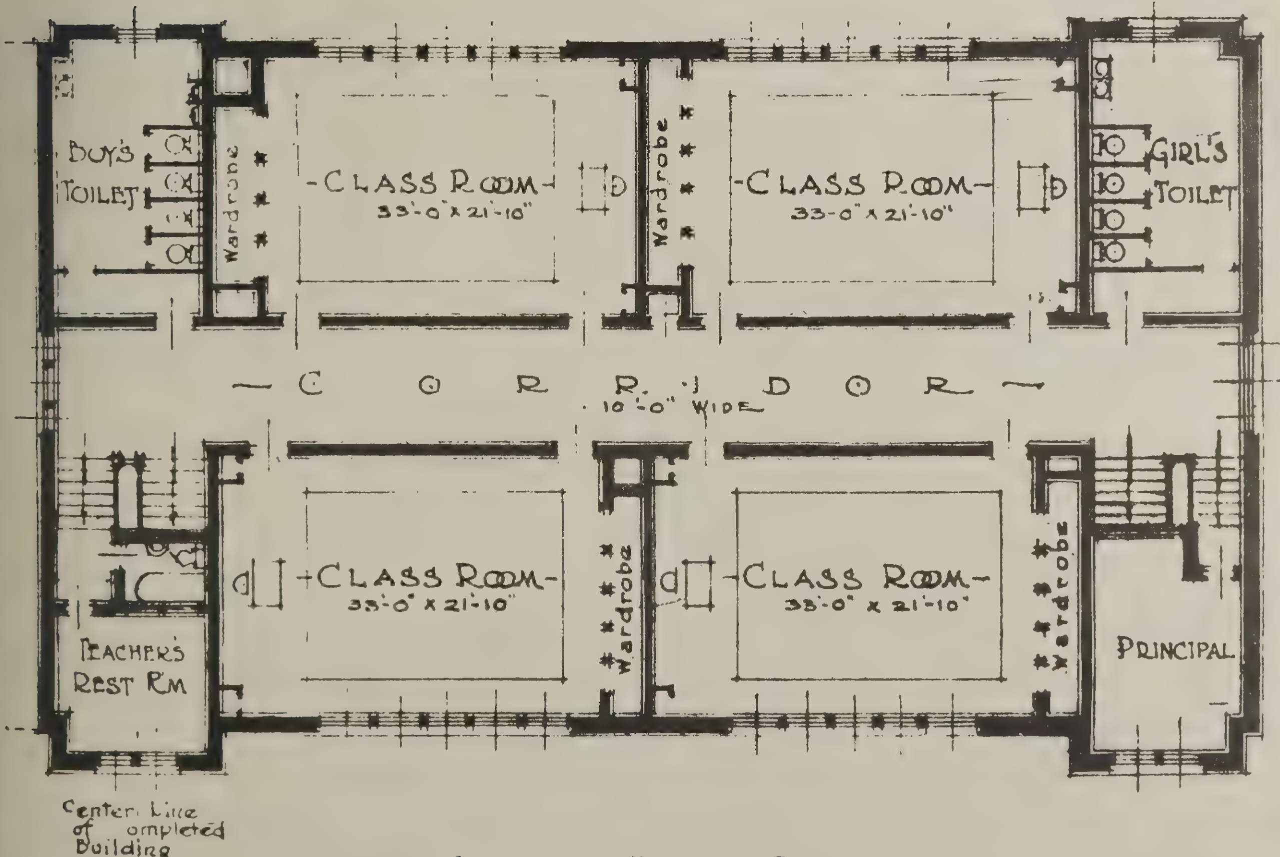

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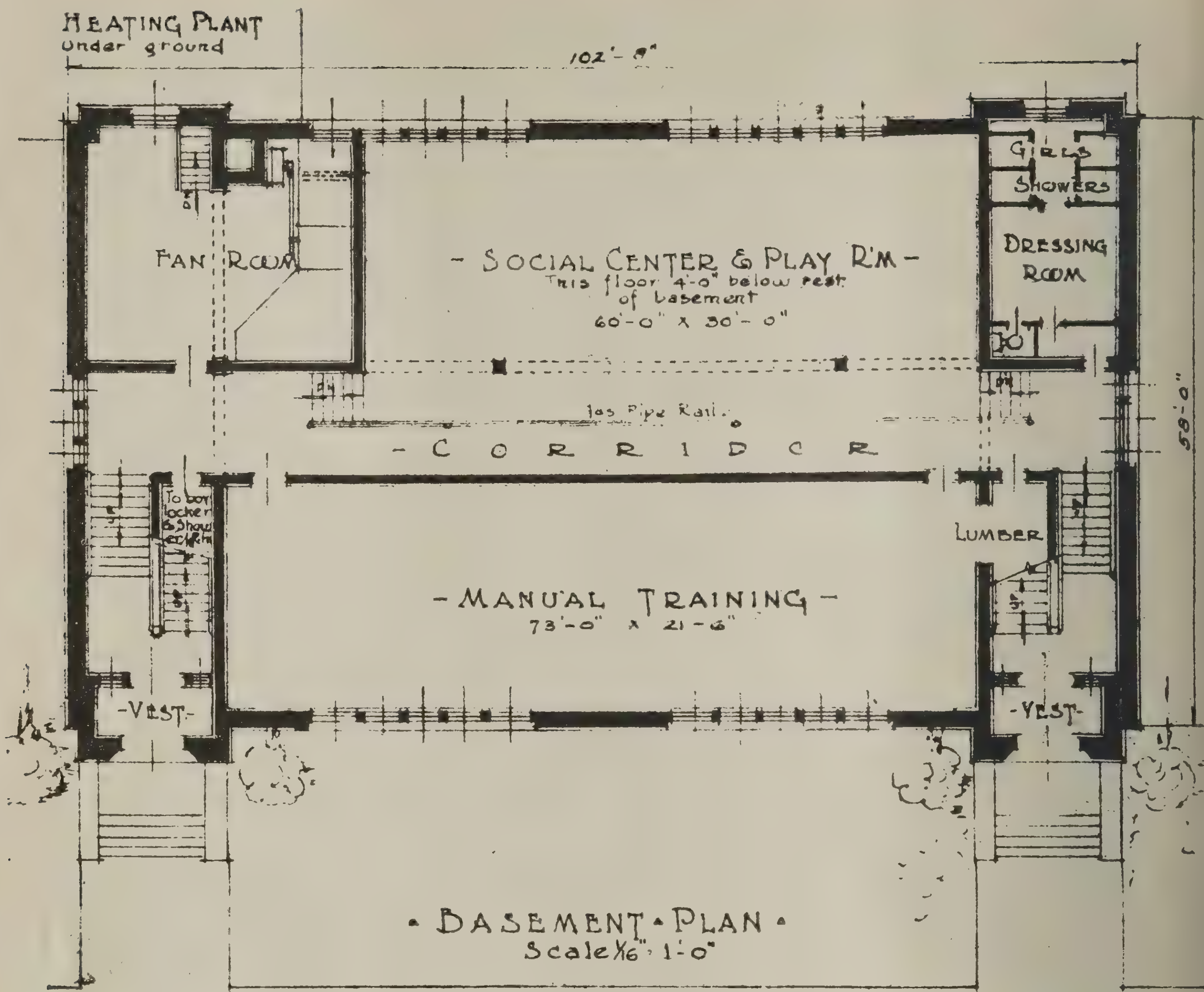


A Real Estate Office

Many real estate and building organizations engaged in subdivision work, maintain offices on or near the property in which they are interested. In some cases these are the only offices of the concern, while in other cases they are sub-offices under the general direction of a main office located in the business district. Considerable attention should be given to making such departments attractive, as prospective buyers are largely governed by first impressions and are more favorably impressed if consideration is shown to their taste and comfort throughout a visit.

The accompanying photograph shows a small real estate office in Albany Park, Chicago. It is of frame construction finished with stucco and stained trimmings. The roof is of prepared roofing laid parallel with the slope and the joints finished with wooden strips to break the monotony. The windows have shutters and benches are provided beside the entrance. The trellis screens with flower boxes add a decorative touch and prevent the small building from appearing insignificant.

A Union Church

AT present there seems to be a rather well developed tendency for the different churches to co-operate. In some cases this movement has resulted in the actual affiliation or amalgamation of different congregations.

This tendency is probably due to the apparent indifference of the public toward religious affairs, that is reflected in the comparative failure of the recent interchurch drive for funds. This public indifference may be permanent or it may shortly react, in any event it is at present a matter of serious concern to religious leaders. One remedy for the financial handicap involved seems to be afforded by a more or less extended union or federation of congregations and denominations.

The Elmwood Christian Church, Providence, Rhode Island, designed by Gorham Henshaw, architect, of that city, is the outgrowth of a union of the Broad Street Christian Church and the Elmwood Temple Congregational Church.

Each of these churches had an active and distinct history extending back for more than eighty years, but finally, after considerable negotiation it was decided that a union of the two congregations was desirable. It was felt that two churches representing denominations identical in policy and so nearly allied in spirit should be able to unite, thus creating a stronger organization with increased financial resources, and making for the conservation of means, time and energy.

Shortly after the union was consummated it was decided to build a new church to take care of the membership which was constantly expanding, and to provide adequate facilities for the Sunday school which was inadequately housed in various portions of one of the old buildings.

The edifice shown in the illustrations is the result. The extension is of brick, trimmed with cut stone. The roof is of slate and the wood trim is stained. The roof ventilation is of copper and its design is a vast improvement over the unsightly ventilators that disfigure so many buildings. All windows are of clear glass, set in metal bars.

There are two principal entrances to the building. One at a small porch leading through a vestibule into a small hall which opens into the auditorium and also into the parlor. A closet also opens from this hall.

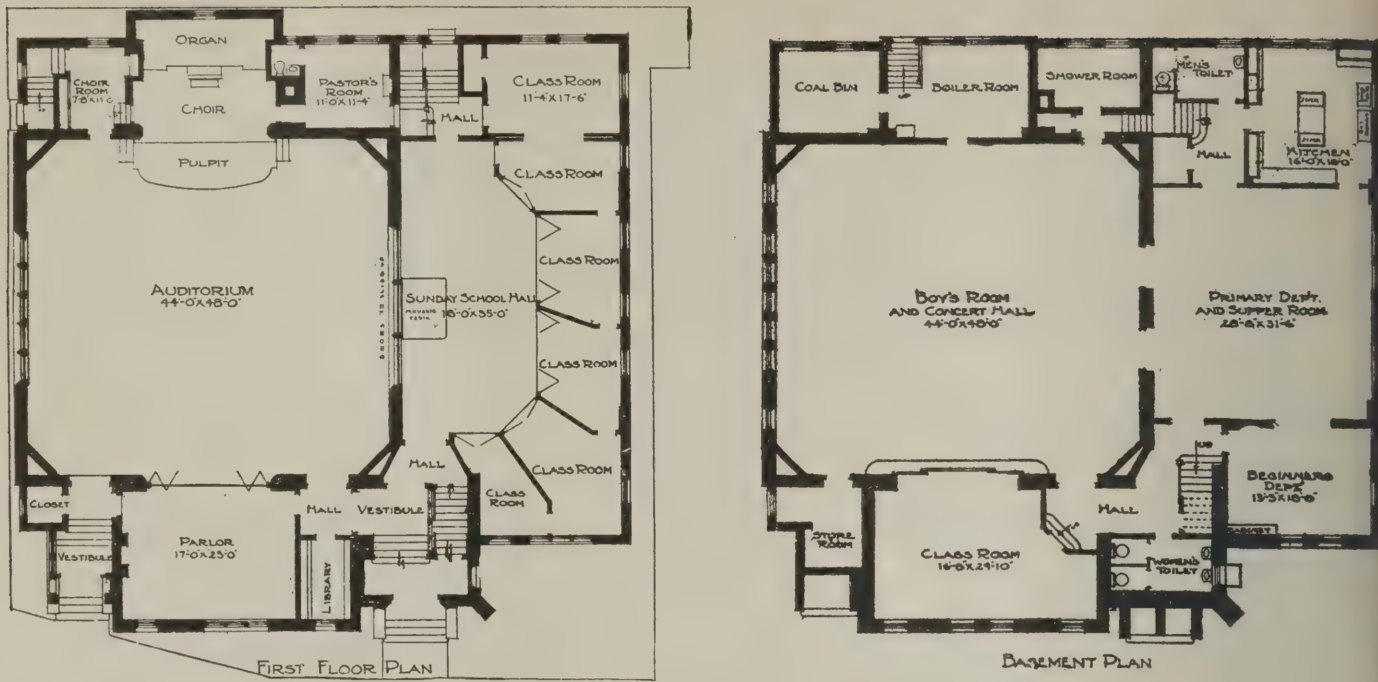
The other entrance is in the tower and opens into a vestibule which connects with short halls leading to the Sunday School rooms and the basement stair on one hand and to the auditorium, parlor and library on the other.

There is also a side entrance leading to the choir room and a rear entrance opening into the rear hall.

The parlor takes up most of the front of the building. It contains a fireplace and is separated from the auditorium by folding doors, thus making the parlor available to the congregation during overflow meetings. A small library with two walls lined with shelves adjoins the parlor.

The auditorium seats about 350 people and is separated from the Sunday School

A Union Church. Gorham Henshaw, Architect



Floor plan of Union Church, Providence, R. I.

hall by a rolling partition so that the two spaces may be thrown into one, when needed. The Sunday School hall contains six class rooms, the larger of which are provided with folding doors.

At the rear of the auditorium is the choir room, which is provided with music cabinets and a closet; the organ space, and the pastor's study, which has a connecting toilet. The rear hall provides an additional stair to the basement.

The basement contains a large recreation room for boys. This room may also be used for concerts and so forth, as it is provided with a stage. The stage is fitted with large sliding doors so that it may be closed off and used as a class room.

The basement also contains rooms for a beginners' department and for the primary school. The latter room may also be used for church suppers as it is connected to a well equipped kitchen containing steam tables, ranges, sinks, cabinets, refrigerators, and all up-to-date accessories for the preparation of food on a large scale.

The women's toilet and the men's toilet, a shower room, the boiler and fuel room and a storage room are also contained in the basement.

Both the congregation and the architect deserve commendation for the thoroughness in which they have dealt with this problem.

Forgotten Items

Forgotten items is forgotten money and a slow biller starts with cold feet and becomes a dead one.

Put not your trust in promises, but take a note—endorsed.

Let the chips fall where they may, but take the stove out.

Utilizing a Lot

The custom of setting public buildings in the middle of a lot seems well established. In many cases such a location is not at all necessary from a standpoint of plan nor because of the closeness of adjacent buildings.

A small library at the rear of a lot

Occasionally we find that better judgment is used and that the property is more fully utilized. Such a case is illustrated by the accompanying photograph in which a small library designed by Chas. V. Burgess, architect, of Lynn, Massachusetts, is shown.

Mr. Burgess wisely chose an ell shaped plan for the building and located it in the rear corner of the lot, thus giving the building a more dignified setting and at the same time providing a broad open space that will be very attractive when the planting is completed.

Building in British Columbia

An indication of restoring confidence comes in the announcement that the construction of University of British Columbia, Vancouver, B. C., will be commenced at once.

THEATRES

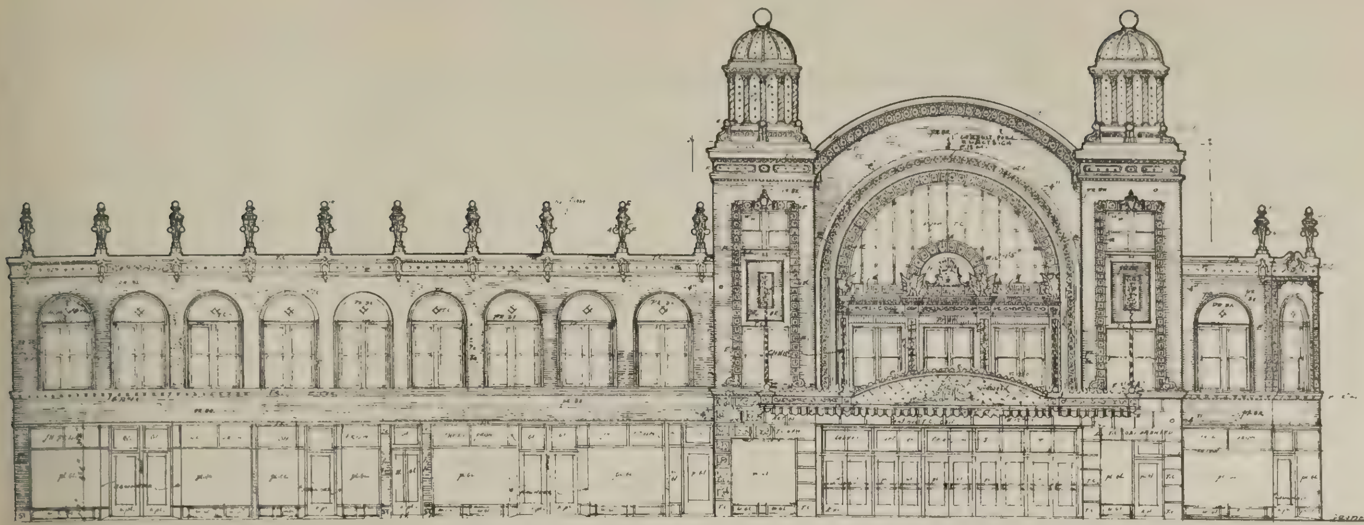
Moving Picture Theatres

Fifth Article

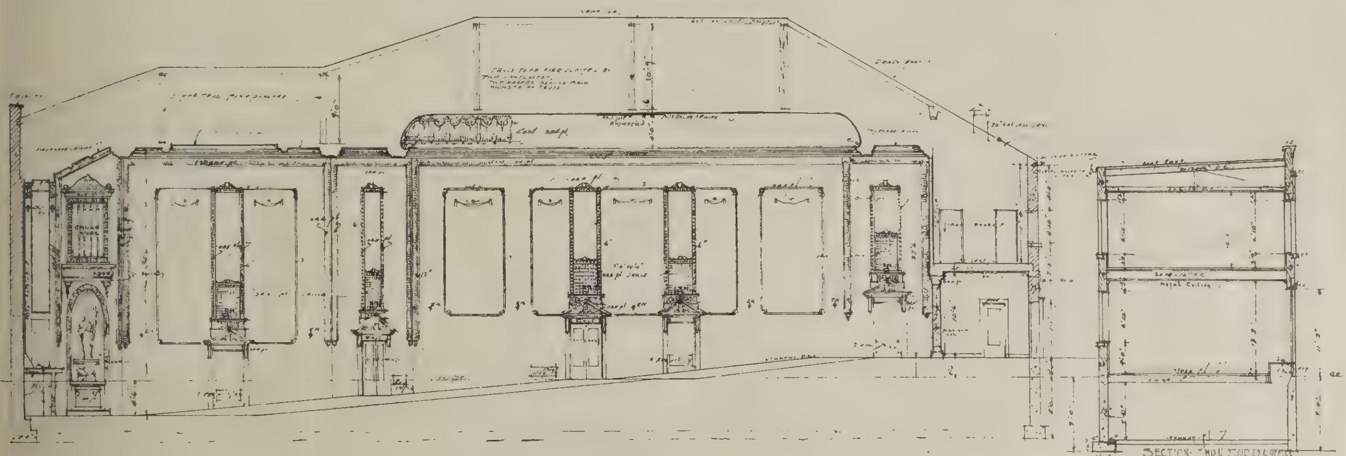
ONE of the most important features of theater planning is the arrangement of the emergency exits. Most building codes specify that at least two emergency exits shall be placed in each side wall of the auditorium on all tiers. That is the main floor and each balcony or gallery must each have at least two emergency exits in each side wall. The Chicago Building Code specifies that one of these emergency exits shall be located at a distance not greater than 5 feet from the proscenium wall or stage, and the other shall be located half way between the foyer and the stage wall. Further, this code specifies that if the rear of the building abuts on an alley two emergency doors leading directly to the alley shall be provided, and that if the emergency exits pass over or under the stage floor level they shall be enclosed with fireproof walls and fireproof or slow-burning floors and ceilings.

The combined width of emergency exits should at least equal the width of the en-

Marshall Souare Theater. A. L. Leroy, Architect



Elevation of Marshall Square Theater



Section of Marshall Square Theater

trances, and there should be a direct exit at each end of every aisle. Emergency exits should be placed at the ends of the foyer and at each end of every corridor or passage. Toilet, smoking or rest rooms, offices and so forth should have either separate emergency exits, or open directly onto passages or corridors communicating directly with such exits.

Emergency exits should be computed separately for each tier on a basis of one foot in width for each 18 or 20 persons to be accommodated on that tier, but no exit should be less than four feet in width in the clear. Emergency exit doors opening directly to the exterior should be of metal or of metal and wire glass construction and should be so hung that they do not form any obstruction to free passage when open. (See sketch.) Such doors should always open outward or in the direction of travel and should be equipped with fire-exit or emergency door bolts that require no special knowledge nor effort for their operation. Such bolts are now designed so that when the door is fastened it is impossible for an intruder to gain access from outside the building, yet anyone in the building may easily release the bolt and open the door. Ordinary draw-bolts should not be used on such doors.

Sloping floors or walks around emergency exits should be made level and approximately flush with the door sill for a distance of at least one foot on each side of the door and extending not less than four feet in front of the exit. There should be no step within four feet of the front of an exit nor within one foot of the sides.

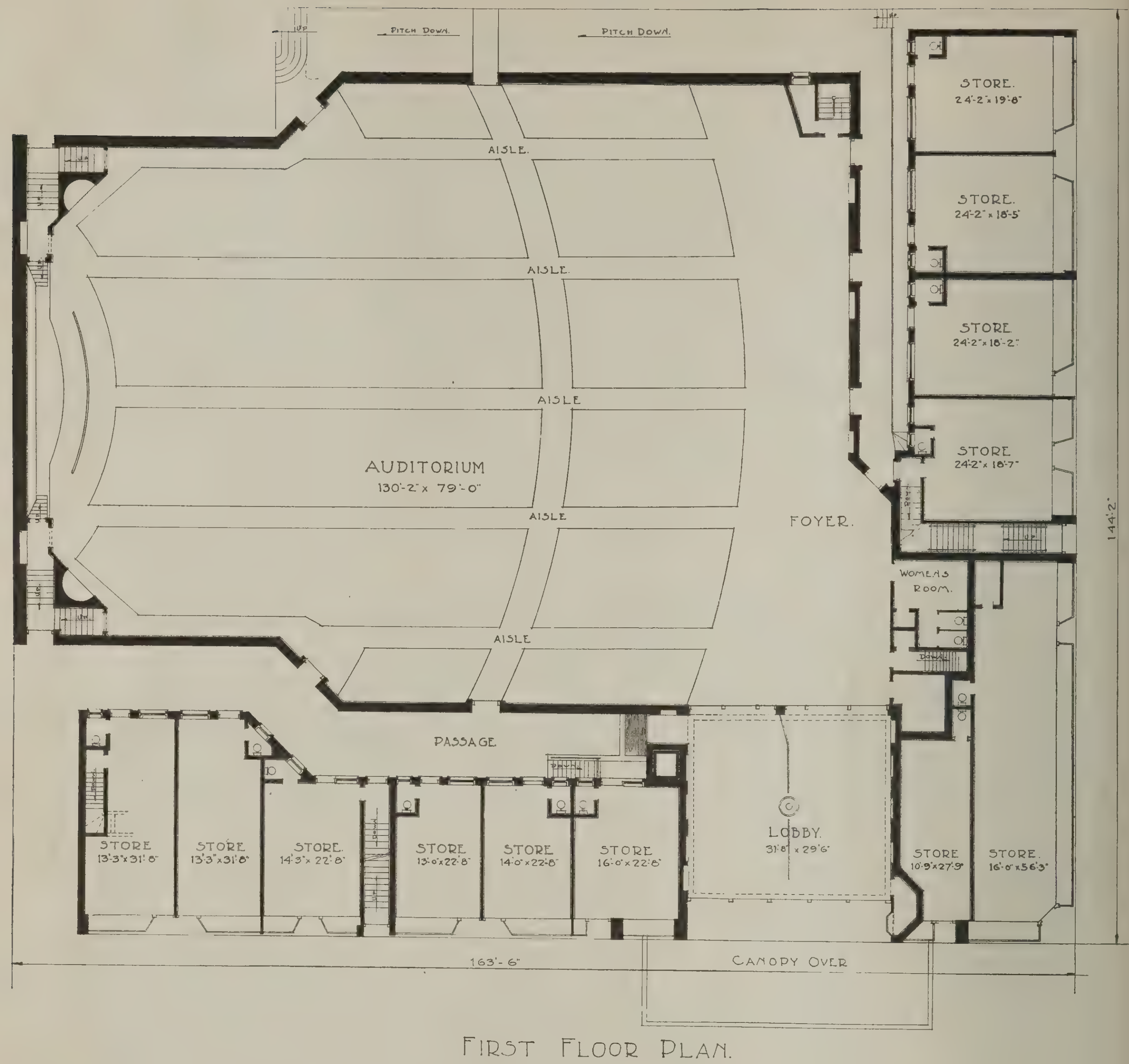
The moving picture theaters which are illustrated in this article are known as the Broadway Strand and the Marshall Square Theaters. Both are located in Chicago and were designed by Alexander L. Levy, architect. Both are of fireproof construction with brick walls and terra cotta trimmings and are combination buildings. That is, stores and offices are combined with the theaters.

Neither of these theaters have balconies, but in the case of the Marshall Square Theater provision has been made for installing a balcony at some future time if desired.

In each of these buildings auditoriums are placed on the inside of the lots, making it necessary to provide courts or open passages to give access from the emergency exits to the streets or alleys.

In the case of the Marshall Square Theater there are streets on two sides of the property, and two alleys form an intersection near one of the inside corners of the lot. To utilize the property to the best advantage, shallow stores have been placed along the street fronts and open courts have been placed between the stores and the auditorium. These passages communicate with the streets and the alleys as the case may be.

In each side wall there are two emergency exits and there are two additional ones at the stage end of the auditorium. There are also four emergency exits in the foyer wall. Note that these latter are placed opposite the ends of the main aisles to comply with the requirements of the building code. The two exits in the splayed portions of the side walls might have been omitted in so far as the code is concerned, but the architect has wisely included them as insuring additional



Floor plan of Marshall Square Theater

safety. As has been pointed out in a former article, it should be remembered that a building code represents only the *minimum* requirements for safety and the conscientious designer will not merely conform to the requirements of a building code, but will go further in an attempt to insure safety.

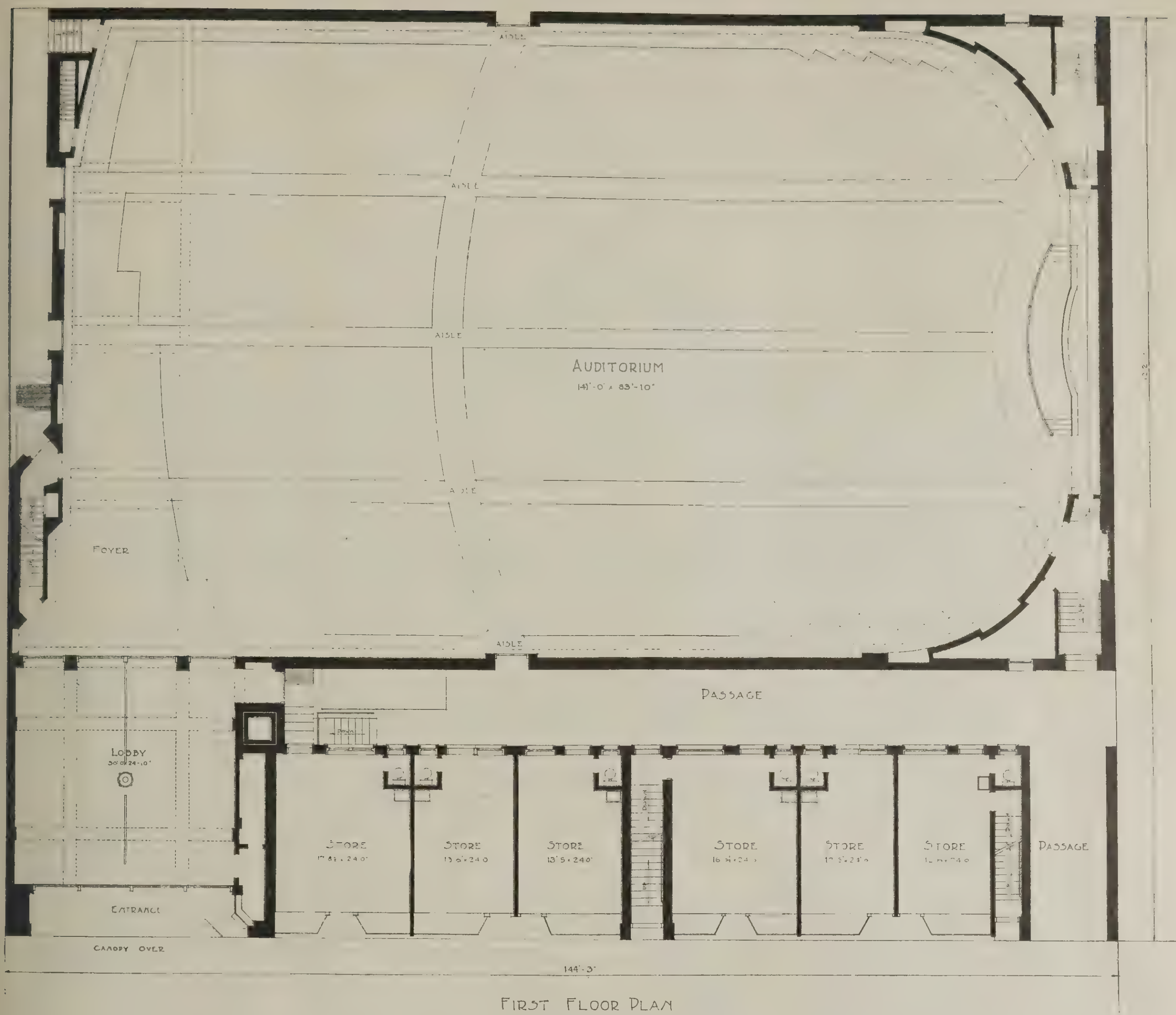
The Broadway Strand property is located on an inside lot, with a street across the front and an alley at the rear. Stores have been placed along the street front with an open court separating them from the auditorium. This court communicates directly with a fireproof passage leading to the street. Another open court runs along the foyer wall and gives access to the alley at the rear.

The auditorium proper has four emergency exits; one in each side wall and two at the stage end. Four additional emergency exits open from the foyer to the open court which leads to the alley.

In each of these theaters the center line of the entrance is at right angles to that of the auditorium and the general layouts are quite similar. Each has a recessed entrance leading to a lobby in the center of which is an ornamental fountain of terra cotta. The ticket booths are at one end of the entrances, in each case, an exit leading from the lobby to the open court is placed in the recess near the chimney as an extra precaution.

In the Broadway Strand the toilet and rest rooms, the office and the machine room are placed in the space above the lobby and the foyer. In the Marshall Square these rooms, with the exception of the machine room, open from the foyer on the main floor level.

Both of these theaters are examples of utilizing property to good advantage and are suggestive for similar problems in communities where land values are relatively high.



Floor plan Broadway Strand Theater

Factor of Safety in Concrete Floors

There has been a persistent impression, due no doubt to the very apparent solidity and stiffness of the concrete building, that the floors are being designed more heavily than is required for the work they are called upon to do. This idea has little basis in fact, according to R. E. Parker of the Aberthaw Construction Company, Boston. Mr. Parker states that the present practice of using a factor of safety of four in designing not only the floor slabs but the other elements of the building gives a result which, while it is amply secure for all legitimate loads, is none too heavy for the usual requirements.

Ordinarily a manufacturing building is figured for a live load of somewhere between 150 and 300 lbs. per sq. ft. It is unusual for a factory load to exceed the design by any serious margin. In a storage warehouse, however, where the building may be designed for a dead load of 300 lbs. per sq. ft., is is not unusual to find goods stocked clear to the ceiling, and the actual load on the floor frequently double that which was anticipated. In such cases it must be remembered that the design provides so many pounds per square foot for the entire floor area inside the outer walls. Necessity for leaving aisles and other means of access to the goods reduces the apparent floor load to a degree much closer to that for which provision was made in the design.

Occasionally even this condition is not met. In a storage building for a large munitions company, built by the Aberthaw Construction Co. some time ago, the great weight of the goods to be stored was taken into account, and the building designed for a load of 800 lbs. per square foot. Ammunition in boxes was produced so much more rapidly than it could be shipped that much of it had to be stored. As the enormous quantity was all of one kind, and access to different parts of the storage was not necessary, this was stacked clear to the ceiling and over the entire area of the floor from window to window. No aisles were left or any other vacant spaces, and the building was actually called upon to bear a static load of about 1,500 pounds per square foot, or practically double that for which it was designed. Even with this tremendous burden the building showed no signs of distress.

In another case, where the actual load applied was approximately three times that designed, incipient cracks have appeared on the lower side of the floor panels. There is no fear, however, that the building will fail to stand up, even under this great abuse. The cracks indicate simply a little more deflection in the panel than was expected; and it is believed that the steel members, upon which alone reliance is placed for tensile strength, are not in any way seriously affected.

The whole question of bulk as applied in a floor slab is tied up intimately with the question of vibration in the building. Storage buildings without manufacturing processes going on are not ordinarily subjected to much vibration, unless it may be from the occasional disturbance of a passing train. In manufacturing buildings, however, the problem sometimes assumes serious proportions, particularly where heavy reciprocating machinery is used. Such a condition might well cause fear that overloading of the building would produce such trouble as is frequently experienced by buildings of wooden floor construction, similarly overloaded.

Broadway Strand Theater. A. L. Levy, Architect

BUSINESS BUILDINGS, STORES AND GARAGES

A Distinctive Store Front

THE accompanying illustration shows a store and office building designed by Otto A. Merman, architect, of La Crosse, Wisconsin. The design is of the so-called "prairie style" that is quite popular in several sections of the country, and is a splendid example of the distinction that may be obtained by using ordinary materials in an extraordinary manner.

The front, altho distinctive in character, is not an expensive one and cost but little more than would a more commonplace one.

The first story facing and the other trim is terra cotta. The hood is of wooden construction covered with Spanish tiles, and with stucco panels beneath. The metal work around the flower boxes of the second story makes an attractive detail, as do the leaded glass panes of the upper windows.

The first story show window has a paneled back and copper trim, and the glass is set in patent bars. The lettering across the main lintel is of the incised type and is brought into prominence by means of a lining of gold leaf.

Not a little of the distinction of this building is due to the quarry tile facing of the sidewalk in front. The novelty of such ideas as this are of the greatest value in attracting the attention of pedestrians.

The shabby buildings at each side of this building serve to accentuate the up-to-date character of the latter. This condition is generally true throughout the country in large as well as small communities and gives rise to the common complaint that the development of business property does not keep pace with the building of homes.

An Idea for a Shop Front

The accompanying photograph shows how distinction may be arrived at by comparatively simple means. This small shop front in Boston attracts more attention than some of its more expensive neighbors simply because of the checkerboard pattern that is painted on the solid portions.

The "checkerboard" painting attracts

This idea might be easily elaborated by means of tile, terra cotta and so forth, and thus form a more important element of a design than is indicated by the example.

A Storage Warehouse

THE shortage of living quarters has forced more people than ever before to store furniture and other property until such a time as rents come down or until they can rent a suitable place to live.

This has taxed storage facilities to the limit and many new storage warehouses have been built. It has also led to the introduction of this type of building into communities where they were unknown in the past.

People who patronize storage warehouses demand that every precaution be taken to avoid the danger of the loss of stored property by fire. Therefore, most, in fact it may be said, all of such buildings are of fireproof construction, with walls, floors and ceilings built of fire resisting materials and the few exposed openings fitted with metal frames and wire glass, or equipped with metal shutters and so forth.

Floors designed to withstand a live load of 100 pounds per square foot are strong enough for such buildings, but building codes frequently specify heavier construction.

The great, blank spaces of wall that are usually characteristic of storage warehouses offer a splendid opportunity for breadth of treatment that skilled designers are not slow to take advantage of. The accompanying photograph shows a large storage warehouse in Chicago, in which the designer has preserved the massive character of the building by surrounding a huge brick panel with a terra cotta frame. The result is impressive to say the least.

New Dwellings Tax Exempt for Five Years in New Jersey

The first state to endeavor to pass some legislation in the aid of new building construction is New Jersey. This state recognized that the best method of overcoming the housing shortage was plenty of new construction. Therefore they are exempting new buildings constructed between October 1, 1920, and October 1, 1922, from taxation for a period of five years, or until October 1, 1925, to this effect:

"Whereas, on account of the high costs of construction growing out of the great war and conditions resulting therefrom, private capital has been unwilling to undertake the construction of dwelling houses sufficient to meet the public emergency caused by cessation of building; and,

"Whereas, it is deemed necessary to encourage the investment of private capital in the construction of dwellings houses during such emergency; and,

"Whereas, the measure hereinbefore set forth, by its terms and provisions, will not in any way reduce the amount of returns receivable from present ratables throughout the state, and will eventually result in a greatly increased volume of ratables; therefore, be it enacted by the Senate and General Assembly of the State of New Jersey:

"1. No taxes shall be levied, assessed or collected for a period of five years from October 1, 1920, on any improvements to real estate which may be erected between October 1, 1920 and October 1, 1922. If, during said five years, improvements for dwelling purposes greater in value than the existing improvements shall be placed upon any real estate, the amount of assessments on such improvements shall in no case, except that of damage through action of the elements, sufficient to warrant a reduction, be less than the assessment for improvement thereon existing at the date of the passage of this act.

"2. This act shall take effect immediately."

A Store and Office Building

A store and office building. J. R. and E. J. Law, Architects, Madison, Wis.

THE accompanying photograph shows a store and office building designed by J. R. and E. J. Law, architects, of Madison, Wisconsin.

The building provides for two stores on the first floor, and two suites of offices on the second floor.

In many buildings of this type, the rear portion of the second floor is arranged for use as living apartments. Some physicians and dentists, especially the younger men, prefer such a combination of living quarters and office, as they may thus keep in close touch with their practice.

The building under discussion has brick walls laid in "garden wall bond" (header two-stretches), this produces an interesting wall surface as well as a good bond. The growing number of new buildings that are being built with genuine bonds showing on the walls gives hope that the monotonous "all stretcher bond," which is really not a bond at all, will soon be extinct.

The trim of the building is of limestone, simple in character and sparingly used, both of which represent good practice from a standpoint of design as well as economy.

The design is modified Gothic a style that has been somewhat overworked of late, but still has possibilities when in good hands. The arched show windows are a pleasing variation from the usual flat headed type.

Business men are coming more and more to appreciate the advertsing value of an exterior that is distinctive, and it is a question of only a short time until the commonplace buildings will go begging for tenants.

BUILDING COMMISSIONER CHARLES M. BOSTROM, says that by next summer Chicago building material prices will have decreased 35 to 40 per cent.

Bridge at Mankato, Minn.

A reinforced concrete bridge

This fine bridge over the Minnesota river was built in 1917 by the city of Mankato, Minn., from plans by J. H. A. Brahtz, consulting engineer, of St. Paul, Minn.

A Small Office Building

The illustration herewith shows a small office building built by W. H. Winslow for a Swanton, Ohio, manufacturer.

The building is 33 by 51 feet in size; is of reinforced concrete construction throughout, and is provided with steel sash which fill most of the wall space and provide excellent light during even cloudy days.

A small office building. W. H. Winslow, builder

An Unusual Treatment

The accompanying photograph is called to your attention because of the unusual treatment of the upper portion of the store building.

The effect is that of a pergola built of heavy timbers. In reality, however, the members are built up of rough boards, stained.

While this treatment has no structural meaning and is open to criticism on that account, it is at least novel and may prove of use as a suggestion for the development of a similar idea.

A pergola treatment

Should the Builder be Licensed?

On the score that contracting is more of a business than a profession, C. A. Crane, secretary of the General Contractors' Association of New York, writes in the *Bulletin* of the A. G. C. that examinations do not develop proof of reliability and integrity. They can do no more than reveal a certain amount, more or less of theoretical knowledge with a statement of the applicant's knowledge on which his practical knowledge is based. Mr. Crane also cites the case of a reporter who passed Civil Service examinations for the position of a plumber in the service of New York City with flying colors, although he had never wiped a joint in his life and didn't know red lead from solder. He was offered appointments to several positions, not one of which he was competent to fill.

Mr. Crane also asks how many builders in the country could, offhand, qualify on even the simplest of technical questions, and asserts that there are any number of first-class capable contractors and builders who couldn't read a blueprint to save their lives. They hire men to do that, but they have that *something* in them which no amount of book learning or even experience can instil—that contractor's sixth sense that some men seem born with, and without which no man becomes a big successful contractor. As evidence of this, how many engineers who have made great reputations in their profession have succeeded as contractors? Yet they could pass the toughest technical examination with flying colors.

Mr. Crane also points out that the control by license of architects and engineers is comparatively new, and has been adopted by 11 states thus far. He thinks the records will show there have been more building and structural failures through faulty design than faulty methods of construction, and that a strict license law for architects and engineers will do more to safeguard building than licensing the builder.

Building Investigations to Extend Throughout Nation

Great interest is being shown in the announcement by United States Senator Calder that he is contemplating following up the preliminary work of the Lockwood Committee by asking the Senate to extend the powers of his own committee so as to enable him to conduct a nation-wide investigation of alleged conspiracies of building material supply men and manufacturers, and of members of organized labor. It is believed in New York that a national inquiry along the lines of the Lockwood probe would go a long way in stimulating building construction next spring. Moreover, the men in the local building trades believe that New York is being unjustly discriminated against by being placed in the limelight by the Lockwood probe, when an investigation of other cities, they declare, would reveal conditions equally as startling.

Samuel Untermeyer has been sounded on his willingness to act for the Calder Committee, and it is reported that he will accept the offer, and undertake the national investigation as soon as his work with the Lockwood Committee is completed. The latter will keep him busy until the middle of January, and he has announced his intention of completing that work before he turns to any other activities.

The Need for More Garages

A public garage. John A. Nyden, Architect, Chicago, Ill.

THERE were 7,558,848 automobiles in service in the United States in 1919. In 1920 the number is estimated to have grown to nearly 10 million, and the total is expected to pass the 12 million mark in 1921.

These figures, if correct, mean an increase of nearly two-thirds within a period of two years and therefore seems to imply that before the close of 1921 it will be necessary to add two garages to every three that were in existence in 1919. Of course, a great many of these new garages were built in 1920. In fact some criticism was based on the fact that while garages and movie theatres expanded in numbers dwelling house construction continued to lag far behind normal. By that as it may, additional facilities for storage and repair were demanded by automobile owners, and it is logical to assume that similar requirements will be taken care of in 1921.

To the additional garages rendered necessary by the increase in the numbers of cars in service, we should add the new garages that are built to replace the ones destroyed by fire and other causes. Then, too, as the garage industry becomes more firmly established, it is recognized that many buildings occupied by garages are mere makeshifts and are not suited to the purpose for which they are used. This also means new buildings. Taken in all the replacement item alone accounts for a large number of the new garages that are built.

The design of the public garage has within a few years, progressed from the remodeled livery stable or store building stage, to its present status of a distinct type of building, in the design of which recognition must be given to the specific character of the problem. This applies to the appearance as well as to the planning and construction.

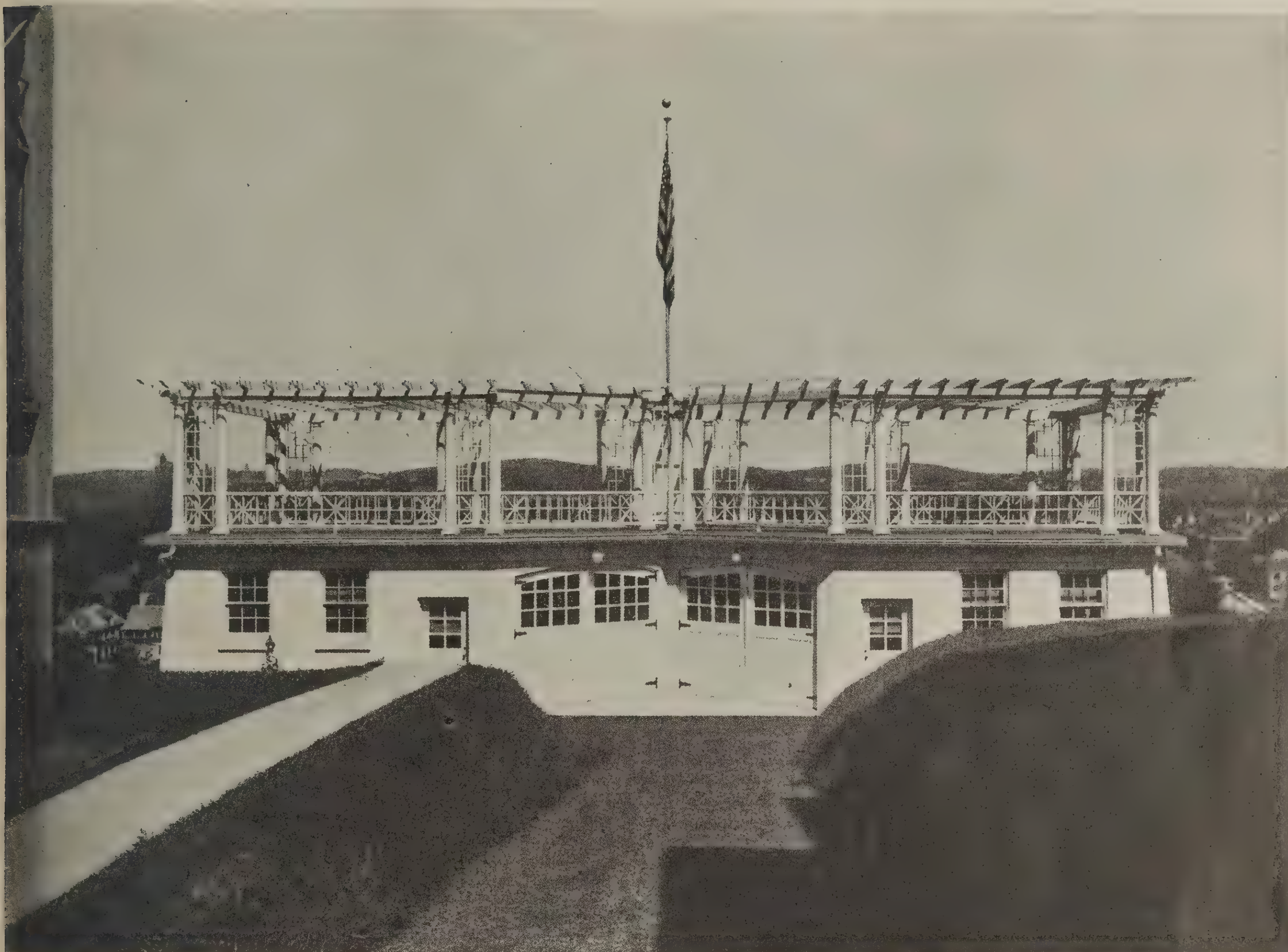
The accompanying photograph shows a public garage designed by John A. Nyden of Chicago. The detailing of the terra cotta trim is excellent and well adapted to the character of the material. This is particularly true of the crowning features of the entrance bays which, although showing some Spanish influence, have the crispness of early Grecian work. The repetition of the circle which appears throughout the detailing suggests motion, and is therefore singularly appropriate when used on a garage. The panels at the sides of the entrance doors have metal frames and plate glass fronts. They may be illuminated at night and offer a space for posters and other display purposes. It is hoped that their provision in this case will tend to discourage the advertising methods that often disfigure buildings of this type.

Parking Systems

Addressing a representative gathering of general contractors, architects, engineers, bankers, etc., in Los Angeles, Calif., General R. C. Marshall, Jr., manager of the Associated General Contractors of America, said:

"We all think that our parking systems are the best of any city in the world. I want to draw attention to the fact that the density of population of this country is little less than one-tenth of that of England and that I have not yet seen any parking systems in any city that looks forward, in my judgment, 50 years."

A Double Garage



A double garage with a "promenade deck" on the roof. Harry D. Phoenix, Architect, Syracuse, N. Y.

WHERE neighbors are congenial, the double garage usually offers the most practical solution of the private garage problem. Double garages not only make a better appearance than do small detached garages,—"dog houses" as they are often called,—but also make it possible to effect a rather substantial saving in cost and maintenance. The cost of one wall is saved, sewer connections are reduced and the lots are traversed by only one driveway. It is also less expensive to heat a double garage than two single ones.

The accompanying photograph shows a double garage at Syracuse, New York, designed by Harry D. Phoenix, architect.

The walls are of hollow tile with white stucco finish. A heating plant is provided, and each garage contains a room that may may be used as a work room, children's play room, chauffeur's room or the like.

The site commands an extensive view the value of which was recognized by providing a trellised pergola on top of the garage. The pergola is useful not only as a viewpoint, but makes a delightful place for children's parties and so forth.

Senator Calder Urges Lower Wages

Wage reduction as a remedy for the housing shortage is recommended by Senator Calder of New York, chairman of the United States Senate Committee on Reconstruction. The Senator bases his conclusion on the fact that builders of houses cannot conduct their business at a loss, and that present high wages demanded by workmen in the building trades make it impossible for contractors to erect houses which can be sold for a price that will be attractive.

This declaration was made before the Senate on the afternoon of December 23, Senator Calder explaining the nation-wide survey into housing conditions which has just been completed by the committee of which he is chairman. He predicted that the cost of building will never come down to the pre-war level, and that unless something is done to permit builders to do business, the shortage of houses will continue.

Cites Living Cost Decrease

"There is every evidence of a reduction in the cost of living," Senator Calder said, "and this will equalize a just reduction of wages. As long as this condition exists, the workman must be willing to do his part."

Several plans were offered by the Senator as a means of encouraging building, in addition to the recommendation for reduced wages.

Legislation providing that 50 per cent of savings deposits may be loaned on mortgages was advocated. Tax exemptions for incomes from mortgages, restriction of the issuance of tax exempt securities, the creation of a home loan banking system, cancellation of transportation priority orders and the establishment of a Federal department of construction, were among other recommendations made.

A Permanent Bill Board

Considerable criticism is justly directed toward the practice of disfiguring vacant property with ugly bill-boards. The advertising worth of such means of publicity is, however, generally recognized and it has remained for a Cleveland, Ohio, brick concern to utilize the method in a manner to create a distinct improvement to the neighborhood.

The bill-board—if it may be so-called—is constructed entirely of brick and consists of a brick wall with pylons at each end and a corbeled cornice at the top. The lettering is formed by projecting bricks on the blank wall surface.

The structure is located near a street car stop and is provided with seats and a drinking fountain for the convenience of the public.

It is perhaps needless to suggest that this idea might be utilized with good effect by builders as well as material men.

A brick "billboard"

Strength of Gypsum Blocks

A contractor and builder in Norfolk, Va., writes: "Can you tell me whether the 4-inch gypsum block with waterproof stucco on the outside is strong enough or desirable for a one or one-story and a half bungalow? Also is white portland cement supposed to be waterproof or can you refer me to a waterproof compound that is inexpensive and efficacious?" These inquiries being referred to Mr. Virgil G. Marani, chief engineer Gypsum Industries Association, reply was made by him direct to the inquirer, in substance as follows:

(1) You do not state what you have in mind when you refer to a "4-in. gypsum block." In the absence of this knowledge would state that the commercial 4-in. gypsum hollow block, marketed and sold for non-bearing partitions, enclosures and fireproofing, is not strong enough for the supporting walls of one or one and one-half story bungalows. The solid blocks, of this kind, are better suited for such purposes.

(2) The average ultimate strength in compression of hollow gypsum blocks, when perfectly dry, is about 100 pounds per sq. in. The solid gypsum blocks of the same composition, when perfectly dry, have a crushing value of about 350 pounds per sq. in. The safety in the use of gypsum blocks for bearing wall construction depends entirely on the composition and density of the block and details of construction which will assure that at no time can the blocks become saturated either directly or by capillary attraction from the foundation walls or piers.

(3) Mr. W. Armstrong of the Manitoba Gypsum Co., Winnipeg, Manitoba, has erected about 50 houses with outside bearing walls of 6x12x18 in. and 8x12x18 in. hollow gypsum block. Tests on these blocks by the engineering department of the University of Manitoba give a crushing strength of 300 lbs. per sq. in. for the 6-in., and 500 lbs per sq. in. for the 8-in. blocks. Undoubtedly these blocks contained less wood fibre and were more dense than similar commercial non-bearing partition tile blocks. "Parola" roofing, in strips was laid upon the foundation walls to protect the lower gypsum courses from moisture. The blocks were covered outside with a coat of Cabot's waterproofing which was followed with a coat of outside stucco, applied direct to the surface. The stucco consisted of cement tempered hydrated lime (with hair) followed with a rough cast coat of Portland cement, hydrated lime, gravel, sand and about 2 per cent of "Medusa" for waterproofing. These houses were one and one-half story bungalows and small two-story dwellings.

(4) Many of the gypsum manufacturers erect, for their own use, houses, office and store buildings, of gypsum block, up to two stories in height. This has been done successfully by the United States Gypsum Company at Port Clinton, Ohio, Oakfield, N. Y.; Southard, Oklahoma; and Arden. Nevada; also by the Arizona Gypsum Company at Big Horn Basin, Wyoming, and Douglas, Arizona, and the Ontario Gypsum Company, at Paris, Ontario. In some cases single tile was used, in others there was employed double tile with an air space between.

(5) Literature upon this subject, with illustrations of some value, will be found in the following:

"Rock Products," June 5, 1920, Article. "Gypsum Block Building and Houses," by Mr. R. W. Stone, U. S. Geological Survey.

"Rock Products," July 17, 1920. Article, "Gypsum Block Houses in Canada," by Mr. W. Armstrong, Manitoba Gypsum Co.

"The Contract Record," Dec. 18, 1918, Article, "Houses of Gypsum Have Many Advantages," by Ontario Gypsum Co.

(6) The possibilities in the use of gypsum blocks for small structures are very promising. When sufficiently developed. as to features involving economy, there should follow a steady and growing demand for blocks made for use in bearing wall constructions. In the meantime the contractor, when placing his order, should clearly state that the blocks desired are to be used for bearing walls and will be required to possess an ultimate crushing strength which should be not less than four times the calculated load to be carried.

(7) More development is necessary as to the treatment of the exposed surface. In some localities blocks have been left uncovered, in some the stucco has been applied to the waterproofed surface direct, and in others upon metal fabric or chicken wire furred to the surface over waterproof paper. As a personal opinion only, the metal fabric method would suggest more permanent results and would provide for some settlement and any unequal expansion or contraction.

(8) Medusa white portland cement is waterproof in the generally accepted meaning of "waterproof." The prefix "Medusa" implies that the required percentage of a material under the trade name "Medusa" has been incorporated in the cement to waterproof it. A list of manufacturers of waterproofing compounds were transmitted to the inquirer.

FARM BUILDINGS

Farm Buildings

FROM a standpoint of efficiency American farm buildings lead the world, but from a standpoint of "looks" they are notably deficient. A day's ride through the most prosperous of rural communities will seldom reveal a single building that is worthy of a second glance.

Generally speaking they are commonplace to a degree; four square, bald and entirely lacking in individuality, they appear to be built from one uniform plan that is contracted or expanded only in size, to meet the bare necessities of the individual owner.

There is really less reason for farm buildings so much alike than there would be for town buildings to be stamped from the same mold. Uniform plots of ground and other artificial conditions of town life are not found in rural communities, and there is every reason, both practical and artistic that farm buildings should be highly individual in plan and arrangement.

The average farm dwelling for instance, merely apes the town house, and worse yet it apes those that were popular 10 or 20 years ago. It is therefore not only unsuited to the actual needs of its owner, but is out-of-date as well.

The accompanying farm buildings are not everything that could be desired from a standpoint of design, but they at least show evidence of an attempt to get away from the stereotyped type of farm building and show more than ordinary consideration toward the appearance of the groups as a whole.

Fig. 1—Superintendent's cottage and outbuildings, T. E. Wilson Farm, Waukegan, Ill.

Fig. 2—Garage and tool-house, the barn and the poultry house, T. E. Wilson Farm, Waukegan, Ill.

Wide siding painted white is used on all of the buildings, the shingle roofs are laid in the tier or coursed method and the dormers are alike in character.

These similarities bind the entire group together and give it a related character that is utterly lacking in most farm buildings.

An Advertising Builder

H. Gibson, of St. John, Wash., believes in stimulating building by newspaper advertising. He uses a two-column space in the local paper, and in the specimen we have received shows the view of the barn and at the left of the accompanying illustrations, with the following advertising text:

THIS BARN WAS CONSTRUCTED BY H. GIBSON FOR P. L. NELSON, 1½ MILES EAST OF ST. JOHN

This barn is of the latest modern design—concrete mangers and modern ventilation. Note: the main truss rafters rest on the concrete wall, and are built up of six-ply 1x12 boards, and the circle is cut without waste of material.

This view illustrates the construction of a favorite type of modern barrel-roof barn. It is 44x74 feet—has stalls for 24 head of horses and cows, the mow a capacity of 165 tons of hay.

The frame structure is built entirely of planking, not over two inches in thickness. And the steady increase in the price of lumber and all building material has necessitated a closer calculation of their strength. Economy prescribes that each piece of timber shall be only as large as needed to safely withstand the strains to which it will be subject and so placed that it will be the strongest. In the largest and best barns built today you will seldom see timbers thicker than two inches.

Most modern barns are built with self-supporting roofs. So this type of construction eliminates heavy beams and posts and reduces cost.

H. GIBSON
HOUSE MOVER AND BUILDING CONTRACTOR, ST. JOHN, WASH.

Tobacco Barns---By E. C. Rodert

TOBACCO BARNS in the real tobacco country are, as a rule, not very ornamental or even substantial buildings. They are built of poles and boards and crudely built up to house the tobacco for the curing period; then they stand idle for the rest of the year.

Mr. Ed. Calvin, of Trading Post, Kans., however, wanted something better than the ramshackle tobacco barn. As he says, tobacco may not always stay up in price, so if he wants to he can put hay in those barns and use them for feed and stock barns. Mr. Calvin farms something over 1600 acres, and tobacco is a novelty and experiment for him.

A tobacco barn adaptable to general purposes

The barns which he has built, and shown in the illustrations, are 52 feet by 120 feet by 24 feet to the eaves on the one under construction, 20 feet under the eaves on the finished one. The uncompleted barn is 16 feet from the plate to the purlins, while the finished one is 20 feet from the plate to the purlins, so both are 40 feet to the purlin. To the builder not acquainted with tobacco barn construction, it may be news to say that all dimensions are divisible by four; the stick the tobacco stalk is "speared" on is four feet long, and the long way two-by-fours, called rails, are four feet apart up and sideways. In these barns the posts are eight by eight inches and 24 feet long, the posts from plate to purlin are six by six inches and 16 feet long, the "ties" (timbers tying the barn together crossways) are two by eight inches and two by ten inches. The side spans are 16 feet wide and the center ones 20 feet wide. The heavy timbers and some of the ties lengthwise of the barn are "native," or oak, with some cottonwood, hickory, elm and walnut lumber. The sides are yellow pine and fir, and the sheathing for the roof is elm and cottonwood. We used about 1600 pounds of nails on this barn under construction, and more were used on the first one. One of these barns will hold the crop of about 15 acres of good tobacco, or 16,000 "sticks," as the tobacco raisers call them.

As this is, or rather has been, an experiment, and so far has proved a successful one for this section of the country, we expect to have the "refusal" of more tobacco barns; and we expect to refuse to have any more to do with them, as our age does not permit of climbing and sky-scraping performances. However, the framing and seeing the giant barns take shape and grow into beauty as they reach completion is as interesting to the carpenter whose heart is in his work as to the farmer who pays for it.

Subsidy Plan Discouraged

A plan for subsidizing home builders is strongly opposed by Senator Calder. "House building is like any other business," he declared, "and is based upon the profit in the venture. Men will build houses again when they see an opportunity for gain," According to him the issuance of state bonds for public improvement has been unduly encouraged under the present Federal tax system.

"These securities are issued tax free," he said, "and have been made so attractive they have divorced the private investor from the mortgage field."

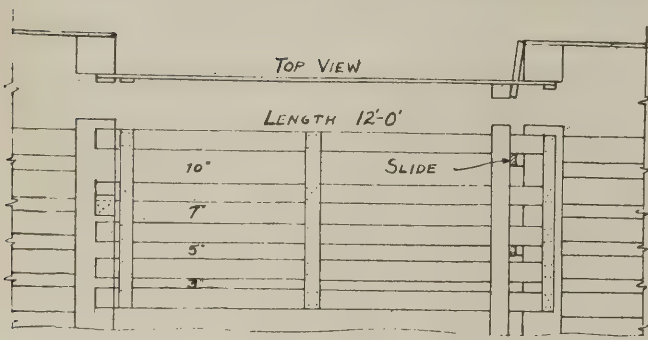
The Marshall Field Estate in Chicago and the Hetty Green Estate were cited as examples.

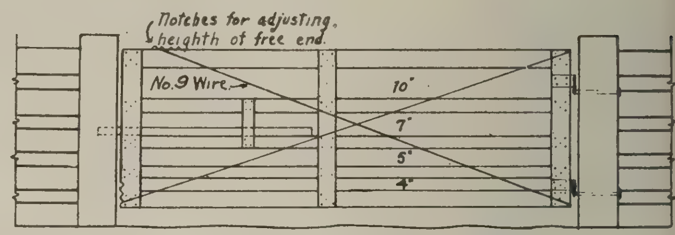
"Both of these formerly loaned heavily on real estate," he said, "but today, finding that their incomes from this source are reduced to less than two per cent, they are averting their capital to more lucrative investments."

Another one in course of construction

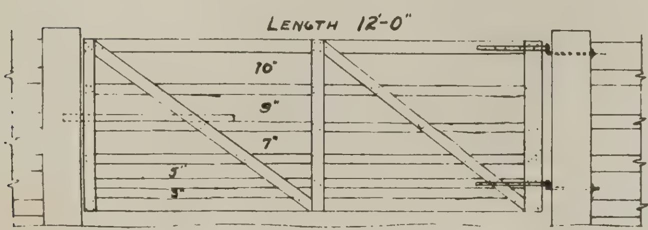
Farm Gate Types

By the Agricultural Engineering Company

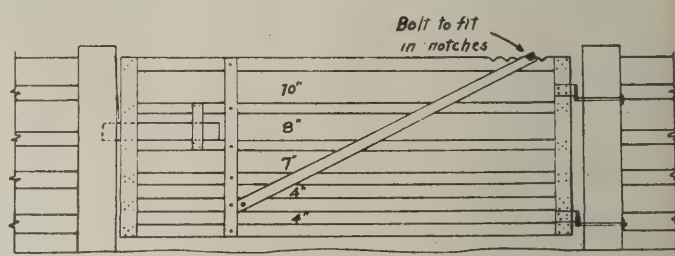




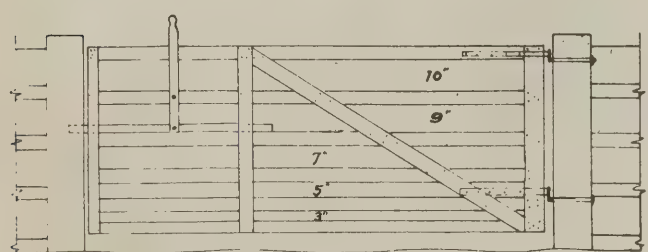
Uprights and wire on both sides of gate



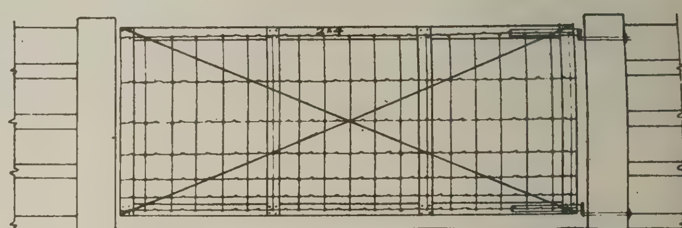
Braces and uprights on both sides of gate

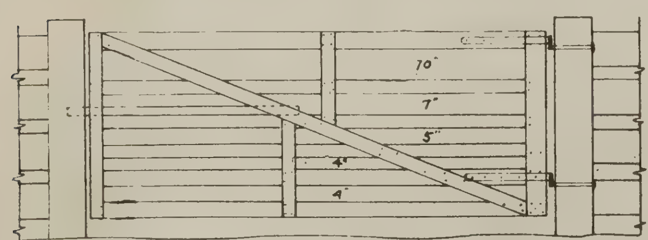


Braces and uprights on both sides of gate

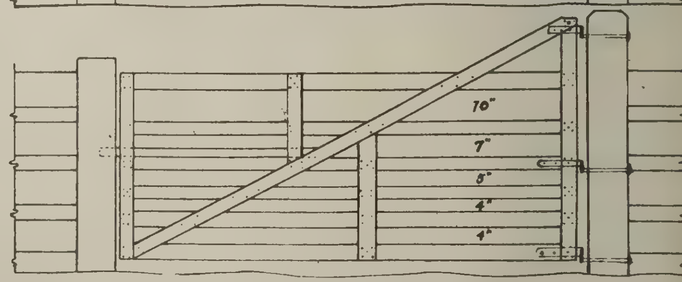


Braces and uprights on both sides of gate





Braces and uprights on both sides of gate



Braces and uprights on both sides of gate

A Modern Hog House

SUCCESSFUL swine breeders recognize the importance of producing two litters a year from the same sows. It is also clearly evident that another advantage will be gained if the farrowing time be regulated so that the pigs may reach the market at other than the ordinary seasons, thus bringing better market prices.

Hog houses play an important part in accomplishing these results in cold or varied climates. They provide shade in summer and protection in winter, and if properly built and operated, insure sanitary and agreeable quarters at all seasons.

The accompanying illustrations show a hog house on the Morse Farm near Libertyville, Illinois. It is of the saw-tooth roof type which provides the maximum of light and ventilation throughout the year. The flat roof is covered with prepared roofing and the pitched roofs are shingled. The interior is plastered and has a concrete floor throughout.

The front portion contains the mixing and storage room for feed, together with the heating apparatus, scales, running water and so forth. The rear portion contains two rows of individual pens with a feeding alley between.

The walls are of concrete up to the level of the window sills with frame walls above. The exterior is of stucco with stained trim.

The concrete paved feeding yard at the side insures that feed will go into the hogs instead of being trampled into the mud, and also is of importance in providing sanitary surroundings.

Fig. 1—Even a hog house may be made attractive in appearance

Fig. 2—The rows of windows face the south, thus gaining full advantage from sunlight

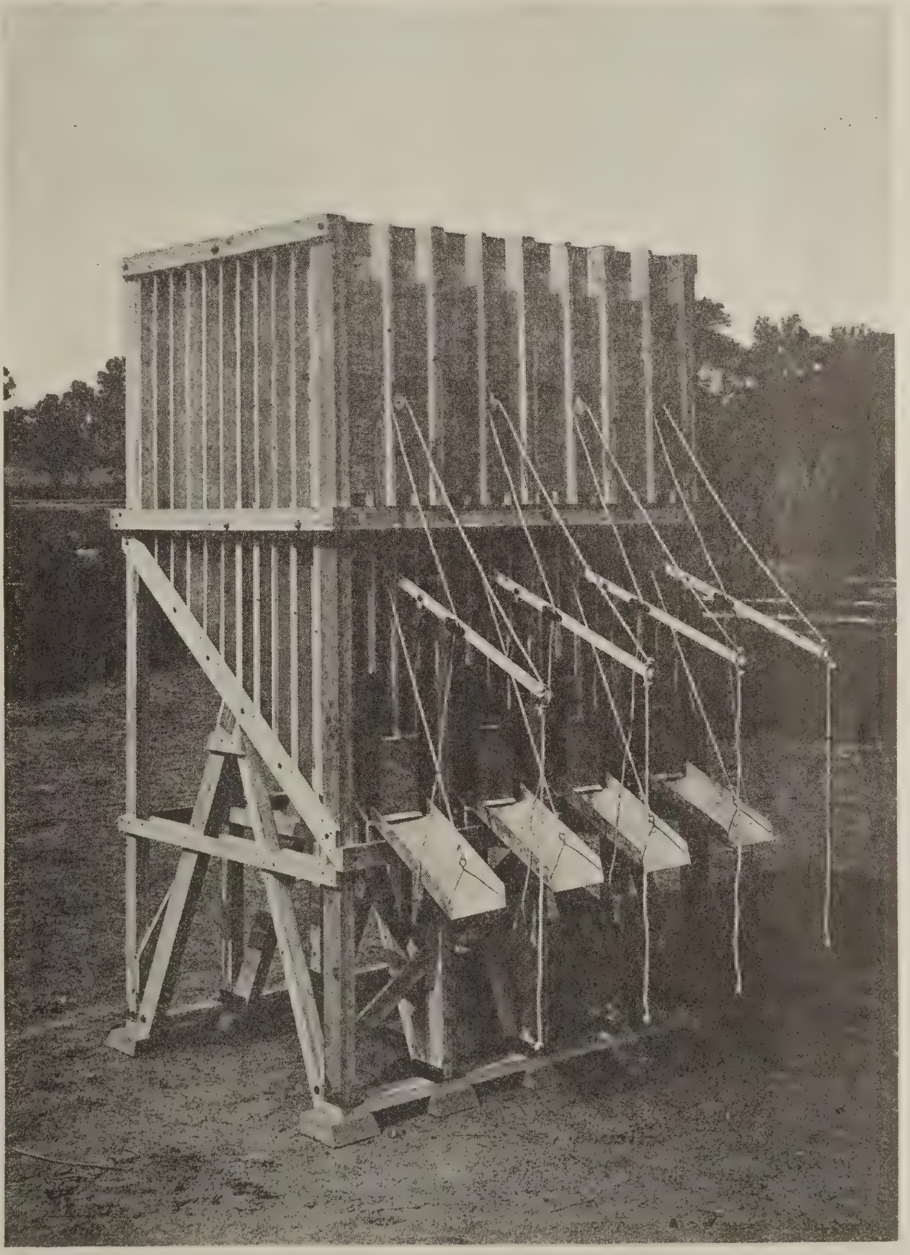
Limestone Bins

Limestone has become a necessity in practically all the older agricultural districts. Farmers generally realize the need of limestone and are applying it in ever increasing quantities but are hindered from using as much as they wish because of the inability to get it delivered when they desire to use it. Few farmers feel that they can take care of a carload in the time allotted for unloading a car without demurrage.

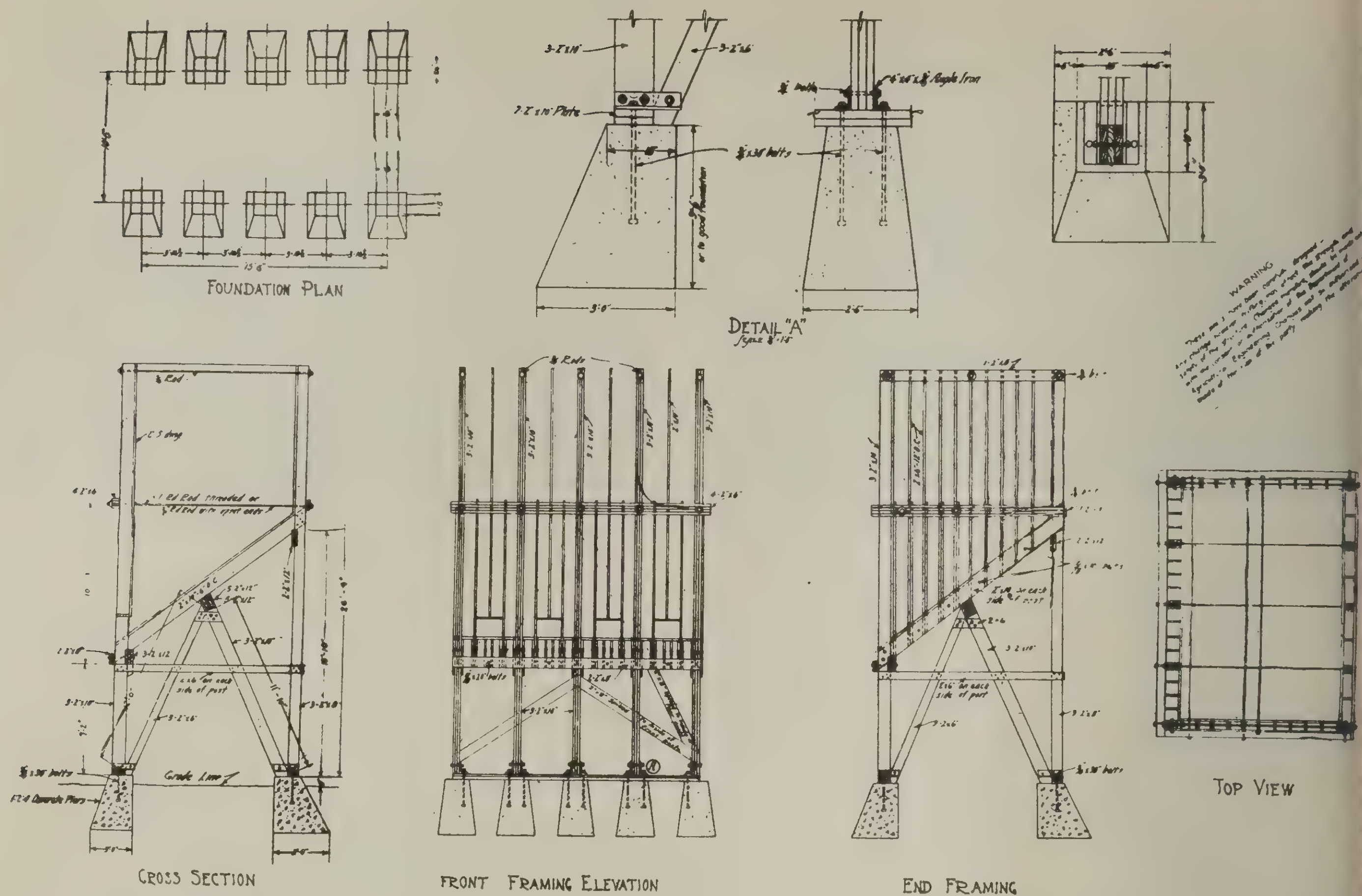
A number of communities, farmers' organizations and even individual farmers are attempting to solve this problem by the use of storage bins. These are to be located at railroad stations along a switch. They will be equipped with elevating apparatus by which the limestone will be elevated into hopper bins as fast as it is removed from the cars. From the bin the limestone will run through a chute into the farmers' wagon. Shipments may then be received at any time, and stored in the bin until the farmer is ready to haul. Road conditions and the press of farm work will not stand in the way of accepting a shipment.

A number of these bins have been built and used successfully in the central states. They can be used for different material. In Illinois, raw rock phosphate is stored and distributed by this method. They have been designed of different materials and of different forms. Monolithic concrete and concrete stave construction has been used. In Ohio a type of wooden structure has been developed. Essentially it consists of an elevated hoppered bin, filled by elevating machinery direct from the car and emptied by metal chutes into the farmers' wagons.

The structure is built up in units of 100 tons capacity. The accompanying illustration shows its construction. It is supported on concrete piers extending 8 in. above grade line. The weight of the bin and contents is carried on ten columns, each constructed of three 2x10's properly braced and secured to the piers by bolts and angle iron supports. The bin bottom is sloping to per-



Limestone storage bin



mit the complete removal of lime and the chutes are placed 8 ft. 6 in. above grade, high enough to allow trucks and wagon to be drawn under the chutes. On the front and rear, the studs supporting the bin sides consist of the columns, supplemented by 2x10's placed uniformly between the columns. Studs for the ends are 2x10's placed 12 in. on centers. The floor is supported by 2x10's placed 6 in. on centers. 2-in. sheathing is used as covering for the bin. Rods, ¾-in. and ⅞-in. in diameter, are used to tie the bin sides together and to prevent bulging.

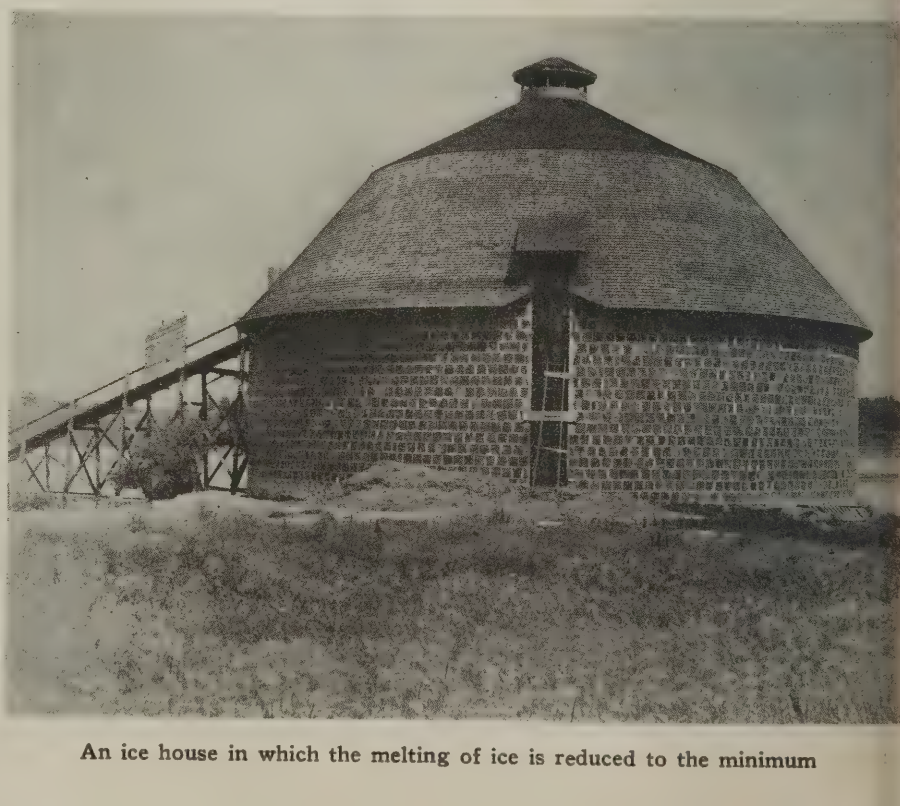
A Community Ice House

The development of community enterprises is often hindered by the feeling that such schemes are the expression of a modern fad that has not entirely proven its practical worth. As a matter of fact the community movement in of prehistoric origin. The first association of two men or groups; the formation of the first tribe, state or nation, was a community movement. Even the lower animals recognize its benefits, as for example the wolf pack and the prairie-dog settlement.

The influence of the community spirit may be traced from the dawn of history to the present day and to criticize community movements, whether social or economic, because of their so-called modernity is to ignore the source of civilization itself.

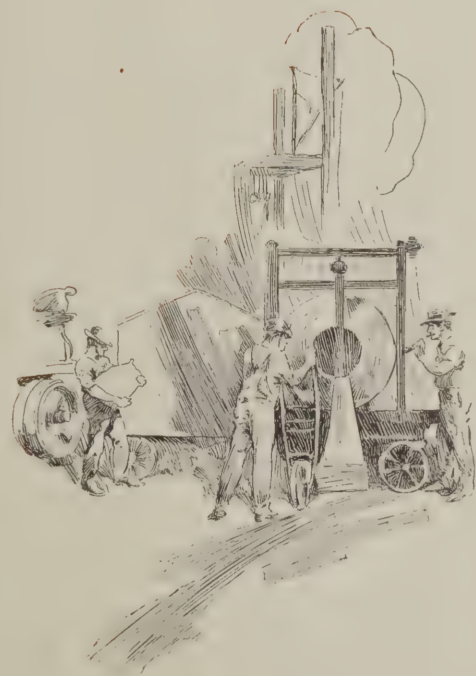
The accompanying photograph shows an ice house built by a rural community near Barrington, Illinois. The building is of hollow tile construction and has a self supporting roof. It is about 50 feet in diameter with walls 20 feet high and has a capacity of about 2,000 tons of ice.

The circular form as used here is of special advantage for an ice house, as les wall is required to enclose a circular build ing than for a square or rectangular build ing having the same area. Thus the ex posed wall surface is less for a circula building and the melting of ice is conse quently reduced.



An ice house in which the melting of ice is reduced to the minimum

CONTRACTORS' EQUIPMENT, MOTOR TRUCKS, MACHINERY, ETC.



(Continued from page 14)

There is nothing that they should do as a national organization but what is for the economic good of the owner and of the country. If he is their financial agent, there will more good flow to him out of this than through any selfish organization that might be created. The Executive Board of the Associated General Contractors is thoroughly imbued with this idea, and it inspires every thought and act of the employees of the National Association.

As an illustration of what we should do, I will refer to what is going on in New York today. There are charges of graft in New York against contractors. Those charges are being investigated by a Legislative Committee. These Legislative Committees are supposed to carry such things to their ultimate conclusion. My experience with them is to the contrary. They carry matters only to a certain political satisfaction. Now we should see that these matters are carried absolutely to their ultimate conclusion, regardless of who is hurt, and thus purge the industry before the eyes of the country.

In Atlantic City in September there was a meeting of a number of different elements of construction and at that meeting an effort was made to have a Building and Construction Congress, so-called. There have been a number of such efforts to bring all of construction industries into one place where they can get together and really come to know each other. The whole reason for their troubles is that they have not understood each other. But all of these efforts have been futile because they have not been all-embracing. Many of us know the efforts being made to get the engineering associations together for the common good of engineers, but so far such efforts have been futile. But gradually the construction world is evoluting to a plane of collective understanding.

The question of publicity is one that the construction world has never competently met. Some four or five months ago the Associated General Contractors employed a publicist of New York to go around the country to find out what is construction; what is its relations to other businesses; what bearing has it on the welfare of the country. He stated as a startling fact, and it is a startling fact when you first hear it, that lack of publicity of construction as a business is responsible for its present woeful condition. He asked a number of the Governors of the Federal Reserve District as to the partition of funds for credit in their several districts, how much was set aside for construction. The last time I saw him he had seen ten of these Governors and the answer from each was that none of their funds had been set aside for this vast industry. Our credit system has been nationalized, but our construction credit is hardly local. It goes even further than that and is becoming individual. The credit a construction man gets is that of the individual, rather than that to which his business is entitled. Just what bearing that has on construction in the future or will have for gradual development, I think you gentlemen can answer for yourselves. It may be that this situation is due to the laws of the land. If that be so, all the more reason for your knowing it, so that the laws may be adjusted not to operate against this, the second largest industry in the country.

What is the character of work done by construction men? The manufacturers make a commodity that is used today and consumed tomorrow. The work of construction on the contrary adds to the permanent future of the country; it is a "non-tax-dodgable" asset, and as I said before, it is a condition precedent to all progress. The fads and fancies of today are taken hold of by organizations to which they pertain and sweep the country—yet when it comes to the thing that is of permanent value to the people, neither the owner, nor the contractor, nor the engineer, nor the architect, can make a way clear to establishing the credit for it to go forward.

This subject is such a big one and most of its lines of thought are so time-worn that I hesitate to take them up. I do not here tonight want to battle solely for the contractors, but to reiterate the thought of the construction industry, the thought of cooperation in it.

We often criticise the laborers for what they do. Let's go back a little into history and see whether or not we should condemn them. Labor has been organized for fifty years. How long did it take them to get recognition in any place and what were they subjected to before they got recognition? I am not defending labor, for the cases where they use unwarranted force to attain their ends—but they were driven into a corner and the whip fell on them for ages before they got anything. Now where do they stand? Who drove them into this corner?

A general contractor goes out on his job and he looks at fifty men down there digging in the ditch and says to himself, "You can't think." But I tell you that the collective thinking of those fifty men is usually ahead of the thought of the general contractor. Labor is so organized that it knows more about the conditions of construction and the facts pertaining to it than any other set of people in this country. They have men who are educated in graphics—they dig into these facts and project their curves ahead of many of you. It is something in my judgment that is brought about by the collective thinking of a great many, and I repeat that their collective thinking is just about six months ahead of your individual thinking.

Engineers are organized along professional lines—not along business lines; material men are organized along business lines, generally speaking. They do not have the many conflicting problems of contractors. Contractors up to two years ago were not organized at all, and we find in the construction world that lack of confidence from the public is brought about by this very fact—that there is no coalition of forces in this construction industry so that the public can have confidence in it. There has been no organization in this country to which the public can turn to be told why they pay the costs that they do pay for what they are getting in the construction. No engineer can tell, for instance, why cast iron pipe costs what it does. He doesn't know whether the foundry is getting too much, or the fellow back at the mine is getting too much. He thinks that all of them are. But whether or not they are, he does not know the why of the cost.

There is no agency in the construction world to beget the confidence of the public as a source of such information; there are agencies that have the confidence of the public from the professional side of technical engineering and manufacturing, but not on the business side of the product, i. e., cost of production. I conceive and believe that it is the duty of general contractors to establish such an agency, and this is one of the purposes of our Executive Board, so that the public may know the why of what they are paying for. By that I do not mean that it is the purpose of our Executive Board to set up an agency that is going to try to correct these things; if they find them evil, the matter of correction will lie in the province of the several elements of the industry involved.

In the question of legislation, what agency is there in the country which gives legislators a composite idea of the subject in hand? We are all familiar with the fact that compensation insurance has laws in a number of states and that no one state is similar to another in this respect. I don't know whether the insurance people go into this phase of the question or not, but truly there should be some economic system developed which would apply, and there should be some source of authoritative information that would carry these matters to legislatures in an effective manner. There is one agency that is always on the alert with information, and that is labor; but what equally representative agency is there to affirm or refute the information that labor gives to the legislator?

We had, fortunately, in the War Department during the war all of the elements together in one place, and much of the friction that existed between them ceased for the time being, but the minute the armistice was signed, the cordial coordination became a thing of the past. (And right here I want to ask contractors not to condemn sub-contractors; not to condemn the material man; not to condemn the engineer; not to condemn the architect—to the public anywhere but face to face. Likewise, I do want to urge upon the engineer not to condemn the contractor; not to condemn the laboring man, and so on down the line —anywhere but face to face.) One agency can be effective in most of these matters, but it cannot be brought about in a day or a year. The subject is a tremendous one and the conditions existing today are the result of years and years of conduct of business—but only when men have a will to do, will they do. If we can create that will in the several elements of construction to put construction on the map as a high grade industry, in due course of time it will be accomplished. The question of not considering construction in its elements and of trying to keep it before the public as an industry is one that seems at first almost unattainable, but I am not one of those who believe that it cannot be attained. I believe that in due course of time we can have a construction congress that will meet annually, which, although it will have no mandatory powers, will be a forum before which the matters which are of common interest will be presented, the loose edges worn off and the several things involved presented to the public in a way that will be to the public interest. Wherever I can I am preaching this gospel. So far nothing definite has come of the larger unified efforts, but there are many men at work today who are earnestly exerting themselves to this end, and sooner or later they will start a nucleus that will grow. This thought cannot be in the minds of so many men and nothing come of it.

If I may I want to refer a little now to work that was done during the war. In the minds of many people the greatest construction work done by the War Department was the training cantonments. That was the most spectacular feature, but it comprised only 25 per cent of the entire program. Our work went into all of the phases of manufacturing, storage, railroading and the other facilities of the country and there was collected together in one place men who represented the whole field of construction. They worked together with a will that perhaps only war can produce, but that will is not altogether wanting when the future of the unified construction industry is presented to them, and these same men are endeavoring to solve the problems to which I have referred.

I have already indicated that the construction industry is the second largest in the country and the general contractor spends most of the money represented. From the income tax returns a tabulation has been made of profits and losses of a number of industries. I will enumerate some of the 15 on the list to which I refer. In certain manufacturing industries, for every manufacturer who makes a dollar, there is one who loses three cents; in quarrying corporations, for every one that has made a dollar there is another that has lost seven cents; down the list next to the bottom you come to financial corporations—for every one of these that has made a dollar there is one that has lost 14 cents; and at the very bottom of this tabulation—for every construction corporation that has made a dollar there is one that has lost 25 cents. From which looms the fact that the construction business is the most hazardous in this country. That tabulation, however, raises, so far as construction work is concerned, a most startling question—what is it that occasions this result?

According to the best tabulation we can make there are 14,000 general contractors in this country. However, the public has no means of distinguishing between these contractors as to who is good and who is not. Our estimate of what should be the membership of the Associated General Contractors is around 4000. In other words, about one-third of the contractors who now have their shingles hung out as general contractors have the necessary "SKILL — INTEGRITY — RESPONSIBIITY" to successfully carry on their work. You engineers needn't smile at that and say that that is what you think of them—*you* are the fellows who give them the work—you are the judge. You architects needn't smile and say "That confirms my opinion"—*you* are the fellows who are giving the work to that other two-thirds, and thus keeping them in business.

This ringing pronouncement of a high practical purpose defines the aims of thinking builders, and is filled with promise for the future of the industry

How can this situation be met? There should be some method whereby the public will know that the association considers this man a trustworthy and competent contractor. If that is accomplished so that the public does know that the association considers this man worthy of being a general contractor and the public chooses another contractor, it will have to bear the fruits of its own picking. We have what we believe to be the proper method of doing that. We believe that the use of the seal of the Associated General Contractors is the best method whereby that end may be accomplished. I believe that the principal reason for the hazard in the construction business is the fact that there are so many irresponsibles fostered by the public, there being no methods or means for their brother contractors to prevent this.

The second reason why I believe contracting is so hazardous is the fact that there is no organization among the general contractors so that they can have coalition of forces to meet the organizations of other branches of industry. We are all familiar with the organizations of the manufacturing industries, and we know that they are very effective in producing a lack of hazard in their several businesses, so far as the commercial tendencies of the country will permit. This is affected through organization more than through any other means. We believe that a similar kind of organization for general contractors will be of vast benefit to the public. We believe that when this business is put on a basis of ordinary hazard, the public will come much more nearly getting its money's worth than it does today. It cannot be otherwise. The public mind will come to rest on the proposition that it is being served, and any organization of general contractors which is based upon any principle other than that of serving the best economic conditions of the country will not succeed. There are many matters that have to be taken up before other national bodies of the country, Congress, the Interstate Commerce Commission, American Institute of Architects, American Society of Civil Engineers, etc. There is only one way by which results can be permanently obtained with these different societies and that is that the organization coming to them shall beget such confidence that what is presented to them will be received without suspicion.

The local contractors' associations in the old days were largely for the purpose of price fixing. They were purely selfish and the effect of those old contractors' associations is not yet dead. The general contractors' associations of today, so far as I know, are not for that purpose, but we must remember that we have that reputation to live down and we want to announce to the world in the fairest sense we can that the Associated General Contractors is being formed and aggressively promulgated for the sole purpose of putting the construction industry on the proper plane to which it is entitled and so richly deserves.

An Official Rental Schedule

A Guide to Estimating Construction Equipment Expense

(Submitted by the Committee on Methods of the Associated General Contractors)

A RENTAL schedule that will furnish contractors with a practical means of estimating equipment expense and determining adequate rental charges was the objective sought by the Committee on Methods in working out a standard schedule for the Association. Such a schedule, evolved from the records and experience of contractors, manufacturers and rebuilders of equipment, has been prepared by the Research Division under the direction of the Committee and approved by the Executive Board. It is herewith presented for use in determining rental charges.

To use the schedule with safety, it is essential to understand how the amounts were obtained, how they are to be applied, and how they are limited for determining rental charges. Knowing these things, no great difficulty should be found in establishing the charges within the bounds of practical accuracy.

For the reason that arithmetical averages as obtained from available records, gave few rational values for depreciation and repairs, such averages were given less weight in establishing the tabular amounts than the practical experience of contractors. In fact, the strongest evidence that these amounts are reasonably safe and accurate lies in the endorsement given them by experienced general contractors.

It may be recalled that a tentative draft of the schedule was submitted to members in the Weekly Bulletin of July 31. They were asked to criticise the amounts and offer suggestions. In accordance with the criticism received, which evinced considerable study upon the subject, some of the tabular amounts were changed. As it now stands the schedule represents the consensus of opinion of many contractors, and with the proper understanding of what the percentage means, it should offer a safe means of estimating rental charges.

What the Values Mean

The endless variation of job conditions, such as topography, ground formation and climate, indicate how great may be the error of any fixed equipment charge when applied to the exceptional job. By having figures which represent the mean of many projects, a starting point exists for ascertaining reasonable charges for the exceptional circumstances. Figures given in the standard schedule may be said to show equipment expense when machines are not required to operate continuously under either the worst or the best of operation strain. When no especially favorable or unfavorable circumstances attend a project, the tabular values probably give the expense within a permissible error.

To eliminate error as far as possible by permitting consideration and comparison of the individual items that make up equipment expense, the gross amounts are reduced to their component parts. Thus any item of the expense which is known to be unusually high in specific cases may be adjusted in the schedule to obtain a more appropriate rental rate.

Components of Expense

Seven items of equipment expense constitute the total rental charge and require consideration in estimating a lump sum contract or in determining fixed rate rentals. An average value for each of these items which represents the expense of a general contractor's outfit as a whole, have been approved by the Executive Board.

Read the address of General Manager Marshall in this issue explaining the aims and purposes of the A. G. C.

The items referred to and their annual proportions of the equipment's initial cost are as follows:

Schedule of Typical Rental Charge

Items of expense are expressed as per cents of original capital investment for equipment having a useful life of 6 years and a salvage value of 25 per cent of the original cost.

	Pct.
1. Average depreciation	12½
2. Equivalent annual interest at 6½%	4
3. Shop repairs	6
4. Field repairs	4
5. Storage and incidentals	3½
6. Insurance	1
7. Taxes	1
Total annual expense	32
Equivalent expense on basis of 8 months' working time per year	48
Rental rate per month	4

How to Obtain Proper Percentage

These percentages and those given in the detailed schedule were determined according to the following principles:

The economical life of a machine is considered to end when its value has depreciated to twenty-five per cent of the original cost. The average annual depreciation then amounts to seventy-five per cent of the initial cost divided by the number of years it may be expected to give service. The initial cost of a machine is represented by the cost of that machine delivered at the contractor's yard.

Interest should naturally be charged at the prevailing rate. This may be computed in three ways:

1. By charging the prevailing rate each year on the depreciated value of the machine.
2. By charging the prevailing rate each year on the average value of the machine during economical life. For example when the salvage rate value is 25% the average value equals (100%x25%) divided by 2 = 62½%.
3. By finding the proportion which the average value is of the initial cost and charging this proportion of the prevailing rate each year. This proportion is called the equivalent annual interest and shows what interest rate on original cost will yield the same interest as the prevailing rate when applied to the depreciating value of the machine. This is the method used in the above schedule. The average value is 62½% of the original; therefore the equivalent annual rate is 62½% of the prevailing rate, or 62½% of 6½% = 4%.

Shop and field repairs are separated by reason of a previous recommendation of the Committee on Methods that field repairs be considered a part of the cost under cost plus contracts and shop repairs be borne by the contractor and covered by the fixed rate rental charge. This recommendation was made on the ground that an owner should not be made to pay the total cost, for example, of re-fluing a boiler which may have been burned out principally on another owner's work.

The other items of cost require no special explanation.

Three Types of Charges

Owners of equipment find occasion to establish rental rates as follows:

1. For a lump sum or unit price estimate.
2. To owners on cost plus work.
3. To others than client owners.

In these instances charges should be made as follows:

1. The rental charge or equipment ex-

pense for lump sum work includes all the items mentioned above.

2. The fixed rate to owners on cost plus work will include all but field repairs, if this item is paid as a cost of the work. To the amount thus determined may be added a service charge depending upon the policy of the contractor, i.e., whether the service of equipment is included in the profit fee or carried in the rental charge.

3. The charge to persons other than client owners includes all of the items of expense and an additional amount of profit or payment for the machine's earning power.

A further consideration in each of these cases is the rate for double shift work, where the percentages for depreciation and repairs should be doubled, or nearly so.

Individual Judgment Essential

The committee desires to emphasize the fact that the values presented in the following table should not be considered absolute in determining a rental charge. A real danger presents itself in using any tabular percentage without investigating the conditions under which the equipment is to work. To illustrate: if the values here given for a standard gage shovel outfit were applied to such an outfit engaged constantly in excavating hard rock, the probability is that the charges allowed would not cover more than half the expense. The frequent dobey shots and the dropping of heavy boulders into cars entails a higher rate of depreciation and repairs than is given in the schedule. On the other hand, if this shovel outfit were steadily engaged in digging sandy loam, the values given in the table would probably cause the equipment charge to contain a fair per cent of profit.

It is with the understanding that individual judgment and experience should adjust the tabular values to meet unusual conditions that this schedule is offered to contractors.

Individual Equipment Rental Schedule

The component expenses incurred by the ownership and maintenance of construction plant are expressed in this table as percentages of the initial cost for individual items of equipment. They indicate the probable annual expense without profit under ordinary job conditions and should be included in any lump sum estimate or in determining time rate rental charges. The salvage value in all cases is considered to be 25% of the initial cost.

Total percentage amounts in the extreme right hand column should be applied to the total cost of a machine including charges for transportation from the factory. This gives the total annual charge which for a lump sum contract covering a full season, is the total equipment expense. For determining a monthly, weekly or daily rental rate the annual amount is divided by the number of such periods in the year during which construction work may be carried on.

Items of Equipment	Economical Length of Life Yrs.	Annual Depreciation Pct.	Annual Shop Repairs Pct.	Annual Field Repairs Pct.	Storage and Incidentals Pct.	Insurance Pct.	Taxes Pct.	Total Annual Charge Pct. of Investment Pct.
Auto-Crane	5	15	6	5	3½	1	1	31½
Auto-truck	3	25	20	20	3½	1	1	70½
Auto-trailer	5	15	6	5	3½	1	1	31½
Backfiller, power	4	18¾	6	7	3½	1	1	37¼
Ballast spreader	8	9½	6	4	3½	1	1	25
Boiler, upright	8	9½	20	5	3½	1	1	40
Boiler, locomotive	8	9½	15	5	3½	1	1	35
Bucket, clam shell	4	18¾	15	6	3½	1	1	45¼
Bucket, orange-peel	4	18¾	25	6	3½	1	1	55¼
Bucket, drag-line	4	18¾	12	3	3½	1	1	39¼
Cars, steel dump	6	12½	8	4	3½	1	1	30
Cars, wood dump	5	15	7	3	3½	1	1	30½
Cars, flat	8	9½	4	3	3½	1	1	22
Cars, hopper	5	15	8	3	3½	1	1	31½
Compressor, steam	7	10¾	6	3	3½	1	1	25¼
Compressor, gasoline	4	18¾	6	7	3½	1	1	37¼
Compressor, electric	6	12½	3	3	3½	1	1	24
Concrete chutes	2	37½	15	15	3½	1	1	73
Conveyor, belt	2	37½	7	6	3½	1	1	56
Conveyor, bucket	2	37½	10	6	3½	1	1	59
Crusher, rock	6	12½	5	3	3½	1	1	26
Derrick, wood	5	15	4	4	3½	1	1	28½
Derrick, steel	10	7½	4	3	3½	1	1	20
Dragline, steam	6	12½	9	8	3½	1	1	35
Dragline, gasoline	4	18¾	10	10	3½	1	1	44¼
Dragline, electric	8	9½	7	7	3½	1	1	29
Drill, tunnel carriage	5	15	8	8	3½	1	1	36½
Drill, traction well	6	12½	7	10	3½	1	1	35
Drill, tripod	4	18¾	7	10	3½	1	1	41¼
Drill, jack hammer	4	18¾	7	6	3½	1	1	37¼
Engine, gas	6	12½	8	8	3½	1	1	34
Engine, steam	10	7½	5	5	3½	1	1	23
Excavator, cableway	6	12½	4	12	3½	1	1	34
Excavator, Keystone	5	15	8	4	3½	1	1	32½
Excavator, trench	5	15	8	6	3½	1	1	34½
Forms, steel concrete	2	37½	20	20	3½	1	1	83
Graders, common road	4	18¾	12	6	3½	1	1	42¼
Graders, elevating	4	18¾	15	7	3½	1	1	46½
Hoist, steam	10	7½	6	4	3½	1	1	23
Hoist, gasoline	6	12½	7	8	3½	1	1	33
Hoist, electric	8	9½	5	3	3½	1	1	23
Locomotive, Indus. steam	9	8½	6	4	3½	1	1	24
Locomotive, Indus. gas	4	18¾	13	10	3½	1	1	47¼
Locomotive, Indus. battery	4	18¾	15	4	3½	1	1	43¼
Locomotive, Stand. gauge	10	7½	6	4	3½	1	1	23
Locomotive crane, steam	8	9½	7	8	3½	1	1	30
Locomotive crane, elect.	8	9½	6	4	3½	1	1	25
Mixer, steam	5	15	12	4	3½	1	1	36½
Mixer, gasoline	4	18¾	13	8	3½	1	1	45¼
Mixer, electric	6	12½	12	4	3½	1	1	34
Mixer, paving steam	5	15	13	4	3½	1	1	37½
Mixer, paving gas	3	25	16	9	3½	1	1	55½
Motors	6	12½	6	4	3½	1	1	28
Pile driver, steam	8	9½	7	5	3½	1	1	27
Pile driver, track	10	7½	5	3	3½	1	1	21
Pile hammer, steam	7	10¾	7	3	3½	1	1	26¼
Pipe, galvanized	3	25	5	6	3½	1	1	41½
Plows	3	25	15	10	3½	1	1	55½
Pneumatic concr. mach.	4	18¾	20	8	3½	1	1	52¼
Pump, centrifugal	8	9½	6	4	3½	1	1	25
Pump, piston	6	12½	7	5	3½	1	1	30
Pump, pulsometer	8	9½	2	4	3½	1	1	21
Pump, Emerson	8	9½	2	4	3½	1	1	21
Rails	8	9½	5	3	3½	1	1	23
Riveter, air	5	15	8	4	3½	1	1	32½
Rock channeler	6	12½	7	8	3½	1	1	33
Roller, steam road	10	7½	5	3	3½	1	1	21
Saw rigs	4	18¾	10	15	3½	1	1	49¼
Scraper, wheel	3	25	8	4	3½	1	1	42½
Scraper, slip	1	75	25	10	3½	1	1	115½
Scraper, fresno	2	37½	25	15	3½	1	1	83
Shovel, steam	6	12½	7	6	3½	1	1	31
Shovel, gasoline	4	18¾	9	7	3½	1	1	40¼
Shovel, electric	7	10¾	6	5	3½	1	1	27¼
Switches, fabricated	3	25	3	3	3½	1	1	36½
Tower, steel hoist	7	10¾	3	4	3½	1	1	23¼
Tractor, wheel gas	6	12½	9	5	3½	1	1	32
Tractor, caterpillar	5	15	15	10	3½	1	1	45½
Wagons, dump	4	18¾	17	3	3½	1	1	44¼
Wagons, hauling	4	18¾	12	3	3½	1	1	39¾
Wagon loaders, power	5	15	10	6	3½	1	1	36½

Motor Trucks

Fig. 1—A light truck is preferred by many builders, as its capacity may be increased by using a trailer

Many builders will not entertain the idea of owning a motor truck because of a feeling that a comparatively small volume of work will not justify the expense of such equipment. In many communities this feeling is bolstered by the fact that trucks may be hired at will from concerns that make a specialty of odd jobs of hauling, thus making it possible for the builders to employ motor trucks only at such times as they are necessary.

On this very word "necessary" hinges one of the faults of such a method. Under the circumstances it is seldom that a builder can or will take full advantage of the benefits of motor trucking. It is only in cases of absolute necessity that motor trucks are employed in such cases, and obsolete methods are used for minor hauling that appears insignificant when considered alone, but which amounts to a surprising total when considered as a whole. In other words, builders who scout the idea of a need for a truck often base their views on the assumption that the rather limited occasions on which they hire trucks is an index of their usefulness.

If such builders would use a little imagination they would often find that there are countless uses for a motor truck that are not evident on the surface. To do this the builder should pretend that he owns a motor truck and should be on the alert to recognize any and all opportunities for its use on job. He should also realize that other factors of construction are influenced by a motor truck. For instance a temporary shortage of materials on the job often means that several high priced mechanics must be shifted from one portion of a job to another and then back again. It is easy to waste a good many dollars in a year because of such unnecessary shifting, much of which could be avoided if a truck were on the job.

Granted that a motor truck is useful only a part of the time, there is still considerable in its favor. A good span of mules, harness and wagon for instance often runs into as much money as a motor truck, but a truck will do as much hauling as three spans of mules, therefore, a truck might loaf two-thirds of the time and yet accomplish as much work as would a team working full time. In other words the superior efficiency of motor trucks is often unconsciously twisted into an argument against their use.

Then it is almost always practicable for

Fig. 2—Easily read signs on the sides of a truck have an advertising value that is considerable

Fig. 3—This truck could "loaf" half the time and, as compared to a team, still make money for its owner

Fig. 4—As a business proposition, "pretty is as pretty does," and the truck puts it all over its handsome four-footed rivals

Fig. 5—A self-dumping truck adds a quick getaway to its other advantages. A helper is not necessary for unloading

the owner of a truck to hire it out for odd jobs of hauling. We have in mind an eastern builder who several years ago bought a motor truck after much persuasion. Finding that the truck was not employed full time on his own jobs he began to hire it out for odd jobs of hauling with such profit that at last accounts he owned a fleet of four trucks and his income from the hauling business compared favorably with that of his construction work.

Tractors

Recent years have made no more important addition to builders' equipment than the tractor. It is a veritable "handy man" on either large or small jobs and its uses are manifold; it seems to fit in almost everywhere.

One of several tractors used on a recent housing development

Its full usefulness may be said to be governed only by the ingenuity of the owner or operator, and new applications of its use on construction work are being developed almost daily.

Combined with a wheeler or scraper in excavation work or in grading or back-filling around completed buildings, it makes teams or hand-shoveling look foolish. In case excavated material must be hauled more than 1000 yards, however, it is more economical to employ teams, but even in such cases the tractor is of great value in pulling heavily loaded wagons from the excavation onto level ground where teams may be attached.

For pulling out trucks or wagons that are stalled; raising bents of heavy timber that are framed on the ground; hoisting steel and other heavy materials into place; moving trailers loaded with materials from one portion of a job to another; hauling concrete mixers and other heavy equipment; pulling stumps and dislodging rocks, are only a few of the more important uses to which a tractor may be put. Almost any job will disclose a score of more important tasks that a tractor will perform with credit.

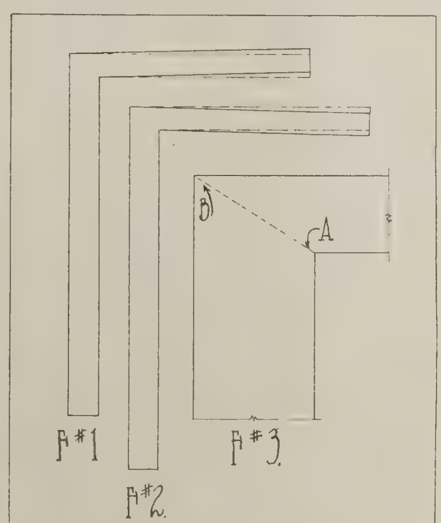
In many cases the engine may be used as auxiliary power to drive other machinery by means of a belt pulley.

It would be interesting to learn some of our readers' experiences with tractors and the various uses to which they have been found to be adapted.

Squaring a Sprung Square

Hugh McClure, general contractor, Kearney, Neb., writes:

Sometimes a carpenter will discard a square which has become sprung and is



therefore out of square.

Unless there is some other reason for throwing away a square, this kink may be the means of saving somebody's square from an untimely end.

Figure 1 shows a square sprung open, and Figure 2 shows a square sprung closed. In Figure 3, which is an enlarged view of the corner of the square, note the dotted line running across the corner. If the square is sprung open, lay the corner of the square on an anvil, and starting near the outside edge at B, hammer along the dotted line toward A, gradually easing up the blows as you approach A. This expands the metal on the outer edge of the square and throws the tongue and blade toward each other. By testing with a true square or by reversing the square under treatment on a straight-edge, and testing and regulating the hammering accordingly, it will be possible to square up the square to perfection.

If the square should be sprung closed, just reverse the process as given above, starting hammering at A, and easing up approaching B.

Costly Economy

The contractor, it would seem, has to assume the attributes of Omnipotence to secure the life and limbs of his employees and at the same time secure the contract and come out even. When a disaster occurs he is given little credit for having used his best judgment. When he makes everything so safe that little short of a miracle would cause a breakdown, the fact that "more than enough is too much" stares at him out of the balance sheet.

However that may be, it costs too much the other way in money and mental distress, material, life and suffering, to leave anything undone to obtain absolute security in equipment, as witness the recent distressing case in Indianapolis, which a correspondent describes. We have suppressed the names, as they are not necessary to the lesson of the calamity, but one which the contractor must learn, though a hard one, that is, "to provide for everything, including the acts of God."

Three arrests in connection with the collapse of the Emmerich Manual Training High School in Indianapolis, recently, which collapse killed two workers and injured a score of others, were ordered November 30 by Coroner Paul Robinson, who, in concluding his investigations of the accident, returned a verdict of manslaughter.

"There is evidence that the derrick was operated in a dangerous and unlawful condition," declared the coroner, naming a subcontractor in charge of the stone work, and the company's foreman and engineer, as responsible and ordering their arrests. The coroner's verdict and report were transmitted to the grand jury for action. The three men were arrested immediately by police officers and arraigned in city court, where they waived preliminary examination and were bound over to the grand jury, all three giving bond in the sum of $1,000.

The accident occurred November 18, when a $1,000,000 addition to the high school in the course of construction collapsed without warning. Many of the workman toward the outside of the building jumped to safety, some of them suffering injuries while jumping, but the remainder were buried in a mass of stone and twisted steel, and it was hours before the last prisoner had been released and sent to the hospital.

The sub-contractor, whose testimony virtually brought the coroner's inquiry to a close, attributed the crash to insufficient bolting and riveting of the steel skeleton and the pouring of concrete on the third floor of the building.

He testified that he was the owner of the large wooden derrick which he ordered placed on the super-structure. The witness, it is understood, declared that he examined the derrick, which was used in hoisting stone for the side walls, and determined that it was safe.

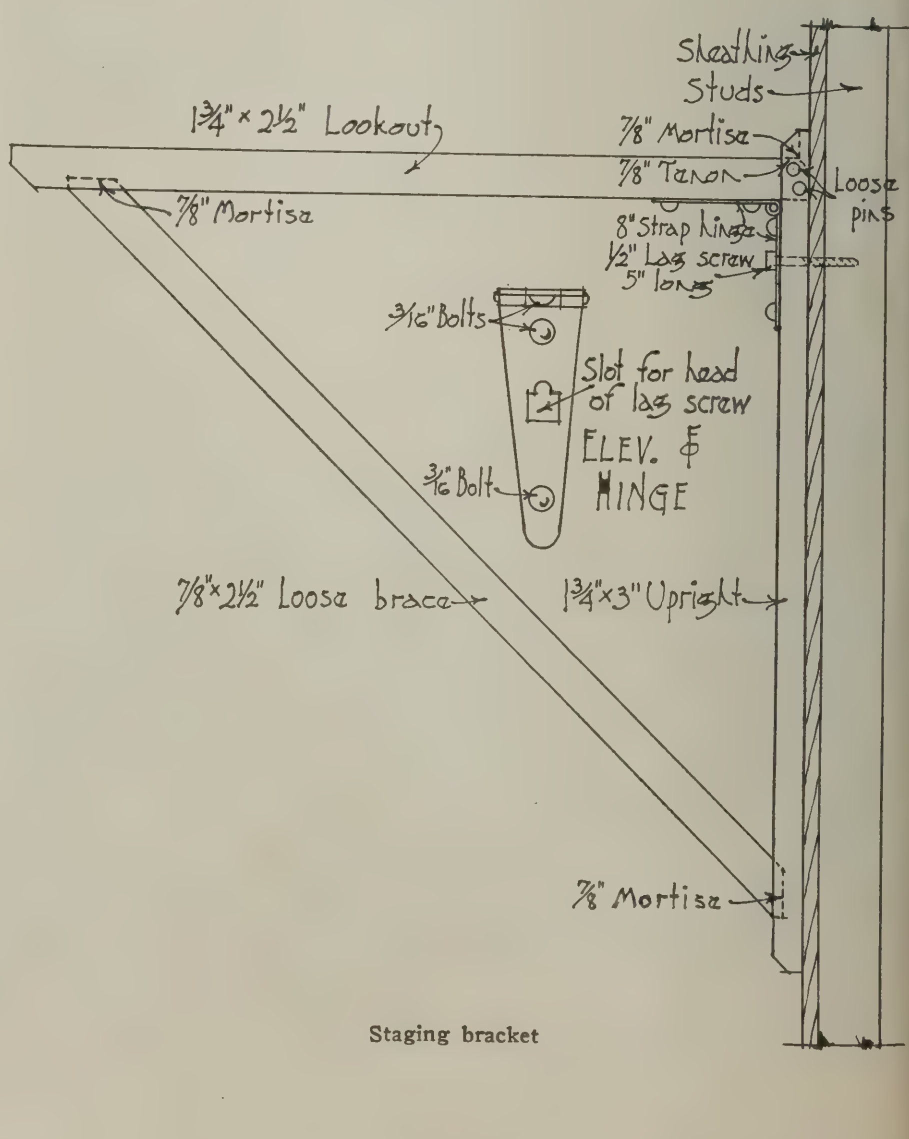
He admitted that the wood lining of the brake of the hoisting engine was worn and that he examined it the day before the crash. The witness was questioned relative to a conversation he had with the architect shortly before the crash, about placing guy braces on the stiff-legged derrick, and related that such a conversation took place a few minutes before the collapse, and that it had been decided to brace the derrick to prevent vibration.

Staging Bracket

I put up a foundry 60 by 100 and 35 feet high and did not stick up a scantling, drive a nail, nor saw a board for scaffolding, some saving at present prices. I used the staging brackets shown in the sketch.

The brackets should be made of spruce as it is light and tough. They should be well made and painted. They will save from 15 to 30 dollars on every house. I have 29 of them and 65 ½-inch lag screws for attaching them to the walls. Some of the lag screws are 6 inches long for use around belt courses and so forth.

One man puts them up on the outside and they don't interfere with inside work. They can be used on old work by putting the lag screws close up to the siding and then plugging the holes when they are removed.



Staging bracket

When I get staging high I put a row of lag screws clear around the house and hang up the brackets. Then they are up out of the way of trucks and graders, and when I get high enough I put in another row of lag screws, and so on up. The last row of lag screws should be about 3½ feet below the plate, this makes the eaves about hip high to the worker.

If I am using drop siding I put the lag screws in the corner post. If I am using thin siding, I nail a short block on the post and put the lag screws in that, thus keeping the brackets away from the corner boards. —S. F. Black, Ohio.

The sender got 5 dollars for this, can't you use a little spare change? Send in your ideas.—Editor.

Announcements and Publications

The Cornell Wood Products Co., of Chicago, announce a flat reduction on Cornell wood board of four dollars ($4.00) per thousand square feet f. o. b. mill Cornell, Wis. The company states that this reduction is inspired by the desire to encourage construction, and to assist in stimulating activity in the building trade.

A new parallel attachment has been placed on the market by the New York Blue Print Paper Company. This attachment eliminates the use of the T square in drafting and is said to give better and quicker results.

Handbook of Building Construction—Editors-in-chief George A. Hool, consulting engineer, professor of structural engineering, University of Wisconsin; and Nathan C. Johnson, consulting engineer, assisted by a staff of 46 specialists. Every detail of practical costruction is considered in this handbook which is complete and thorough in every particular. The work is published in two volumes (not sold separately); 1474 pages, 6 by 9 inches, with flexible covers, and fully illustrated. Price $10.00. Issued by the McGraw-Hill Book Co., Inc., 239 West 39th Street, New York.

Bisk Kitchens—Circulars with illustrations and blue print showing manner of installing Bisk standardized unit kitchens in living or dining rooms. Issued by Bisk Corporation, Brockton, Mass.

Upson Smiles, for December, 1920, the neat and sprightly house organ of the Upson company, Lockport, New York, as usual is filled with helpful suggestions on the uses of the company's product.

Announcement is made that the Republic Iron Works, Tecumseh, Mich., has been brought under the control of W. F. MacGlashan, president of the Beaver Board Companies, and J. B. Carson, president of the Acme Steel and Malleable Iron Works, and other metal working institutions, and that an improved line of cement mixers will be brought out in 1921 by the Republic Iron Works, which will carry a merchandising campaign of unprecedented intensity, so far as this staple is concerned.

Kimball Elevators—Kimball Bros. Co., Council Bluffs, Iowa, announce as evidence of the stability and correct construction of their specialties, the text of a letter from a hardware dealer ordering another elevator of the Kimball type similar to one he had in use for twenty-six years and which was only put out of commission by the complete destruction of the building by fire.

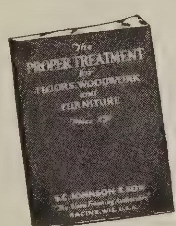
Carey Floor Covering—Illustrated circular describing Ezola mats, and floor covering and aisle runners for offices, theaters, stores, public buildings, etc. Issued by the Philip Carey Co., Lockland, Cincinnati, Ohio.

Stefco Ready Built Sectional Steel Buildings—The Steel Fabricating Corporation, Harvey, Ill., announce the construction of a large plant at Michigan City, Ind., to provide for the increasing demand for Stefco sectional steel buildings.

The Van Dorn Electric Tool Co.—Circular letter describing the rise and development of portable electrical drill construction, for drilling wood, iron or steel and adaptations to electrical grinding. Issued by the Van Dorn Electric Tool Co., Cleveland, Ohio.

Meyer Cup Elevators—An illustrated descriptive catalogue of the line of steel roller chain elevators and appurtenances manufactured by A. F. Meyer Manufacturing Company, Morton, Ill.

The Proper Treatment for Floors, Woodwork and Furniture—This brochure is now in its eight edition, and has been published by S. C. Johnson & Son, Racine, Wis., for the past fifteen years. As its title denotes it gives the latest, most practical and concise instructions for finishing wood, either in stained or enameled effects, and gives covering capacities of the various materials. Some beautiful interiors are shown in this edition which marks another advance in the progress of the preceding issues. The work should be in the hands of every painter, decorator, contractor and architect. It is obtainable on request.



Hendricks' Commercial Register of the United States for Buyers and Sellers—This annual is in its 29th year, and contains more than 48,000 subjects indexed and cross indexed so that the manufacturers of any article may be readily found. It has a classified trades section, and a trade name section as well as an alphabetical section. Price $12.50. Published by S. E. Hendricks Co., Inc., 70 Fifth Avenue, New York.

Expanded Metal Construction, issued by the North Western Expanded Metal Co. (E. Drage Browne, Editor), 37 West Van Buren Street, Chicago, is one of the most practical, instructive and tastefully prepared of the special organs issued in the building industry.

Crystalrox is the name of a new floor hardener described in a leaflet with the adjuration "Don't Sweep Your Concrete Floors Away." Issued by the General Fireproofing Company, Youngstown, Ohio.

Reproductions of concrete and composition marbles, granites, onyx, porphyry, etc., produced by the formulas of the Art Stone Company, Waynesboro, Pa., are shown in colors simulating the products themselves in a leaflet issued by the company, announcing the sale of the process.

The Stanley Works announce that with the merger of the Stanley Rule & Level Co. and the Stanley Works, both of New Britain, Conn., it has become advisable, starting January 1, 1921, to open three new offices on the Pacific Coast. These new offices will be as follows: San Francisco, Cal., with S. V. Armstrong as district sales manager; Los Angeles, Cal., with L. M. Knouse as district sales manager; Seattle, Wash., with Bruce Findlay as district sales manager.

The Lehigh Portland Cement Co., Allentown, Pa., is distributing a new combination concrete and lumber computing scale, showing in various proportions the quantities of cement, sand and stone required for the mixture of one cubic yard of concrete, and on the same side of the scale the proportions of cement and sand for one cubic yard of mortar. The lumber scale on the reverse side computes the number of board feet in various sizes of lumber. The scale is supplied to architects, contractors and engineers interested in receiving it.

Blaw-Knox Co., of Blawnox (Pittsburgh), Pa., has established a new sales district in the South, with headquarters in Birmingham, Ala. The Birmingham office is located at 408 American Trust Building. In addition, the Blaw-Knox Co. has district offices in New York, Chicago, Detroit, Boston, Baltimore, San Francisco and Sheffield, England. Prescott V. Kelly, formerly connected with the executive sales department at Pittsburgh, is in charge of the new office.

Douglas Fir
Northern White Pine
Idaho White Pine
Western Soft Pine

Western Hemlock
Washington Red Cedar
Red Fir and Larch
Norway Pine

WHAT THIS TRADE-MARK MEANS TO THE LUMBER USER

WHEN the Colonists first built their homes in New England, they cut and sawed their own lumber. They knew the wood they were using. They selected it carefully.

Much of their work endures today. Wooden dwellings, barns, wharves, warehouses—two hundred to three hundred years old—models of simple architecture and still serviceable.

Yet modern-built houses in these same communities oftentimes last only a few years. Men point to the contrast and say that lumber is not what it used to be.

The good lumber is here today in just as available supply as it has ever been. But discrimination in choosing it for the particular purpose it is to perform is not what it used to be.

There are 46,000 saw mills in the United States, large and small—each working the wood of its locality. This lumber is shipped into an open market, many kinds and numerous grades of each kind.

If a man buys *just lumber* he may get anything but the one thing that best suits his purpose.

Here we see the reason in its simplest form for a real service to the lumber user.

As substantial factors in the lumber business, the Weyerhaeuser people want you to think more about the wood you use.

To this end we will supply to lumber dealers and to the public any desired information as to the qualities of different species and the best wood for a given purpose.

This service will be as broad and impartial as we know how to make it. We are not partisans of any particular species of wood. We advise the best lumber for the purpose, whether it is a kind we handle or not.

What we advocate is conservation and economy through the use of the right wood in its proper place.

Think what this means to a great industrial concern which buys 10,000,000 feet of lumber at a time.

And no less for the farmer or home-builder buying anything from a single board or scantling to the lumber for a residence complete.

From now on the Weyerhaeuser Forest Products trade-mark will be plainly stamped on their product. You can see it for yourself at the lumber yard or on the job after it is delivered.

When you buy lumber for any purpose, no matter how much or how little, you can look at the mark and know that you are getting a standard article of known merit.

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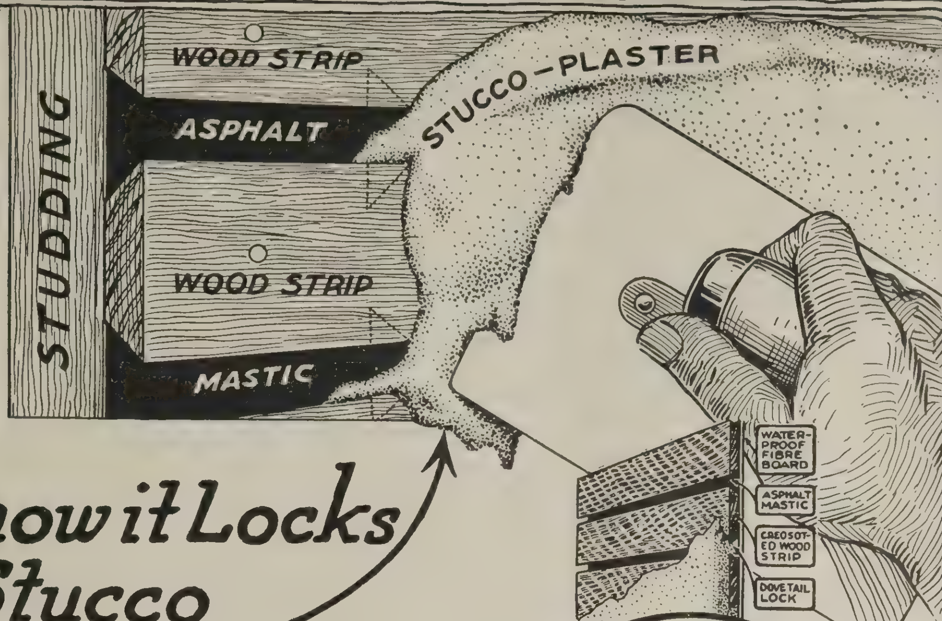
SAINT PAUL • MINNESOTA

Producers of Douglas Fir, Western Hemlock, Washington Red Cedar and Cedar Shingles on the Pacific Coast; Idaho White Pine, Western Soft Pine, Red Fir and Larch in the Inland Empire; Northern White Pine and Norway Pine in the Lake States.

Bishopric for all Time and Clime



See how it Locks the Stucco

THE DOVETAILED KEY INTERLOCKS THE PLASTER
BISHOPRIC STUCCO AND PLASTER BASE

BISHOPRIC locks stucco or plaster in an inverted wedge clasp with a grip that holds for generations and the asphalt and fibreboard backing provide a better working arrangement for the plaster, saving the plaster that usually is lost through the open spaces in other forms of lath. Moreover, 25 per cent less plaster is required on account of the dovetail key construction and the plasterer does his work in less time.

Bishopric Stucco and Plaster Base is so rigid and strong that buildings, before the stucco has been applied, have been lifted from their foundations by storms without getting out of plumb or without a single wood strip being broken.

BISHOPRIC SHEATHING—Strengthening, insulating, sound-deadening, weather-proofing unit; for exterior walls, sub-flooring and sub-roofing.

BISHOPRIC STUCCO BASE—Interlocking dovetailed key, insulating and waterproofing unit; creosote treated and not treated; for exterior. Applied direct to the studding or over BISHOPRIC sheathing.

BISHOPRIC PLASTER BASE—Interlocking dovetailed key, insulating, moisture proofing and sound-deadening unit; for interior plaster walls and ceilings.

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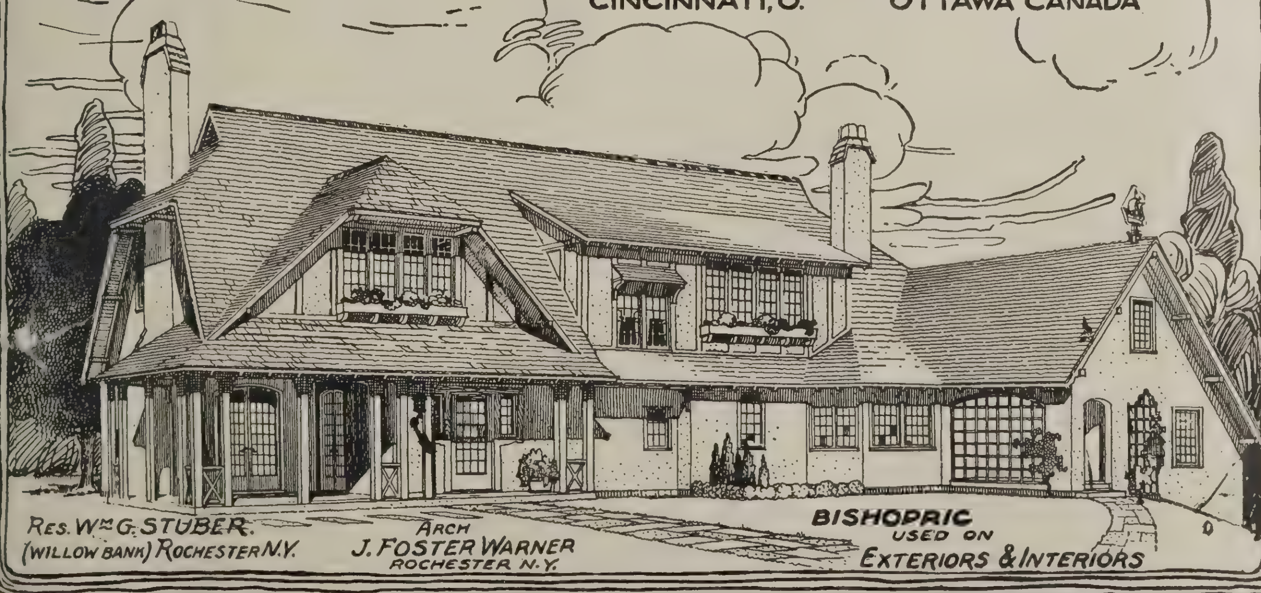

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NATIONAL BUILDER

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The Situation

THE contradictory opinions about the resumption of building activity does not interfere with the fact that for a very long time to come everything will remain on a higher level than before the war.

What is demanded by the public is some definite assurance that the cost of construction shall be established on some basis so that the value of building will not be materially reduced by considerably lower costs of building in a few months or even years.

The builder wants to know how to advise his customers. It must be remembered, however, in treating the situation generally, that each customer's problem involves the elements of time and use of the proposed building and that getting a building erected on time and having the advantage of its use may be so advantageous as to compensate for a possible lower cost of construction at a later date. This is true in a lesser degree of residence construction than business buildings.

Present Decrease in Costs

The latest available investigation of lower costs and possibilities of the future comes from Mr. F. E. Davidson, president of the Illinois Society of Architects. He invited any architect who had taken competitive bids since January 1 on any project upon which bids had been taken during the middle of 1920, but construction on which had been postponed, to prepare a table showing the percentage of increase or decrease of each item. The first results are shown in the following table.

Drop of 14.75 Per Cent in Eight Months

This table shows the prices given in May, 1920, by contractors who bid for the construction of a three-story English basement apartment building, and the figure on Jan. 10, 1921. The architect who received the bids, Ralph C. Harris, says although the firms that bid this month are not the same as those that submitted estimates last May, all estimates were presented by reliable concerns.

	May 20, 1920	Jan. 10, 1921	Pct. Diff.
Masonry	$ 44,300	$ 40,220	9.4
Carpentry	74,000	55,700	24.7
Concrete	5,200	4,650	10.5
Stone	5,573	6,200	7.6
Plumbing	28,100	25,879	.8
Heating	11,250	10,600	.6
Electric	4,525	4,300	.5
Plastering	22,200	17,400	20.5
Steel	4,629	4,109	11.2
Sheet metal	2,890	2,960	.17
Painting	14,920	12,300	17.6
Glass	2,113	2,200	4.6
Tile	5,840	5,700	2.4
Totals	$225,548	$192,229	*14.75

*Average decrease.

"COM'ON, BOYS, LET'S CUT HIM DOWN!"

From the Chicago Tribune

Mr. Davidson points out that this drop justifies his prediction that the building material costs will follow in general the price level of all commodities, and the price level of commodities will parallel the curve representing monetary circulation, as well as loans and discounts. The American public must become accustomed to doing business on a higher price level than before the war. Price levels will never recede to or even approximate pre-war levels.

"Stabilize Conditions"

"As soon as those interested in building construction have been convinced that costs are more or less stabilized," says Mr. Davidson, "construction work will start."

Building Material Producers Consider the Situation

Appreciating the fact that producers of lumber and building materials of all sorts have problems peculiar to themselves and differing in kind that cause marked inequalities in the opportunities to reduce costs, it devolved upon the National Lumber Manufacturers Association at a called meeting held on January 5 and 6, to invite a conference of all interests in the building materials field to be held in Chicago, January 21 and 22.

In response to a visit by representatives of the National Lumber Manufacturers Association to explain the object of the conference President-Elect Harding in a commendatory letter to Mr. John H. Kirby, president of the association, wrote significantly:

"An effort of this kind, while immediately involving only one set of related industries, would of course have a reflex influence upon every other line of business. I very much hope that your convention will be able to develop a workable plan. If you gentlemen shall prove that this is possible, it can not be unreasonable to hope that other industrial groups may undertake similar efforts."

The conference was not fully representative, but probably met all expectations as an entrance to a larger understanding and collaboration in supporting the building industry.

The deliberations closed January 22 with the adoption of two vigorous resolutions the first of which urged a return at once to basic prices and a second asking Congress to repeal or amend the Clayton anti-trust act and the Adamson law and other statutes "which interrupt the operation of the natural economic laws such as unscientific revenue acts, excess profits tax, excessive surtax on individual incomes, etc." The resolution which was offered by Charles S. Keith of Kansas City was adopted unanimously. It was:

"Whereas, the fundamental, economic conditions of the United States are sound as based upon the following conditions:

"We hold one-third of the gold reserves of the world:

"We have the greatest reserves of the products of agriculture that the nation has ever possessed. Our granaries are bursting with food for man and forage for beast;

"Present prospects for future agricultural production were never more favorable;

"The nation has the greatest production of natural resources of any nation of the world, producing one-third of the world's supply of coal, one-half of the world's supply of lumber, two-thirds of the world's supply of oil, and nearly all other necessary commodities in proportion;

"The fabricated productive capacity of the nation is second to that of no other nation;

"We possess adequate railroad facilities to move the nation's production, and,

"Whereas, there exists a potential demand for all of the products of the nation; that the reservoirs of the supplies of the world are depleted and exhausted; that half of the world is naked as well as hungry; that a potential demand for all of the products of the nation exist, if they can be financed and thereby allocated; and

"Whereas, at the same time, regardless of all of the foregoing favorable conditions there is, due to the unnecessary restriction of credit, aided by propaganda designed to reduce the high costs of living with total disregard to the law of supply and demand, a stagnation of industry and serious unemployment of labor; be it therefore

Want Laws Amended

"Resolved, that Congress be requested to direct its attention to those laws which interrupt the operation of the natural economic laws, such as unscientific revenue acts (excess profits tax, surtax on individual incomes), laws exempting securities from taxation; laws creating privileged classes, such as the Adamson act and the Clayton act; laws discouraging domestic production and encouraging foreign competition; laws permitting agencies of the government to interfere with legitimate business, such as those creating numerous commissions and bureaus for the regulation of industry; laws authorizing different rates of discount in different federal reserve districts, and many of the similar laws which are interrupting the reasonable and legitimate and proper course of business.

"Be It Further Resolved, that all such amended laws should be modified, amended or repealed to permit the operation of the great American principle of equal opportunity to all and special privileges to none."

Price Resolutions

After several hours' debate the price resolutions were adopted as follows:

"Be It Resolved that we call upon all persons engaged in the business of manufacturing building materials of every class and character, as well as upon builders and contractors, to exert their utmost efforts to see that conditions are brought about which will result in immediate reductions in costs of construction.

"We call upon the retailers and distributors of building materials to do their full share in meeting the demand of the people for cheaper building materials. We call upon labor engaged not only in the construction industry, itself, but in the making of the great variety of materials of all kinds entering into construction, to do its full share, in increasing output and hastening construction, to the end that labor costs which constitute so large a proportion of the total cost of raw materials and of building, may decline to a point where it will be possible to proceed with construction which is so essential to the health, comfort and well being of all the people.

"Be It Further Resolved, that we endorse the conference of housing conditions to be held by the Chamber of Commerce of the United States, at Washington Jan. 27 and 28, and recommend that that conference thoroughly investigate and publish the relative costs of producing building materials, the recessions in prices of building materials themselves, the relative costs of distribution of building materials as based upon increased freight rates, and comparison of wage scales and efficiency of building trades labor.

Help to Start Building

"Be It Further Resolved, that the building materials whose producers are represented at this conference, pledge themselves to take such action as they legally and conscientiously can within their own industry and in co-operation with others to bring about conditions which will make possible the early resumption of construction to the end that the health, happiness and the general and profitable employment of the American people may be assured."

The Attitude of Labor

On the morning of Jan. 21 a statement from the Building Trades Council of Chicago appeared in the press to the effect that "We as officials of the building trades organization, can't see our way clear to enter into a contract for a wage which will not maintain labor; particularly as there is no evidence that costs of living are to come down. On the contrary, indications point to the maintenance of about present prices for at least a considerable period.

"When wage contracts are entered into, they must necessarily be for a period of time which will stabilize labor costs so builders will know what buildings are going to cost them."

"Another question arises. Is a lower wage a desirable thing? Labor is the big factor entering into the cost, and there doesn't appear to be any particular advantage in reducing wages.

"A reduced wage means a lessened purchasing power.

"A full, honest, fair day's work should be furnished by labor. This is being done and will continue so.

"Full Day's Work or Discipline"

"We all know that there have been abuses on the part of tradesmen, manufacturers, and financial people who have taken advantage of conditions. The building trades —the rank and file as well as officers of the organizations—have thrashed out this subject, and it is agreed that any workman who does not do a full, fair, honest day's work will be disciplined by his organization."

Attitude of Manufacturers

A warning to organized labor to "take stock of its policies and practices from a thoroughly American standpoint" was given on January 21 by Stephen C. Mason, president of the National Association of Manufacturers.

"The American people are no longer going to accept lip service from those organizations which are leading the nation to the brink of the most serious economic and social crisis in our history," said Mr. Mason.

"We should not restrict immigration," he said. "The labor organizations are trying to do this. They want to cause a shortage of labor, thereby sending wages sky high once more. And this must not happen."

$300,000 to Fight Graft

A fund of $300,000 with which to combat the forces which have prevented building will be raised immediately by the National Lumber Manufacturers Association. This will be used to launch an immediate advertising campaign, pointing out the present low price of lumber and urging the public to start building at once.

Senator Calder Urges Trade Schools

Senator Calder, who has as chairman of the Senate Special Committee on Reconstruction and Production, made a national survey of the housing situation, has addressed the following letter to the governor of every state in the union:

"My Dear Governor: A comprehensive study of the causes of the present shortage in housing and of the various factors entering into the building industry which have tended to retard its progress, has been conducted by this committee during the past eight months, and although we have not been able to visit every State in the Union, we have covered all which the time at our disposal has permitted, and have interrogated authorities from all over the country in order to give a national scope to the study. Our investigation has enabled us, as a result of the perspective thus afforded, to ascertain some of the things which will remedy the conditions which are unsatisfactory and hamper reconstruction.

"One of the outstanding factors which is now hampering the building industry is the curtailment at the source of the supply of skilled tradesmen. The building industry is more highly organized than any other large industry but it is noticeable everywhere that its members are now getting along in years and in some trades the skilled young man is a rarity. It has been the experience of the past that the skilled mechanic in the building trades drops out very much earlier than in other trades and is forced to take up other or less skillful employment. His pay has accordingly been somewhat higher than the usual run but the necessity for constant replacement has been ever present.

"The American youth takes kindly to the particular trades which require a little more skill than the others, and so we find among the electricians, the plumbers and the masons numerous young men of American birth, but such is not the case with the other trades. Heretofore, men from foreign shores dissatisfied with the political and social conditions existing in their fatherland, have come to this country and, without serving a technical apprenticeship, they have started at the bottom of the ladder in the building trades. Those who have been worthy have risen to heights limited only by their ability. The country was a huge industrial training school where the building trades were taught largely to newcomers to our shores but the ravages of war cut off this source of supply and the result is apparent on every hand. The remedy seems plain—more apprentices. This goes to the essence for without apprentices we shall soon be short of journeymen not only, but of foremen and practical employers. The problem is—How shall this be achieved? The best solution seems to be through the fostering of building trades schools. Some of the states have, under their labor codes, authorized a State Industrial Commission to operate an apprentice department.

"Another thing which has been patent in all of our investigations, is that the supply of labor is depleted through over-specialization. There are trades, such as paper hanging, in which work is done but a few months in the year. This particular trade being the busiest, of course, just prior to the seasonable rental dates, with the result that these particular trades are and must be highly paid, or else the men who participate therein must be competent to function in other trades in the off season. This leads to the thought that extensive Government or State aid to trade schools in which apprentices may be trained in a sufficiently wide range of related activities to enable them to adjust themselves to changes in industrial conditions and seasonable demands of the construction industry, would be beneficial not only to the tradesmen themselves but to the body politic.

"Summarizing the above, I solicit your good offices in promoting the replacement of the fast dwindling supply of building tradesmen through an adequate system of trade schools which shall be conducted along lines mentioned above, and I request that you at your early convenience give me the benefit of your counsel as to what has been done in your State along this line or what you believe can be done.

" Very truly yours,

"(Signed) William M. Calder, Chairman."

A Builders' Sideline

More and more builders are finding out that there is at least one line on which business need never be dull. That line—and it is a very profitable one—is lightning protection. With a good standard system of protection, it is easy to fill in the dull times and slack seasons on other items in stock with this all-year and every-year seller.

Lightning rods are recognized everywhere as necessary protection for practically every building on the farm, and in town, too. They are recommended by insurance companies, state fire marshals and all electrical authorities. Lightning is the principal cause of farm fires, according to the last report of the Indiana State Fire Marshal, who says in substance:

"In a recent investigation of 38,266 farm fires, it was found that 19,820, or 51 per cent, were due to lightning. Of these, exactly 100 per cent occurred in buildings not protected by lightning rods."

In other words, not a single farmer who installed proper lightning rod protection suffered loss from lightning fires.

Nearly all insurance companies handling farm business, realize the saving power of lightning rods against the attacks of the destroyer from the skies. They are convinced of the value of the lightning rod as a protector of farm property. The lightning rod now occupies the same place with relation to the protection of farm property as the automatic sprinkler does to municipal building protection, at least as far as liability goes.

The sale of lightning protection is not governed by the ups and downs of the building business. When new buildings are going up, naturally the best prospects are the owners of the new buildings. But when the building business is dull, plenty of business can be had by selling the owners of old buildings which are not protected.

SCHEDULE OF LABOR AND MATERIAL PREVALENT IN THE BUILDING INDUSTRY, 1914 TO 1920, INCLUSIVE

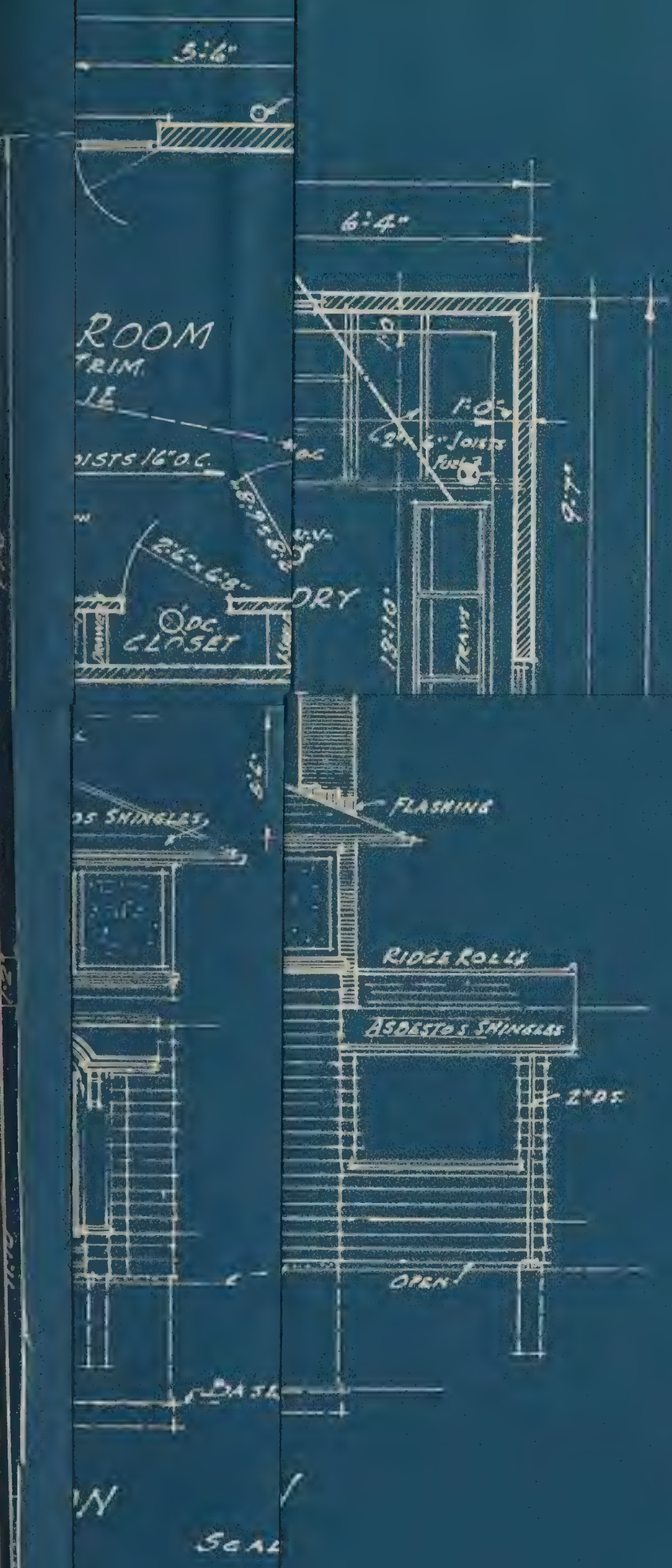
One of the largest and best known general contractors in the United States has prepared the following table and supplied it to the editor of the monthly bulletin of the Illinois Society of Architects:

Labor	1914	1915	1916	1917	1918	1919	1920	1920
Carpenters	.65	.65	.70	.70	.80	1.00	1.00	5/1 1.25
Bricklayers	.75	.75	.75	.75	.87½	1.00	1.00	5/1 1.25
Bricklayers' Laborers	.40	.40	.42½	.45	.57½	.70	.70	5/1 1.00
Cement Finishers	.65	.65	.67½	.67½	.75	1.00	1.00	5/1 1.25
Caisson Diggers	.57½	.57½	.62½	.65	.77½	.90	.90	5/1 1.25
Hoisting Engineer	.75	.75	.75	.75	.87½	1.00	1.00	5/1 1.25
Structural Ironworkers	.68	.68	.69	.70	.87½	1.00	1.00	5/1 1.25
Plasterers	.75	.75	.75	.75	.87½	1.00	1.25	
Material								
Structural Steel, per ton	37.63	42.00	83.99	109.37	103.31	85.24	115.00	
Common Brick, per M	7.00	7.00	7.00	9.00	9.00	12.00	16.00	
Crushed Stone, per yard	1.65	1.40	1.35	2.00	2.00	2.40	3.00	8/25 4.25
Screenings, per yard	1.25	1.15	1.05	1.75	2.00	2.10	3.00	8/25 4.25
Bank Sand, per yard	1.25	1.25	1.00	1.75	2.00	2.00	3.00 car del.	8/25 4.25 team del.
Torpedo, per yard	1.65	1.65	1.40	2.10	2.30	2.40	3.00	4.25
Portland Cement per bbl. not incl. sacks	1.17	1.17	2.01	2.08	2.11	2.19	2.60	8/25 4.40 Universal
Lime, per bbl.	.65	.55	.70	.90	1.00	1.00	1.50	
Com. Nails, per keg (base)	1.85	1.95	3.00	3.50	4.50	4.50	5.00	
Scaffold Plank, per M	24.00	24.00	27.00	35.00	47.50	52.50	55.00	

Average Labor—92%
Average Material—184%

A Western House—Ralph H. Oliver, Architect, Chicago

See descriptive article on opposite page and complete plans in detachable blueprint insert in this issue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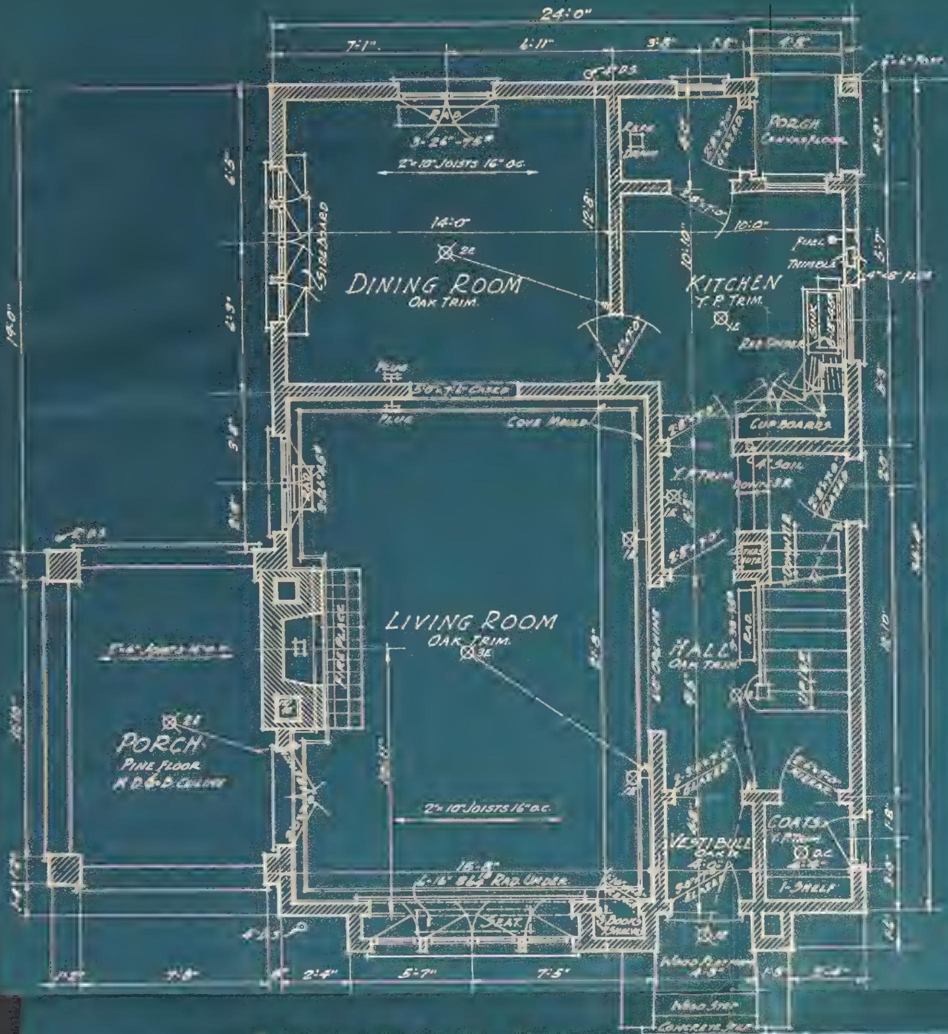
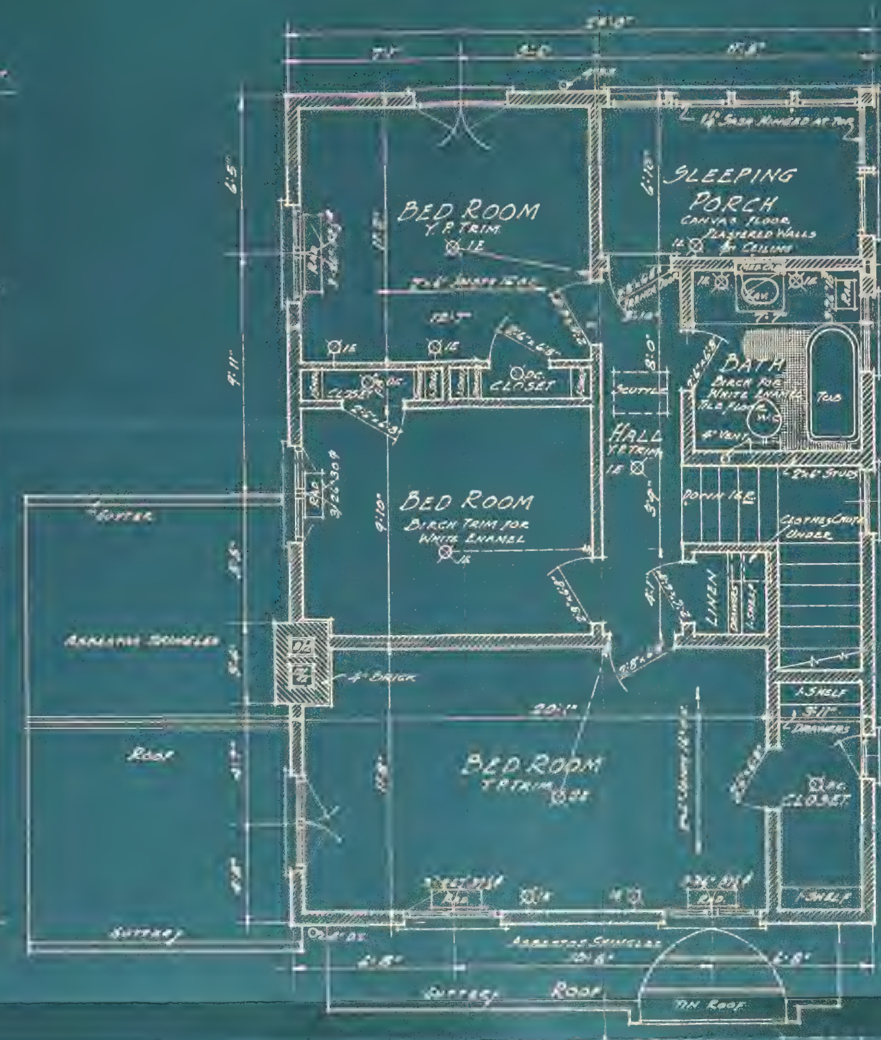


·FIRST FLOOR PLAN·



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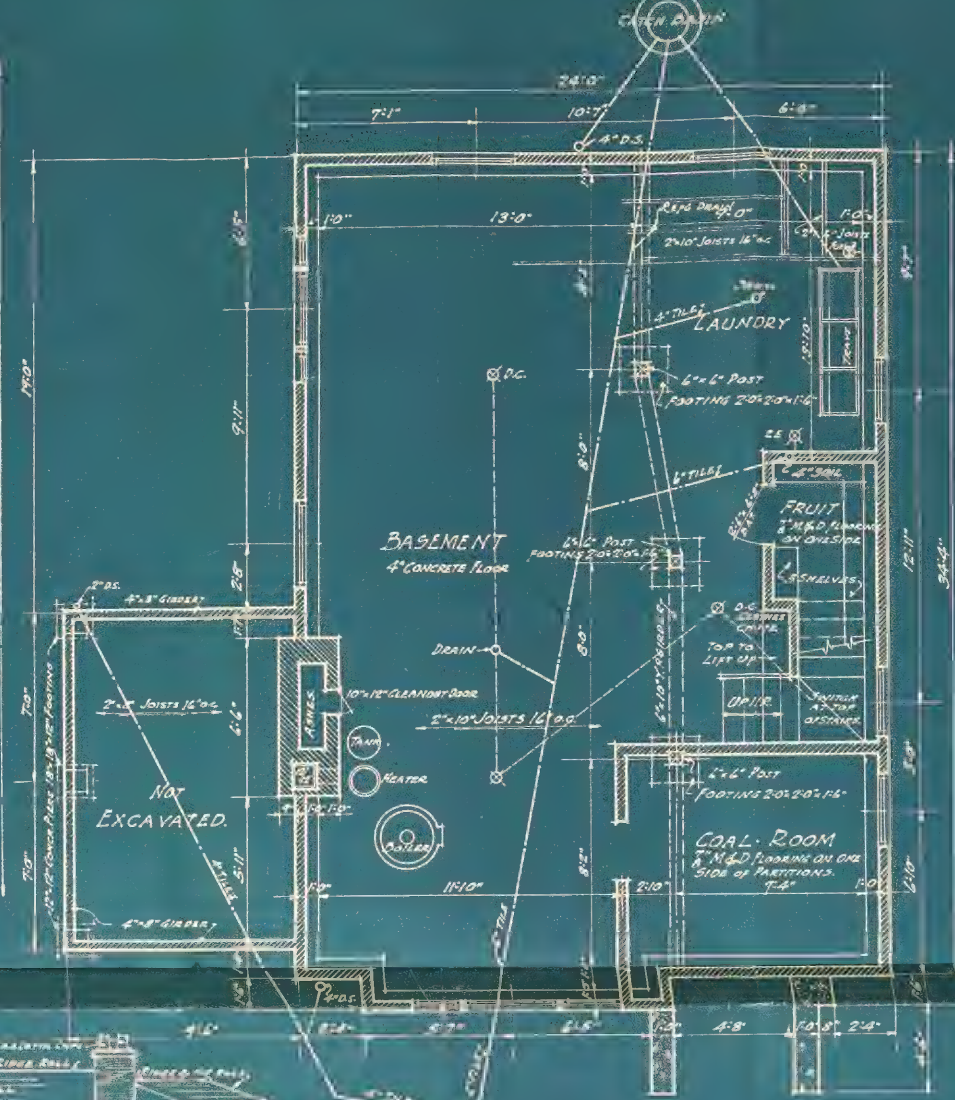

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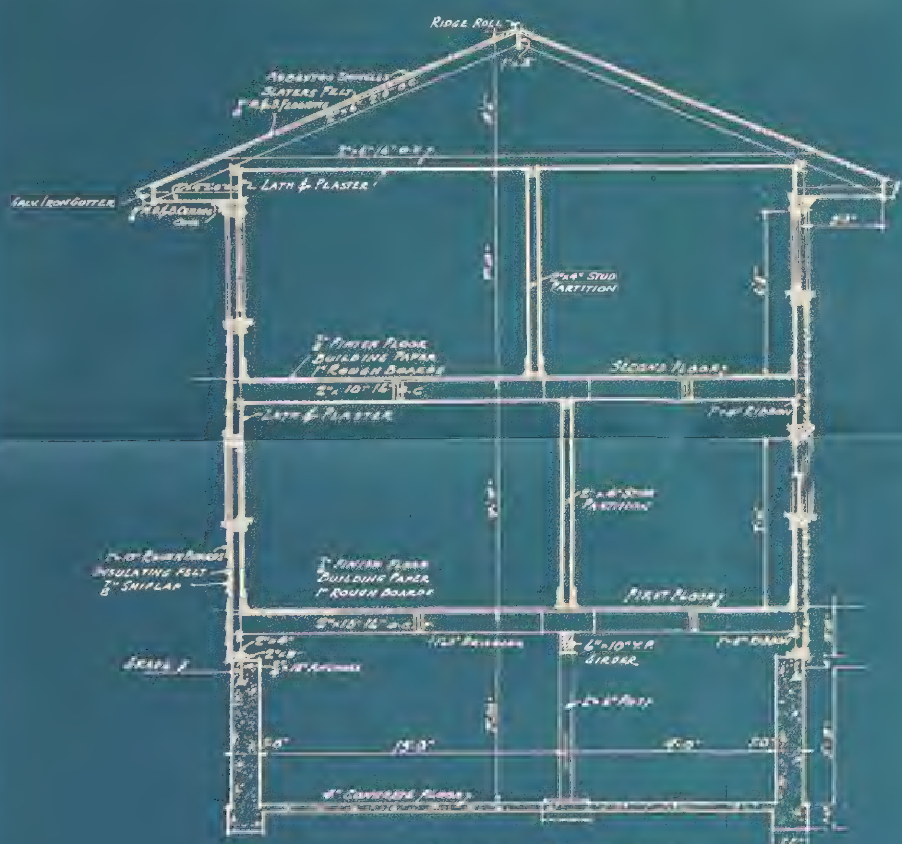

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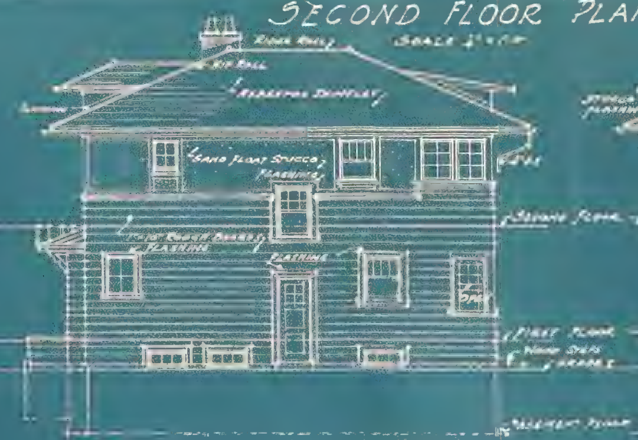
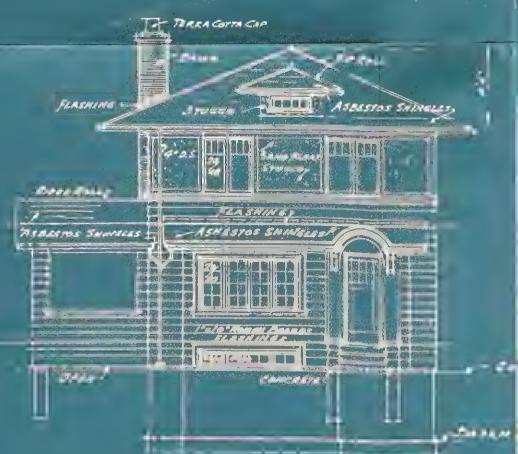
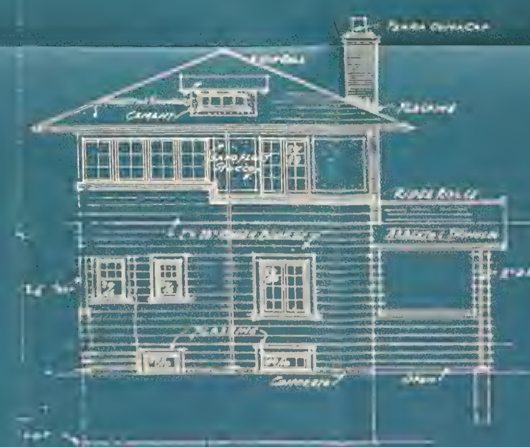


SIDE ELEVATION

SIDE ELEVATION



FRONT ELEVATION



REAR ELEVATION

NATIONAL BUILDER

February, 1921

WORKING PLANS OF A WESTERN HOUSE

Ralph H. Oliver, Architect

See Photograph and Descriptive Article in Reading Pages

A Western House

Ralph H. Oliver, Architect

Complete Plans of this Building as a Suggestive Study are Shown in the Detachable Blueprint Insert in this Issue

THE Western, or Prairie, style of architecture has suffered much from its friends. The freshness of the style has a definite appeal to the young designer, who, spurred on by the pioneer spirit that characterizes youth, is apt to endeavor to break the marathon record before he has learned to crawl.

On the other hand, with but few notable exceptions it has enlisted scarcely any following among the older members of the profession.

The usual consequence is that within a few years or months the enthusiasm of the young designer for the new style is tempered by the humility which comes with experience. He begins to feel that the discrimination of his elders is perhaps founded on sound judgment, after all. In most cases this leads to his desertion of the new style in favor of a more conservative one.

As a result the new style often serves as a stepping stone during a designer's fledgling days, but is ignored when he learns to fly. Under such conditions it is small wonder that the Western style should be frequently condemned on account of the many odd and erratic structures that are erected in its name.

The house which forms this month's supplement attains distinction without resorting to freakishness. The architect, Ralph H. Oliver of Chicago, has contrived to design a house in the Western style without permitting imagination to run riot with good taste. The result is a simple, livable house that is a source of pride and contentment for the owner and his family.

The construction is of frame throughout. The exterior walls are covered with dark stained boards with a stucco paneled frieze above. The foundation walls are of concrete and the roof is covered with asbestos shingles. All exterior walls above grade are insulated with heavy felt covering which is not only conducive to comfort both summer and winter, but also aids in reducing fuel costs.

The basement contains the laundry, heating plant and considerable storage space. A fuel room is partitioned off in one corner and the space under the stair is useful for storing canned fruits and so forth.

The main entrance to the first floor is through a vestibule at one corner. A convenient coat closet of large size is located alongside the vestibule. The door to this closet has a long mirror on the inside, a feature that is as useful as it is uncommon.

The living room has two cased openings, one leading to the hall, the other to the dining room. One end of the room contains a bay window which forms a pleasant seat with a small bookcase at one side. French doors near the fireplace lead to an open porch at the side of the house. This porch could be easily fitted with windows, thus making it available for year around use.

The dining room contains a built-in sideboard with low casements above.

The kitchen has a built-in cabinet and opens into a small entry that leads from the rear porch. This arrangement is far better than opening the kitchen directly onto the porch. A grade line entrance forms a supplementary entrance to the kitchen as well as giving convenient access to the basement. The circulation on this floor is excellent and the front hall may be reached from the kitchen without passing through other rooms.

The second story has three bed rooms, a bath and a sleeping porch. The front bed room is quite large and has a large closet. A large linen closet with shelves and drawers opens from the hall. The sleeping porch opens from the hall, a more satisfactory arrangement than if opening from a bed room only.

Taken in all this house has a well studied plan and is a good example of economical, yet sound, construction.

Notes on Building

By Charles Cressey

PROBABLY few of us grasp the extent and importance of that kind of forethought which aims at a maximum of convenience in directing the operations of building work. Organized, as we are, on a basis of blueprints and specification, it is vital that those documents shall be drawn by men familiar with the spirit and practice behind the art of getting things done, and particularly the art of doing common things in the common way. This means usually a reasonable acceptance of those gradually built-up habits of a district, based on local facilities, also the use to the best extent possible of established organizations familiar with the routine of a district. Contrast this with an insistence on unusual materials and methods, and the question of economy and convenience needs but slight demonstration. Anyone acquainted with carrying out work designed by men from distant states will recall the vexatious changes and delays due to ignorance or neglect of the material and labor situation local to the job, a condition hard to excuse in view of present-day facilities for information. I have seen several instances where the common Eastern preparations for snow, and the boxing and insulation of pipe systems, have not only been gravely drawn and described, but actually carried out on work in sunny California. Eastern common lumber, and unusual market sizes at that, specified for the West, show total disregard for practical convenience and economy, as would directions based on the simpler construction and mild weather details of the West, if such were sent East. If high wages are to be maintained, both major and minor details of a job must pass question on any avoidable inconveniences to economical construction, a field of waste too little explored. This criticism can only be given by men interested and eager to note the niceties of modern methods, in contrast with text-book diagrams primarily drawn to illustrate principles rather than to interpret the hundred and one modifications of every-day life. On every architectural junior and building builder should be impressed the need for acquiring the sketch and notebook habit, constant visits to shops and work in progress, and more than all, the careful measurement and redrafting in detail of work actually built, noting its motives, any lack of care, the effects of exposure, and all the interesting things a building detective must observe by insight and intuition as a guide in his later responsibilities. This business or art of building is surely unsurpassed by any other activity for human interest and variety, and of all its attractions what can beat the honest joy of building, not only well, but with the utmost smoothness and convenience of operation. Real convenience, if adopted as a plan of action by the architect, provides the line of least resistance in execution, removes the main incentive to unauthorized substitution, makes a smiling willing brother-in-arms of the builder, and usually gives working results at least sufficiently good for these days of enforced economy.

GIVING THE DEVIL HIS DUE

It is an unfortunate thing that our useful friend, the brick mason, always seems to be chosen as the shining example of modern industrial indolence, and the depravity of the American bricky only becomes bearable when compared with the utter depths of the impossible, reached by his representative in England. I suppose that the ease of counting bricks per man per day suits the simple mental makeup of the critic and provides easy proof of the preconceived fault he seeks. Of all the routine jobs in building that I for one would least like to stay with, the laying of bricks each day and every day, world without end, approaches the ultimate. At that I am something of a brick mason, too, but strictly on paper, dear friends! And I remain content with distinctions possessed by few brick experts of more muscular experiences than I. In addition, however, to the princely perquisites awarded the layer of bricks today, inborn attractions exist sufficient to bind the heart and interest of any man skilled in this most ancient of arts. Fools may lay bricks, but only a man well skilled and mentally balanced can lay them right under the exacting conditions of modern contracts and continue to lay them right indefinitely. Slackers and shufflers, of course, exist in this trade, just as cut-throats and hold-ups are met with elsewhere, but in spite of these and the critics I am proud of my brick mason friends and happy in the memory of earnest hours spent with them in threshing out the intricacies of bond, arch or angle. Yes, friend critic, you count the straight-away wall as you please, but to me the skill in readily building the complicated walls demanded by modern construction is the thing that counts to the architect and his builder colleague. Few so-called plain walls are without their "modern built-in features", troublesome and full of causes for delay and give to many a good man a bad name unjustly, when judged by the absurd standard of bricks per day. It is of interest incidentally to correct the disparagement of the brick mason of England. He handles and lays a brick nominally 9 x 4½ x 3 inches, a hefty comparison with the smaller American standard brick. Again there is a much rougher class of common brickwork and thicker joints accepted, as a rule, in America (good enough, too, I think, in most cases), than is permitted by British inspectors; also the wet weather conditions prevailing there render honest comparisons difficult in any case. Old-timers are fond of reciting the wonderful feats of the titans in their day, refusing all thought that these good men probably died of over-exertion. Anyway, dead they are, and with them many another abuse of flesh and blood. Present-day demand is more for steady work and reliability than for record-breaking stunts, and again I say that honest comparison is difficult in face of the thinner walls and the many up-to-date complications. I excuse no extortion, loafing, or unreasonableness; these things are common to all humanity and produce their own antidotes in the long run, but I protest that the upstanding manly men forming the large majority of knights of trowel and hod are entitled to the honor and respect of the public, and their building associates are the ones to speak in their just defense. Here's to the music of the ringing brick! To the wall well laid! And above all, to the cheery good health of the man on the scaffold!

Into the vexing question of the respective responsibilities of the man who plans and the man who carries out the plans; the man who pays and the man who works for that pay; the recompense and the efficiency of labor, skilled and unskilled, must come a broad spirit of co-operation and recognition of duty. Evils shall be overcome, never to rise again, by striking at the root of their growth—not merely trimming their branches—thru strongly establishing in practice that equity which is the basis of all contractual relations.

FINANCE AND DESIGN

One of the most encouraging tendencies in matters architectural is the growing realization that there is good investment in good design. Not only does this apply to the general public, who, if slow, are usually sure in finally grasping the truth of things, but those hard-headed wholesale distributors of speculative architecture are at last becoming convinced that crude disfigurements are both bad public policy and distinct private loss, if good designs are in competition. Even the house-a-day, street-a-week specialists find that competent design is not only a real attraction, but that it is actually cheaper to build than the well-meant efforts at artistic effect by ill-trained men. The art of design is as much the genius for leaving out as of knowledge of what to put in, and the good work begins at a much earlier stage than the trim, ornament or color is integral to the plan or section as much as to elevation, and means all that the word character expresses when applied to a man. Success in design is as subtle and as hard to define as to state precisely why the country-made costume lacks the distinction and smartness of a city-tailored dress, for the difference is often remarkably slight between the projection or pitch of a really good roof effect and another which frankly fails to please. Again good design is now accepted to include good relation to neighboring buildings and surroundings, the absence of which is the most marked feature of design by men whose abilities are chiefly practical and executive. When the results of recent grouped housing and other civic improvement work designed by capable men become better known, public policy will demand that building design shall be controlled equally with the features of construction. Just as fools are said to do more harm than wicked men, so must it soon be realized that no man, however honest and well intentioned, shall unwittingly blight a city by any unskillful and inharmonious design. It is a matter of finance equally with being one of art, sentiment, or opinion, and scoffers stand confounded by the tangible increase of values apparent where good design exists, when compared with the depreciation immediately apparent where unsuitably designed property is erected. The parrot cry about saving the architect's fees is reactionary and unprofitable, and the amateur dabbler in design has no more right to indulge his conceit than the billboard fiend has to offend the public eye. Every man to his own calling leads to stability of mind and business. If the architect cannot justify his existence, away with him! But present evidence is much in his favor on purely financial grounds. The architect-builder is as poor a success as is the builder-designer, and each should concentrate on the one field most suited to his talents, either branch being enough for any human mind. Working together, there is an enormous opportunity for the good of all, if the interests associated with building will dignify and respect each other's calling and develop the rapidly-awakening consciousness of the public mind toward the values in good architecture.

Denver's Brick and Cement

By Helen Dean Bogan

DENVER is, by virtue of its situation, especially well suited to become the city of many small homes. The mountains are twenty miles away, and there are no other natural restrictions to the city's growth. With the exception of a few stone houses the houses are all of brick or cement, for the city's fire regulations are stringent. However, cement and brick, particularly when accompanied by growing greenery, can be made to do very attractive things, as the photographs shown here abundantly testify.

Our illustrations are too numerous to afford more than a passing comment upon each. Both the brick and cement rely largely on their coloring for the effect produced. Tapestry brick in soft greens, browns, and reds, combined with rough cement and field stones as in Fig. 1, or well set off by a grass terrace as in Fig. 2, is pleasing even when the architectural treatment is of the simplest. Or it may become more sophisticated and take to itself a blend from some distinct country or method. Fig. 3 gives a version of a thatched roof treatment. Instances of the Colonial may be multiplied indefinitely. An unusual, and a very successful adaptation, is shown in the Colonial cottage in Fig. 4. Its simple doorway, white trim, and well proportioned windows make a dignified structure. Not conventional, but still Colonial in its feeling with its gambrel roof and slender white Doric pillars. The use of the fence in linking the garage to the house is worthy of note. Our brick is still nothing but brick, but the house in Fig. 5 is an example of a modern house of the more pretentious type in which stone is used to add character to the entrance and to the high windows on the first floor and the line of smaller windows on the second.

Suggesting Spanish influence in design

The English style is well illustrated by the house shown in Fig. 6. It is of variegated tapestry brick in soft tones of tan and brown. The trim is of very deep cream stone. The ornament is of the simplest sort, only the dignified doorway, with its Gothic door, the balcony above with quatrefoil piercings, and the window casings are of stone. Much of the credit must be given to the carefully thought out chimney and chimney breast and the excellent balance of the chimney end of the building with the broken lines of the roof at the other end.

Cement lends itself so readily to Spanish adaptation that we would expect to find many of the cement houses reminiscent of Spanish or California-Spanish architecture. Not all of them however. Fig. 7 represents just a good, comfortable, American home, its trim of darker brick applied intelligently and with good taste. Neither does the house in Fig. 8 show any particular Spanish influence, here the feeling is rather Italian. Its French doors, simple trim and tiled roof, together with the soft color of the cement make of it an unusual and pleasing house. Its effect is somewhat marred by the poorly proportioned entrance. The bungalow in Fig. 9 is quite distinctly Spanish—too much so perhaps for some tastes. The larger house in Fig. 10 is also based on the Spanish tradition, as the broken sky line, rounded windows, and red tiling bear witness. The house shown above is innocent of any specific dependence upon Spain, and yet it retains some evidence of Spanish influence.

Brick made much of the older Denver architecturally monotonous. But brick and cement, used with greater originally and intelligence along the lines indicated here, are capable of making of the newer Denver a city of beautiful homes.

Brick

Never before has there been more varied and so beautiful selections of brick to meet every taste in color and texture. Competition and demand have produced results in the material brick that only need selective taste to provide buildings of distinction and beauty.

SOME DENVER HOUSES

Stucco and Masonry Walls

By John Y. Dunlop

IN England the stone house, the brick house and the half timber house are all very much in the background at the present time owing to the high cost of labor and materials. What seems to be the house of the future all over England is the stucco house. Builders are able today to put up this class of building very much quicker and the cost is also less.

The stucco house is the type which is being built all over England by the various local authorities at the request of the Government so that the most of our housing schemes which are being pushed ahead are either brick and stucco, stone and stucco, or concrete and stucco.

The Government is putting no ban on stone or brick building, but the difficulty lies in getting labor for stone cutting and stone building and also for the exacting work of building with face brick.

The conservative idea of stone houses for a stone bearing country and brick houses for a brick making country has had a rude awakening recently. Owing to the scarcity of materials the concrete house has come into the field, with the result that concrete and stucco houses are popular all over the country.

In many districts they are now making a cheap class of bricks of the refuse from coal fields and as these bricks are not fit to stand more than a winter's frost, the most of the contractors who are using them for outside walls are stuccoing the external surfaces. A great number of these brick and stucco houses are being built.

The great cry against the increased cost of building has brought many new ideas of wall construction into the market, and the most of them have cement for their basis. The original intention was to get a cheap house that could be rapidly built, but from the start the inventors of patent walls have had an up-hill job, as cement in any great quantity cannot be had in England at the present time. Builders tell me if they order 10 tons they are mighty lucky if they get 1 ton and very often they have to order 6 months in advance.

Fig. 1

Fig. 1—Double stone house built with sandstone in coursed rubble masonry

The views which accompany this article have all been taken in one district and show the class of house which the English Government is encouraging building contractors to proceed with at once for the housing of the people. The stone houses which are shown are built of sandstone.

The walls are, as a rule, composed of random rubble which for strength and imperviousness depends very much on the quality of the mortar used. Random rubble is often faced with square rubble which gives a better and neater wall.

The half-timbered house which is shown in the photographs has the first story finished on the face with what is called quarry or rock-faced stone. That is, each stone has a rough projecting face which has been formed with a hammer and pitching tool.

Quarry faced stone is usually a little cheaper than the tooled faced variety, but the rough projections catch dirt and rain and are therefore more liable to be blackened by the soot and smoke of towns.

Fig. 2

Fig. 3

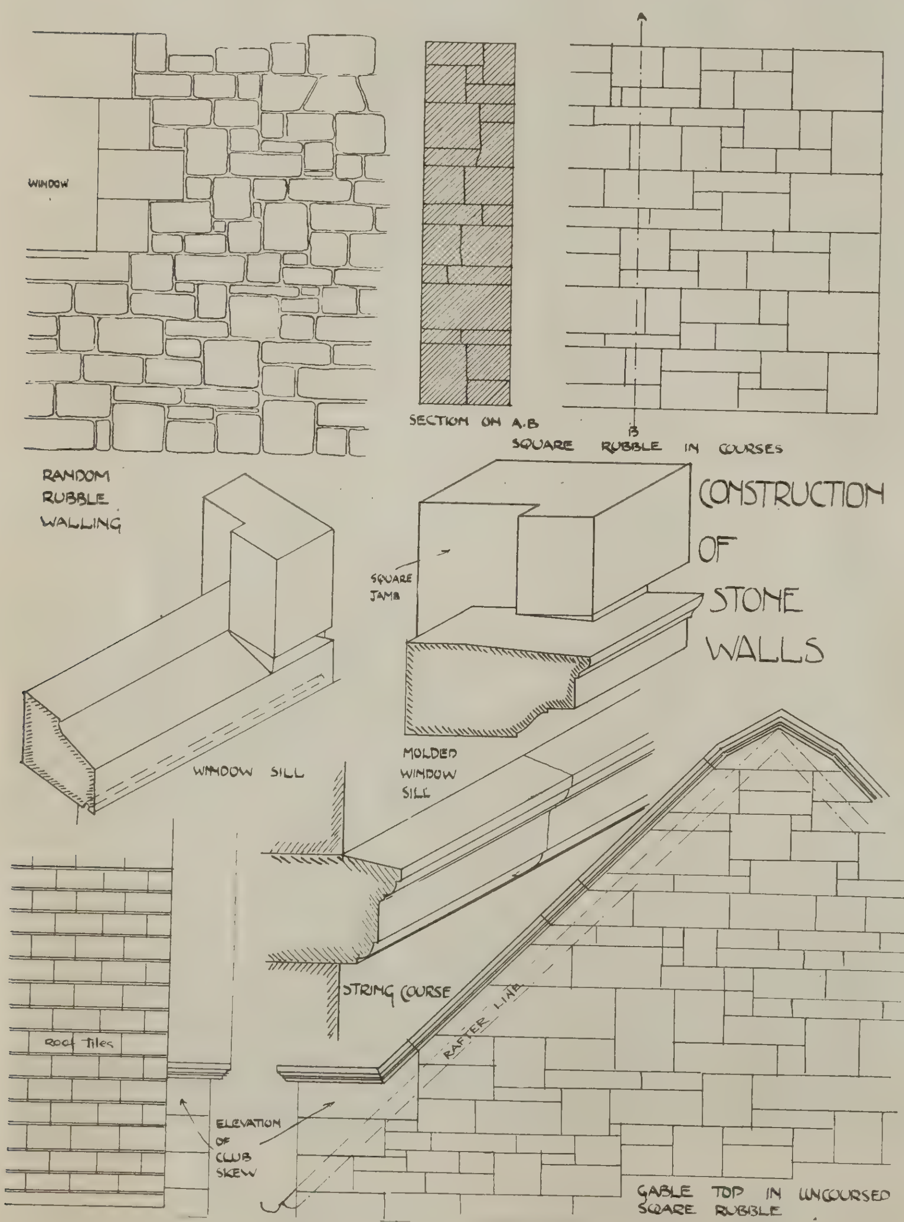
Fig. 2. This eight-room house is built of local stone coated with stucco. Note the two stone chimneys

Fig. 3—Stone and stucco house in which the corners are finished with square dressed quoin stones arranged header and stretcher

Fig. 4

Fig. 5

Fig. 4. Double house built of stone and half-timber work filled in with brick and covered with stucco
Fig. 5. End view of a half-timber house



The favorite type of stone walls is square rubble, which is generally tooled on the face and laid in regular courses, each composed of large and small stones built to a specified height. Uncovered or sacked rubble is built in much the same way. Square rubble is always a more expensive class of work than coursers due to the use of the large stones of different depth and to the labor in tooling the face.

In stone walling a great amount of the labour is caused by the forming of openings. The stone sill extends the whole way across and usually passes 6 inches on each side under the rybats or side stones. The stone sill is always splayed on the top to throw off the rain. At the ends where the splay is stopped a level stool is cut to form a rest for the first rybat on each side. The lintel and the several rybats which form the sides of the opening are usually checked on the back for the window frames.

One of the most prominent features in a stone building is the projecting string course which may be straight, but is also often broken in direction to allow the different levels of this feature to intersect with sills and so forth. The string course is of much use in throwing off any rain which is driven against the building and which otherwise would run down the face of the wall to the ground.

In building a stone gable the top surface which slopes parallel to the roof should be covered with a flat stone called the coping. To prevent the coping from sliding down, a large stone called a club skew is built in at the bottom of the slope. This stone is finished and pointed so as to form the lower part of the cope on the gable. If the coping is a long one, very often a kneeler is formed midway between the club skew and the apex. This kneeler is cut to form part of the wall as well as a part of the coping, with the result that the kneeler ties the coping to the stone work of the gable. At

Fig. 6

Fig. 7

Fig. 6. This six-room house is built of brick with stone oriel windows

Fig. 7. This brick and stucco house is built so that the front roof overhangs to form a porch. At the left is the conservatory linked up to the house

the top of the apex stone is cut to finish the top so that the coping is tied to the top of the wall at three places; the club skew, the kneeler and the apex stone.

In the heart of the stone districts bricks are often used for all internal walls and for all but the facing of external walls. The reason for this is their cheapness and the ease with which they can be laid.

For cottages and small houses, villas, composite walls are often used. They consist of an outer shell of stone about 6 inches on the bed and an inner shell of 4½ inches of brick work. This type of wall has bond stones extending through the wall. One bond stone in every square yard of wall surface, and two checked rybats at each opening. Sometimes in place of using bond stones, pieces of hoop iron are placed across the wall between the courses. Thicker walls of this type are used for larger buildings.

In many districts, however, instead of having the wall formed of a composition of stone and brick, two varieties of stone are used. An example of this class of work is shown in the stone and stucco house with the dressed quoins. In this design the corners and the window and door dressings are formed with sandstone which is laid head and stretcher. The main parts of this wall are built in the roughest form of rubble work and of local stone which although hard and durable was formerly used only for road making. Still when carefully built with good mortar and covered with stucco, this type of wall is all that could be desired.

Brick houses are very common all over the midlands of England; in fact, whole towns are built almost entirely of this material. In the city of Birmingham many of the most important buildings are carried out with brickwork used in Classic and Gothic designs.

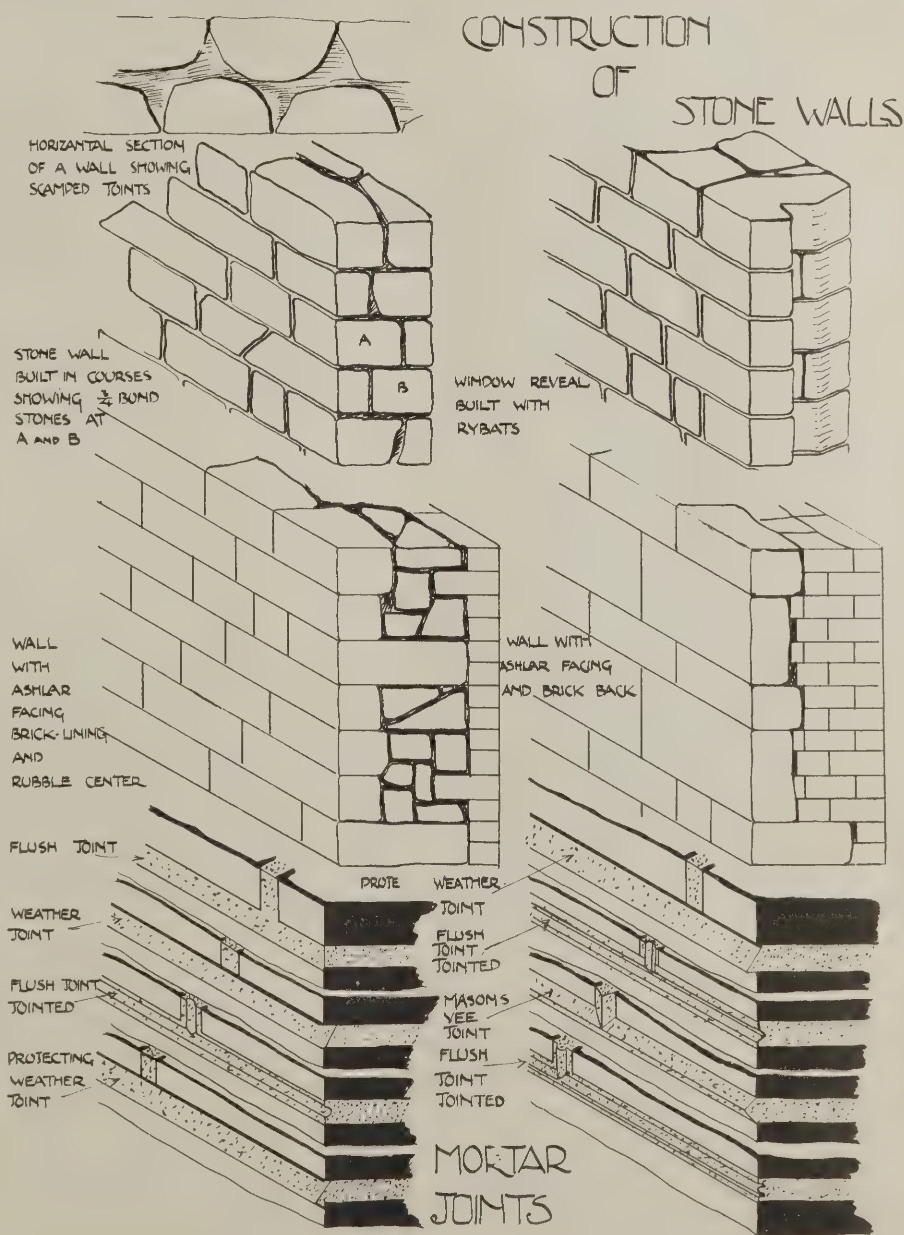


Fig. 8

Fig. 9

Fig. 8. Gable end of a brick and stucco house showing a square projecting window on the ground floor, with a small oriel in one of the bedrooms

Fig. 9. House built of brick and stucco. The verges of the gables are finished with wood cornices

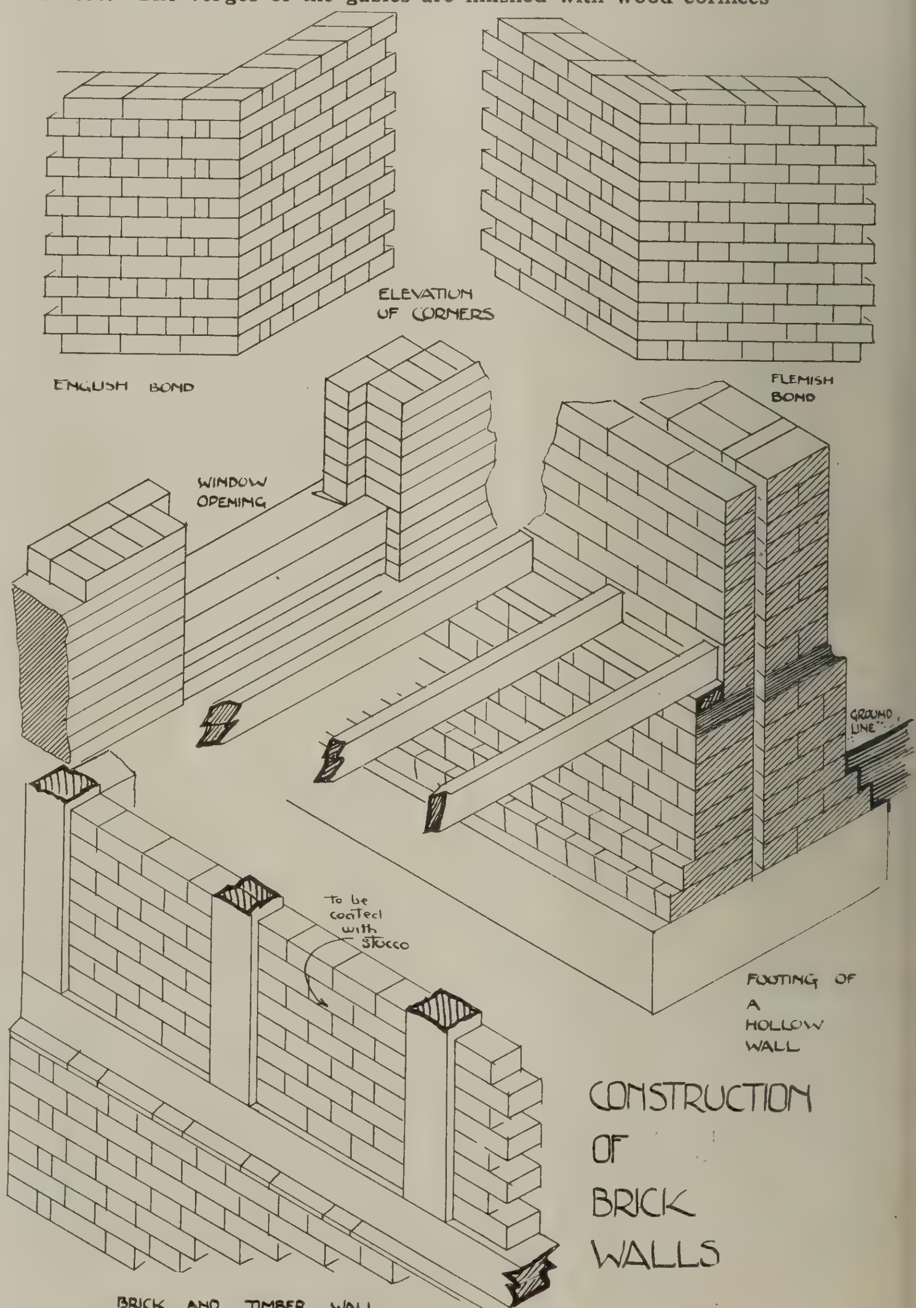
Where thick walls are built in house construction it is usual to build the face of the wall with face brick and the inner thickness of a cheaper grade.

In many cases hollow walls are also used. These have the great advantage that the plaster can be applied directly to the inside of the wall without the use of furring and laths. Hollow walls are built in the smaller houses with two 4½-inch shells having a 2-inch space between. The shells are bound together with metal ties. For two story houses the design of the hollow wall is as shown in the detail, and these are tied together with metal ties and very often with bonding bricks.

A great difficulty which bricklayers have to contend with is due to face bricks often being thinner than those used in the back of the wall. In such cases it is almost impossible to make a really good bond between the two kinds of bricks, as headers can only be inserted when the facing and backing courses have risen to the same level. Thin facing brick, however, may be used without difficulty for the facing of hollow walls and also for those walls in which a small cavity filled with asphalt or other waterproofing composition, is formed between the tiers or shells of brick.

For the formation of angles other than right angles special brick of the desired shape may be obtained. For rough work, ordinary bricks roughly cut to the required angle are generally used.

Houses of half-timber framing are very common all over England. The solid oak framing of these houses is usually filled in solid with brick to receive the stucco coated panel. The general framing of these buildings is composed of upright posts and rails of timber from 4½ inches to 6 inches square, mortised and tenoned into each other and pinned where necessary with oak pins. The oak framing of many of the older houses has often been tarred for the sake of preservation.



Of course all types of masonry depend largely on good mortar and on good bedding and pointing. The thickness of mortar joints depends on the regularity of the material, the fineness of the mortar and the skill of the workman. A few of the mortar joints which are in use are shown in the line drawing. Although apparently a small matter, the method of finishing the joints is of much importance. The joints may be finished as the wall proceeds or may be left rough to be raked out and finished at some subsequent period. The first operation is called the jointing of the work while the second one is called the pointing.

Where the rough fabric is covered with stucco no greater attention than to see that each joint is flushed up need be paid to the finishing of the joint. Formerly the base of stucco was some kind of hydraulic lime, but nowadays Portland cement is almost invariably used as it hardens better and is more weather proof and durable.

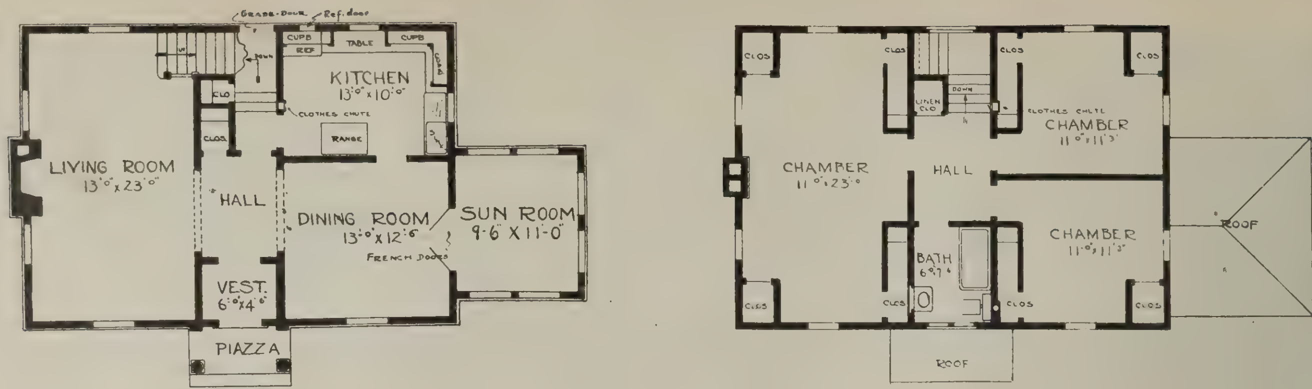
A Dutch Colonial Cottage

THE Dutch Colonial has long been favored by Americans. Its popularity is no doubt largely due to the picturesque and homelike character of the style together with the nature of its construction which permits much of the roof space to be utilized for bedrooms. Thus making for low costs both in construction and upkeep.

A Dutch Colonial cottage. Dale C. Swain, Architect, Minneapolis, Minn.

It is a style that is well adapted to small houses, in fact it may be said that a large Dutch colonial house never is attractive in appearance. For houses containing more than seven or eight rooms, more satisfactory results will be obtained by the use of another style.

Of late years there has been some critcism of the Dutch colonial style because it is said to be overdone. This is as ridiculous as it would be to criticise the English for their almost invariable employment of this distinctive style of cottage, or the French for theirs. The Dutch colonial was originated by our early colonists for use in their new surroundings. It is an American style, developed by and for Americans. If more designers would open their minds to the possibilities of our already existing national styles instead of attempting to conjure a national style from the hodge podge of ideas derived from every corner of the universe, we should soon be able to speak of American architecture without mumbling. As a matter of fact, the average designer is anxious to develop a *personal* style rather than a *national* one. Such ideas are worse than useless, architectural styles are produced by groups of men not by individuals. In fact a national style must be in full sympathy with the ideas of the man on



First and second floor plans of a Dutch Colonial cottage

the street before it can hope to become permanent and worth while. The more personal an idea is the more difficult it is to obtain its acceptance by the general public.

The Dutch colonial cottage that illustrates this article carries the charm of the old work from which it was adapted yet it is as modern and distinctive as one could desire. It was designed by Dale C. Swain of Minneapolis, Minnesota, and is located on a heavily wooded lot that contributes much toward the attractiveness of the composition.

The entrance is through a vestibule into the central hall which also connects with the grade line entrance at the rear. Coat closets are provided in both the front and rear halls and the front door may be reached from the kitchen without passing through any of the rooms.

The living room contains a fire place and has windows on three sides. The main stair is located in one corner of this room instead of in its customary position in the front hall. This permits narrower halls and gives more space in the second story hall.

The dining room opens into a small sun porch that is also useful as a breakfast porch. The kitchen contains a wealth of cupboard space and a work table around two sides. It also has an outside icing refrigerator and a clothes chute.

The second floor contains a large bed room with four closets, and two bed rooms with two closets each. The hall contains a linen closet and a clothes chute and opens into the bath room which takes up one end.

The exterior is finished with wide white clapboards and has green shutters and a red brick chimney and base course. All rooms have cross ventilation and are of ample size.

The Explanation

As Chicago sees it, the housing shortage is due to strikes, lockouts, high wages, high taxes, high rates of interest, high freight charges and lack of transportation facilities. Is that all?—*Boston Transcript.*

A Suggestion for a Breakfast Corner

By Charles Alma Byers

THE special breakfast corner, as an adjunct of the kitchen, has become extremely popular, and, as tending toward lightening the work of keeping the regular dining room in order, as well as the house generally, is generally regarded as a very desirable home accessory. Shown in the accompanying illustration is a specimen breakfasting place of this kind that, as a suggestion on the designing of such a feature, will doubtless be found of especially practical interest.

Suggestion for a breakfast corner

The little breakfast corner, often called a Pullman breakfast alcove or corner, is somewhat variously designed, and is, moreover, more or less subject to variation in the matter of size and location. The one here illustrated is to be created as a special built-on extension, which, of course, is to be immediately linked to the kitchen. It is, therefore, of the alcove kind.

This alcove, in floor dimensions, should be about five feet wide by at least three feet nine inches deep. Its table, then, may be three feet in length by approximately two feet wide, and, naturally, will be about thirty inches high. The seat at either side should be three or four inches longer than the table; and, being designed with band-sawed end pieces and a slightly sloped, paneled back, will have a seat-board thirteen inches wide, elevated eighteen inches from the floor. Incidentally, if desired, the seats may be of the so-called box type—that is, the space underneath boxed-in from the floor up and the seat-board equipped with hinges in lid fashion. The seats and table will, of course, be made permanent or stationary fixtures.

The breakfasting place of this kind should have windows in at least one of its outside walls. Here the end wall is to be provided with three small casement windows. An electric light fixture over the table is also quite necessary. The table and seats may be built of pine or any other soft wood, and usually will be finished to match the kitchen woodwork. In the drawing of this alcove, incidentally, will also be observed a section of a very practical combination of built-in cupboard shelves and drawers, the shelf compartments to possess glass doors.

A breakfast alcove such as is here suggested may be either included in the plans for the new house or built on as an addition to the old house.

A Government Bureau of Building Planned

A bill proposing the creation of a bureau of building construction and housing in the Department of Commerce has been introduced by Senator Calder of New York. "The bill," said Senator Calder, "provides for a bureau in the Department of Commerce, which will be a clearing house for all information concerning building construction matters and particularly housing, and will be most helpful in lowering costs."

A Stucco House

A STUCCO house of rather more than average size is here illustrated and described.

An unusual feature of the plan is the combination of the main entrance with the auto entrance at the side. A toilet and coat closet are located under the stair at the end of the hall.

Another unusual feature are the flower boxes which are located in the wall between the living room and the veranda or living or breakfast porch as it would commonly be named. Note that the serving pantry opens into both the dining room and the breakfast porch, making for the easy service of meals. Tile floors are used in the entrance, the living porch and the breakfast porch.

The kitchen has but two entrances. One leads through a cold room onto a small rear porch. The other to a grade-line entrance which is convenient to the basement

A commodious stucco house

porch. The bookcases and fireplace at one end of the living room form a group that is no doubt a source of much comfort to the owner.

Folding French doors open from the hall into the dining room. Another French door on the opposite wall leads to the sun porch stair. The back stair from the kitchen to the second story is also convenient to the latter entrance.

The main bedroom on the second floor is provided with a private bath which contains a shower and a towel cabinet in addition to the usual fixtures. This room also has a dressing room fitted with a large built-in wardrobe.

The daughter's room contains a wardrobe as well as a closet. This is a very desirable feature for a girl's room. From this room opens a sewing room that may also be used as a sleeping porch if desired.

The arrangement of the bath room between the guest's room and the daughter's room, with doors opening directly into the bath from each room, would not be satisfactory to many people. It may be taken as an axiom of planning that a bath with more than one door is seldom a satisfactory solution of a problem. The sleeping porch is rather remote from the principal bedrooms. The linen closet in the side hall is well located. It is made wardrobe fashion with small doors,—a very sensible scheme.

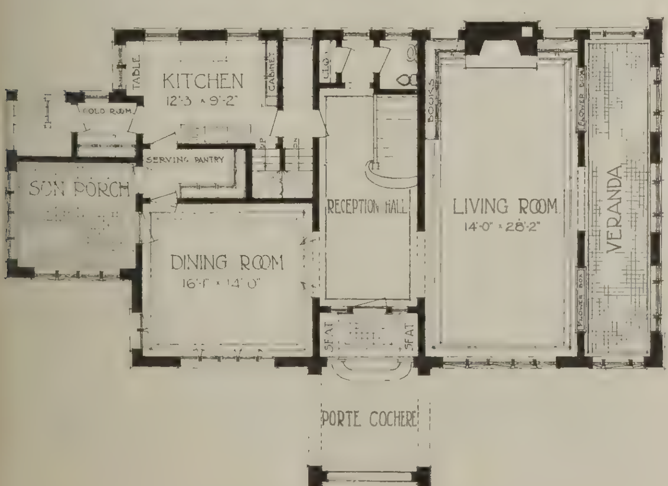
The maid's room is well isolated from the remainder of the house. It may be reached from either the main hall or from the back stair without passing through other portions of the second floor. A private bath room is provided for the maid's use.

Editor's Note.—We have no record of the location of this house nor of the name of its contributor.

Wrecking Operations

To break up an old stone wall or other masonry, or to knock out a superfluous brick pier without the use of dynamite, slow hand labor is unnecessary. Simply drill a good-sized hole in the wall—making this bottle shaped with as small an opening as possible. Put in quick lime until this hole is almost full and make a tight-fitting wooden plug that can be driven firmly into the opening. Quickly pour in enough water to slake the lime and drive home the plug.

The expansion of the lime as it slakes will exert a tremendous pressure that will easily break up any ordinary piece of masonry.



FIRST FLOOR PLAN

SECOND FLOOR PLAN

Suggestive Built-In Features

By G. E. McDonald

Fig. 1—Built-in bed, bookcase, desk, cupboard and drawers

Fig. 2—Note how the bookcase swings out to provide a cupboard space; the drawer is in the panel above

Fig. 3—A built-in buffet bed. The door at the left leads to the dressing room. The bed slides under the dressing room floor

Fig. 4—The low-ceilinged dressing room is approached "with three upright steps," as will be noted at the left. They are hinged for use as compartments

NEARLY every house-owner has his own ideas of what is convenient and desirable in a house, according to his or her mental makeup, and when they themselves contrive conveniences suited to their ideas they certainly add to the stock of notions that the architect and builder may submit to clients or modify and use in meeting the requirements of cramped quarters.

The built-in features illustrated show in Figures 1 and 2 a bed, bookcase, desk, cupboard and drawers, all hand-made cabinet work, originated and put in leisurely by the owner of the home, George Parry, an old-time miner and veteran, in California. The desk table is three feet wide. In addition to the bookcase doors opening conveniently in the ordinary way both sections of the case are mounted on heavy hinges and swing out as shown in Figure 2, affording a large closet space inside. The panel above the bookcase is the face of a deep and wide drawer, in which bedding, etc., is stored between seasons.

Figures 3 and 4 illustrate a built-in bed and buffet in the dining-room of a four-room California bungalow, occupied by a lecturer and built according to his ideas. Built up over the bed in the rear is a low-ceilinged dressing-room with a wide window. The entrance to this dressing room at the left in Figure 4 shows the steps, hinged to provide compartments for shoes, and such matters. The built-in wall bed off the front room makes the whole layout more compact and comfortable than an old-style house twice the size.

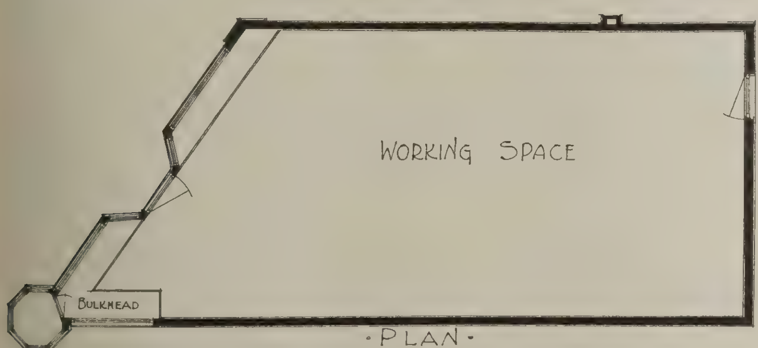
[EDITOR'S NOTE—It must be remembered, however, that there are on the market a vast number of conveniences of the built-in order that do this very thing. Study what is in the market before jumping into special stuff.]

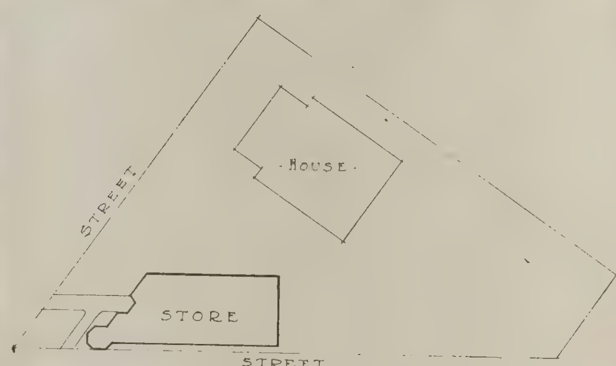
those who have them. The josh about the man who can make pretty pictures, but who is "so impractical" is not without reason, and is not based on mere prejudice. Society is made up, however, of human complements. One individual supplies what the other lacks. A freer appreciation of this fact makes for the co-operative forces that accomplish great things in the building arts. The man of taste and discrimination can see in very ordinary materials possibilities of combinations of beauty that give them a new value, but he may be weak in the constructive faculty. The merely practical man who wants to achieve an effect tries to obtain it by oddities, novelties, ornate and showy materials—and falls down except in his own conceit.

That there are many-sided men who are sufficient to themselves in construction work provides the "saving remnant" that holds the building arts together until builders and designers learn more generally to complement each other.

A Store in a Residence District

Store in a residence district





Plan of a store in a residence district

Cash Value of Design

That men will pay large sums for things of beauty and yet quibble over the price of staple things is but another proof that good design has a cash value, and particularly so when applied to buildings. A man may be a good builder or a good engineer and yet be badly lacking in the qualities of taste and the fitness of things. It is a fine thing if such men have the breadth of character to appreciate that they lack these qualities and have sense enough to go to

The accompanying illustrations show a small store building built on an irregular shaped lot in a residence district.

The existing house set well away from the street corner, making it possible to use that desirable location for the store.

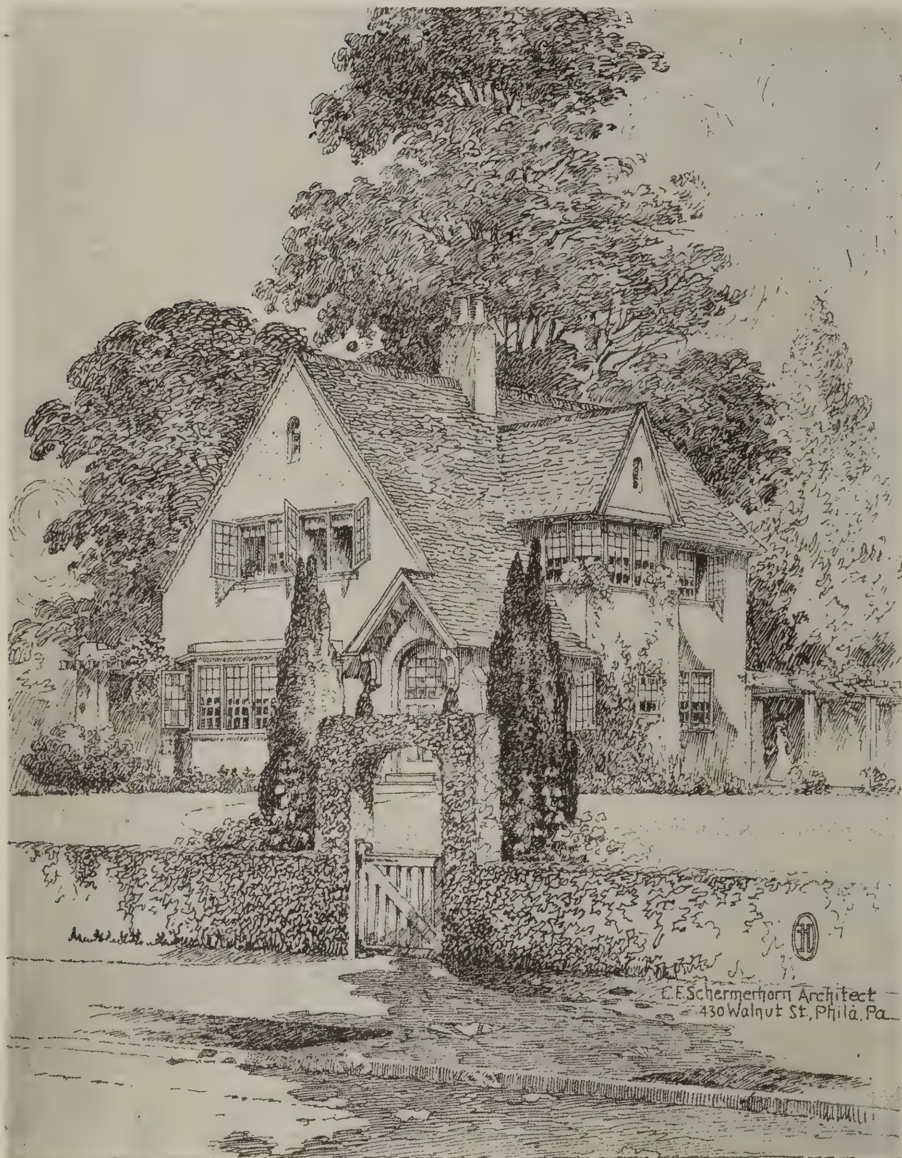
The store is finished with stucco, which together with the octagonal shaped bay and the pitched roof gives it a semi-domestic character that does not clash with the surrounding residence property.

The setback from the front street line also aids in this respect, and the concrete walks seems to have considerable effect in leading chance customers to enter the store.

Violators of Sherman Law Indicted

Restrictions established by mill men, contractors and carpenters' unions in Chicago, excluding outside competition in building material, uncovered by Federal authorities, have caused grand jury indictments of a number active in these violations.

An English Cottage



Americanized English cottage

THE English cottage style of design with plans adapted to American requirements is a strong favorite among people who are partial toward the picturesque in domestic architecture.

At its best the English cottage is simple in decorative treatment, but rather complex in its arrangement of roofs, windows, porches and other details. For this reason English cottage design requires a degree of skill that is not always appreciated by the unskilled. To paraphrase, "amateurs often rush in where designers fear to tread," with results that are entirely lacking in either taste or common sense.

The house which is shown in the accompanying illustrations was designed by C. E. Schermerhorn, architect, of Philadelphia. It is an example of the successful Americanization of an English cottage which retains the home-like and informal character of the foreign work without sacrificing any standards of plan or arrangement.

The picturesque roof, sweeping low at one side, the general mass of the composition; the grouped casement windows, arched openings, and the stucco walls are characteristic of English cottages. The absence of half-timber work is commendable. Real English cottages of the present day seldom have half-timber details, as such work is unduly expensive if well done, and sham half-timber work is a cheat that has no place in a real home.

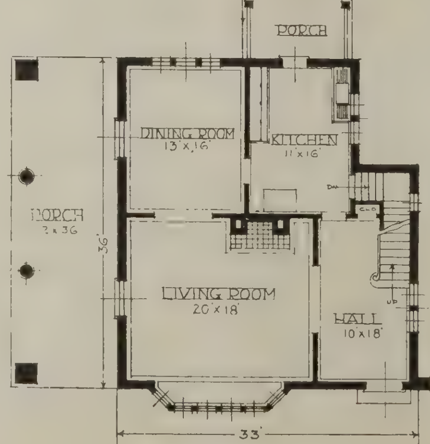
Another characteristic of English cottages is expressed by the "off center" arrangement of details. The entrance doorway with its hood is placed at one corner of the building, but balance is preserved in the design by the bay window near the opposite corner. The living room fireplace is also off center and is balanced by the cased opening beside it. The living room is also exceptional from its shape which approaches a square rather than an oblong.

Both the living room and dining room open onto the wide side porch. The central chimney serves all of the smoke requirements of the house and its inside location makes it a fuel saver. The kitchen has a convenient door to the front hall and a grade-line entrance could be provided at the basement stair landing if desired.

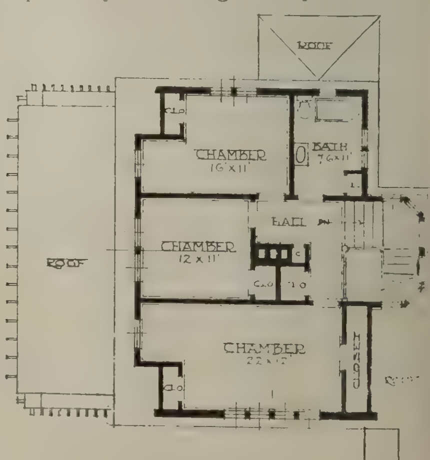
The bay window of the main stair is an attractive feature both outside and in and a somewhat different arrangement of the upper hall would make it available for use as a well lighted sewing room if desired.

All of the bedrooms are of good size and contain ample closets. The hall contains a broom closet and a linen closet and the bath room has a towel closet.

This house is suitable for a large, well wooded lot. It could be somewhat reduced in size by trimming the dimensions of the rooms, which are larger than those required by the average family.



FIRST FLOOR



SECOND FLOOR

Pergolas

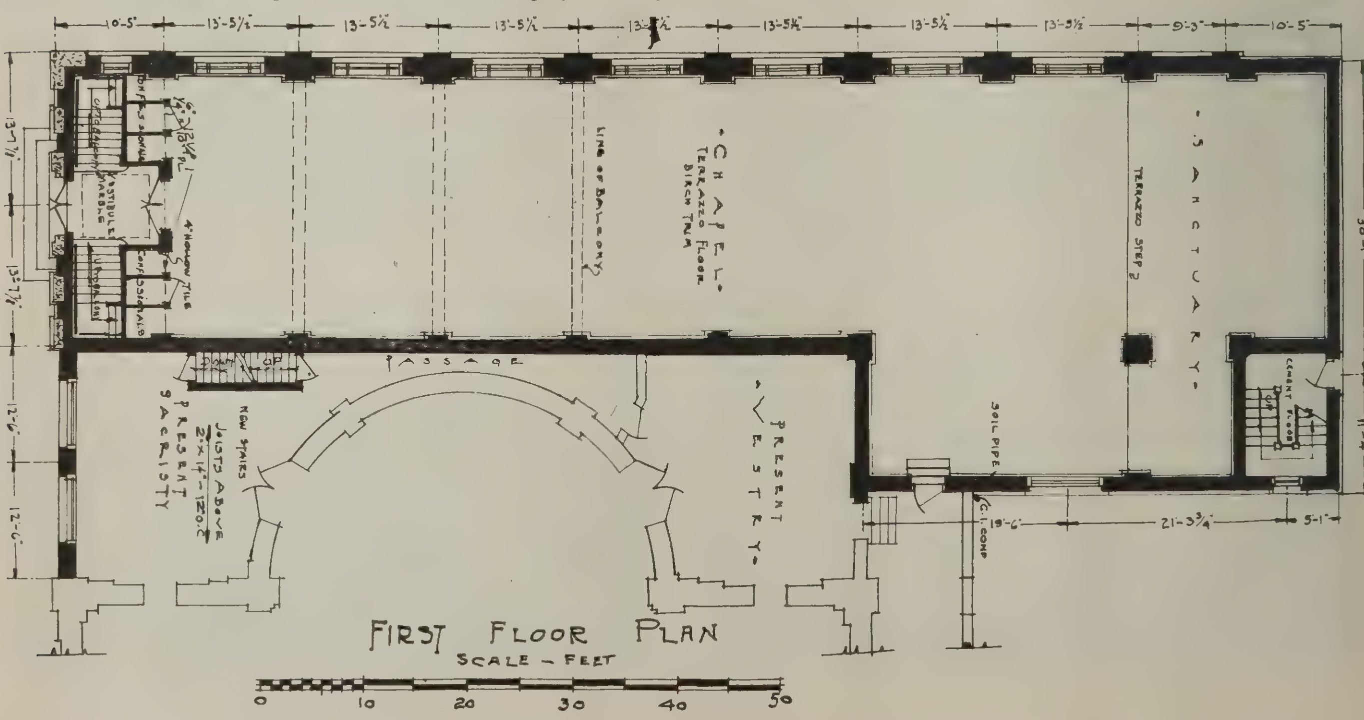







A Chapel

Fig. 1—St. Catherine Chapel, Detroit, Mich. B. C. Wetzel & Co., Architects



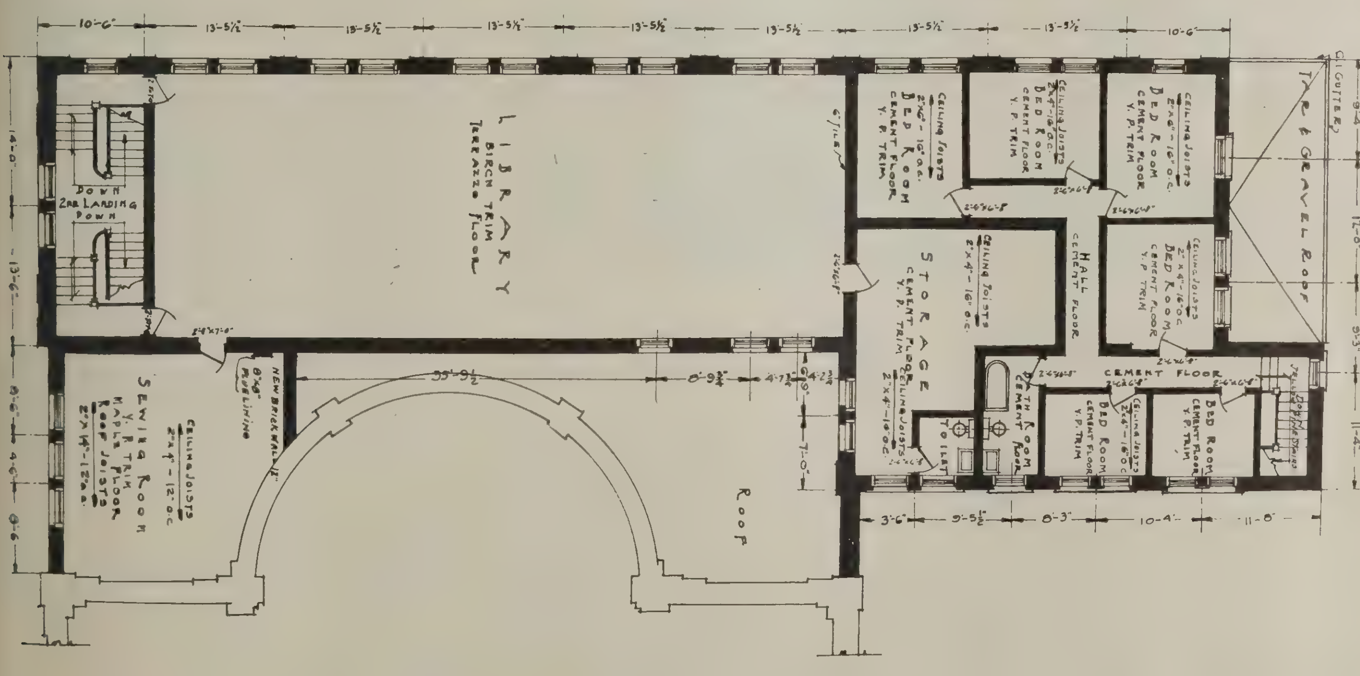
THE accompanying illustrations show a chapel designed by B. C. Wetzel & Company, architects, and erected at Detroit, Michigan. It is built at the rear of an existing church and conforms in a general way to the style of the larger structure.

The style is pure Italian renaissance, carefully handled and well executed. The entrance treatment is especially fine, and is beautifully detailed. The entrance, the base course, the pilasters and the entablature are of cut stone, while the wall surfaces are of brick. The construction is of reinforced concrete with brick curtain walls between the column and girder construction. The floors are of concrete and the second story floor has reinforced concrete joists with tile fillers. All floors have terrazzo finish. The balcony is of reinforced concrete and all partitions with the exception of those between the bedrooms are of hollow tile. The roof is of asphalt shingles and is carried on steel trusses. Metal windows are used throughout. The chapel has a high, marble wainscot and is finished with ornamental plaster.

The first floor contains the chapel which is entered either directly from the street or by means of a cloister leading from the church. The vestry, sacristy, and brothers' room are arranged to serve both the chapel and the church.

Wide double stairs lead from the chapel vestibule to the balcony and to the library on the second floor. Besides the large well lighted library, the second floor contains a sewing room opening from the stair landing, and at the rear of the library are six large bedrooms and a bath room all connected by a passage. A large storage room containing a toilet room to serve the library is also provided. The rear stairway leading from the bedrooms is entirely enclosed by brick walls, except for one side

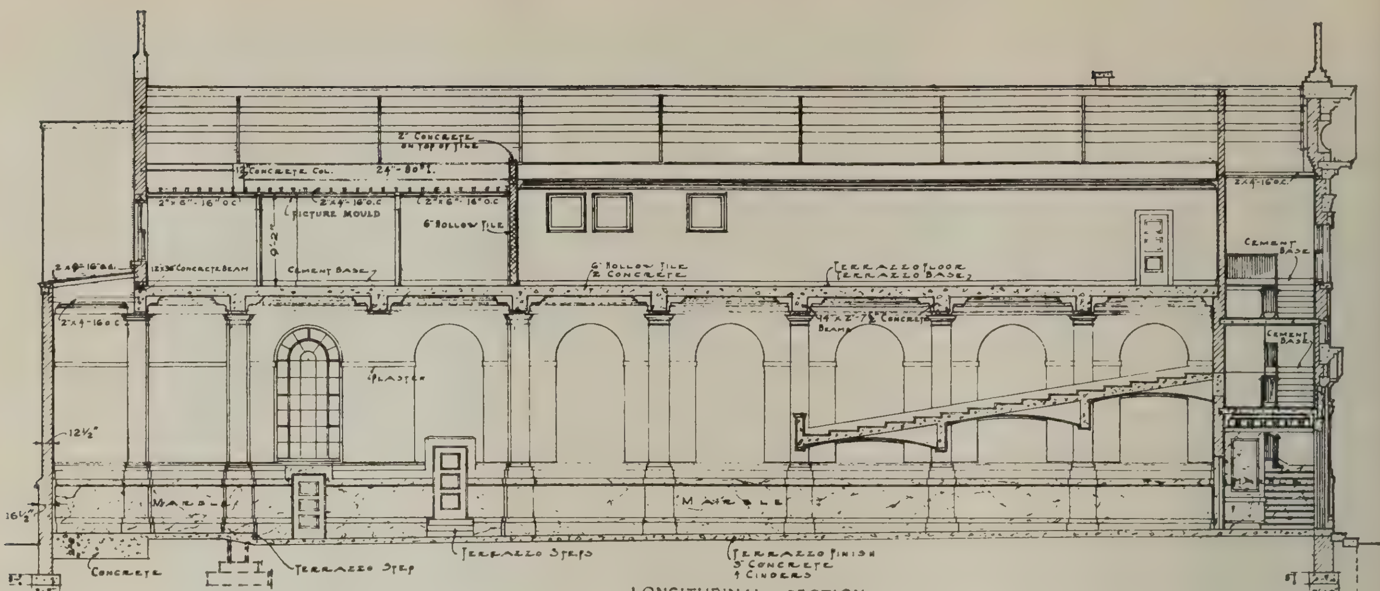
Fig. 2—The entrance is a well designed piece of stonework



SECOND FLOOR PLAN

SCALE - FEET

0 10 20 30 40 50



LONGITUDINAL SECTION

on the second floor, thus forming a fire tower similar to those used in factory and mill construction.

A Wall Trellis

Some people consider that a brick wall around a yard has too "cold" or formal an appearance.

The accompanying illustration shows a case in which such a feeling was overcome by a comparatively low brick wall which carries a light trelliswork. Vines have been trained to grow on the trellis and cement bowls for flowers were placed on the piece. Various adaptions of the idea are possible.

A tasteful combination

Kalamazoo Building Houses

In Kalamazoo, as in many other cities, the Chamber of Commerce has been the first organized body to take up the problem of providing more houses for the people. December, 1919, the Kalamazoo Chamber of Commerce brought about the organization of the Kalamazoo Land Company for the purpose of building houses. Charles B. Hays, a noted house builder, was made president and Ray O. Brundage, secretary, of the new company. The capital stock is $400,000, of which $300,000 has been paid in.

House building was begun at once, and the first 58 houses were completed in September. They are of 13 different plans, with variations, and contain 5, 6, or 7 rooms each. They are of frame and strictly modern, yet they are costing only $3500 to $5500 each, including the lots.

This low cost was made possible by several facts: First, they got the lots very cheap, as 627 lots scattered through the city were bought at one time at an average cost of $342 each. Second, one of the big lumber companies sold them lumber at the wholesale price plus five per cent. Third, the president of the company, Mr. Hays, has been building houses in Jackson for thirty years, is reputed to have built 1300 houses of his own for sale, and knows the whole house building business so thoroughly that he is able to build at least cost. The houses are to be sold at 10 per cent down and one per cent a month on the balance, of which 50 per cent is financed by a first mortgage at 6 per cent, and a second mortgage for 40 per cent at 7 per cent, the Kalamazoo Land Company accepting both mortgages and giving a warranty deed on the first payment of 10 per cent.

Scupper Detail

Wide, open porches with a closed railing require scuppers at intervals along the floor line to permit water to escape readily. The accompanying photograph shows a scupper which the builder has been at some pains to elaborate. A paneled effect with narrow slats forming a pattern is used, and while the appropriateness of such elaboration of a minor feature is questionable, it is passed along for what it is worth.

Scupper detail

Concrete Block and Tile Construction

No. 1

MODERN concrete block and tile construction has met with increasing favor until at the present time it has a substantial hold as a material for the foundations of residences, farm buildings, factory and other structures of moderate size; and it has been used recently in the upper walls of hundreds of such buildings, both as a base for stucco surfaces and with plain special aggregate block surface exposed. Several of the largest housing developments in America have walls entirely or for the most part, of concrete block.

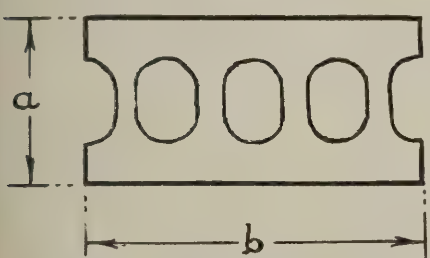


Fig. 1—The one-piece solid or hollow wall block must be able to carry an ultimate load equal to 1000 pounds per square inch of gross cross-sectional area. This area equals the product of the length by the width (a x b) (without subtraction of the air space area if there be one). The load requirement equals 1000 x a x b, taking the dimensions in inches

The success of modern concrete block construction does not constitute in any sense the acceptance of the poor, discredited block of the past, made by rule of thumb methods, of unknown materials and without regard to specification. Leading cities have in effect rigid codes to insure the manufacture of a uniformly high class product and it may be said that concrete blocks are generally called upon today to withstand more rigid strength and absorption requirements than are demanded of most other masonry materials.

Standard Specification for Block

The standard specification for concrete block and tile, adopted by the American Concrete Institute, the highest technical body in the concrete industry, is accepted generally and forms the basis for strength and absorption requirements for block and concrete tile in most city building codes where these materials of construction are mentioned. These specifications impose the following requirements:

1. In the case of solid cast stone, block or brick, the ultimate compressive strength at 28 days after manufacture must average 1,500 pounds per square inch of gross cross-sectional area as used in the wall, and in no individual test may it fall below 1,000 pounds per square inch.

2. For hollow building block and tile, the compressive strength at 28 days must average 1,000 pounds per square inch of gross cross-sectional area and must not fall below 700 pounds per square inch in any individual test.

3. In the case of two-piece building block, if only one piece is tested at a time, the ultimate compressive strength at 28 days must equal 1,000 pounds per square inch of gross cross-sectional area, this area being the length of the block multiplied by one-half the width of the wall for which the block is intended.

4. If pairs of two-piece block are tested together, the cross-sectional area is taken as the product of the length of the block by the full width of the wall for which the block is intended. No test shall fall below 700 pounds per square inch of cross-sectional area as computed above.

5. No concrete block or structural tile, when 28 days old, shall absorb more than 10 per cent of its weight of water when the entire block is immersed in water for a period of 48 hours.

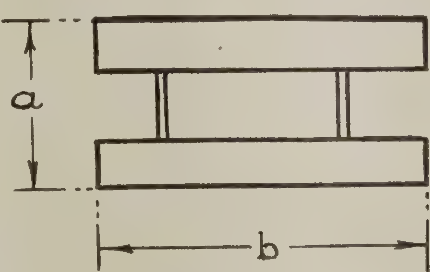


Fig. 2—Two-piece block may be tested singly or in pairs. If only one piece of the two-piece unit is tested, it must withstand a load equal to 1000 pounds per square inch of gross cross-sectional area, such area being defined as the length b multiplied by half the width of the wall a. The block is required to carry a load of 500 x a x b. If a pair of block are tested together, they must carry a load equal to 1000 x a x b

6. The load allowed on solid walls of concrete block, laid in portland cement mortar, or hollow walls filled with concrete, is not to exceed 300 pounds per square inch of cross-sectional area.

7. The load allowed on hollow walls of concrete block or tile is not to exceed 167 pounds per square inch of cross-sectional area.

8. Where girders or joists rest on concrete block in such a manner as to cause concentrated loads of over 4,000 pounds, the block supporting the girders or joists must be made solid for at least 8 inches from the inside face of the wall, except where a suitable bearing plate, not less than ⅜ inches thick is provided to so distribute the load that it is reduced to an average of not more than 300 pounds per square inch of gross cross-sectional area if of solid block, or 167 pounds if of hollow or two-piece block.

9. If the combined dead and live floor loads exceed 60 pounds per square foot, floor joists must rest on ⅜-inch steel plates ½-inch to 1-inch less in width than the wall thickness; or these joists may rest on solid block.

10. The thickness of concrete block and tile load bearing walls should be governed by the limits of loading. Three hundred pounds per square inch for solid walls and 167 pounds per square inch for hollow walls. No bearing wall should be less than 8 inches thick. These calculations are approximated in the following table:

Thickness of Walls in Inches—Residences and Apartment Buildings—Floor Load Not to Exceed Sixty Pounds Per Square Foot

No. of Stories	Basement	1st Story	2nd Story	3rd Story	4th Story
1	8 in.	8 in.	....	....	....
2	10 in.	8 in.	8 in.	....	....
3	12 in.	12 in.	10 in.	8 in.	....
4	16 in.	12 in.	12 in.	10 in.	8 in.

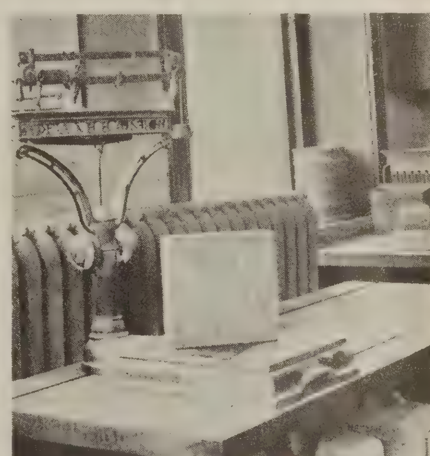


Fig. 3—After thorough drying, the block is weighed and immersed in pure water for 48 hours, at the end of which time it is removed, the surface water carefully wiped off and the block reweighed. The second weighing must not show an increase of over 10 per cent above the weight when dry

School Laboratories and Fittings

THE proper design and construction of laboratories and their fittings is one of the most important factors in a modern school building. Laboratories are planned for what might be called single and double rooms. Single when the floor area meets the requirements of 20 pupils, and double when there is a working accommodation for 40 pupils with two teachers.

The three examples in the line drawings show current practice in laboratory design in Great Britain and it is hoped that they will offer suggestions to American readers or stimulate constructive criticism on their part.

Kings College School, London

This is an admirable example of a physics and chemistry building in connection with a boys' school. It was desired that the physics laboratory should be both a demonstration room and a lecture room and for this reason the tables are arranged and fitted so that all of the boys face toward the lecture bench. The arrangement of the chemistry room is similar.

The tables have one and three-quarters of an inch oiled teak-wood tops and three round sinks are provided in each table. The sinks are of a round shape so that they can be cleaned with a minimum amount of labor. The waste pipes are taken into glass lined, acid-proof drains which pass through the floor under each table and are carried to the earthenware sewers outside. Each sink has gun metal, swan-neck faucets fitted to receive rubber tubing and at the base of the table are two small taps for condensing and other work.

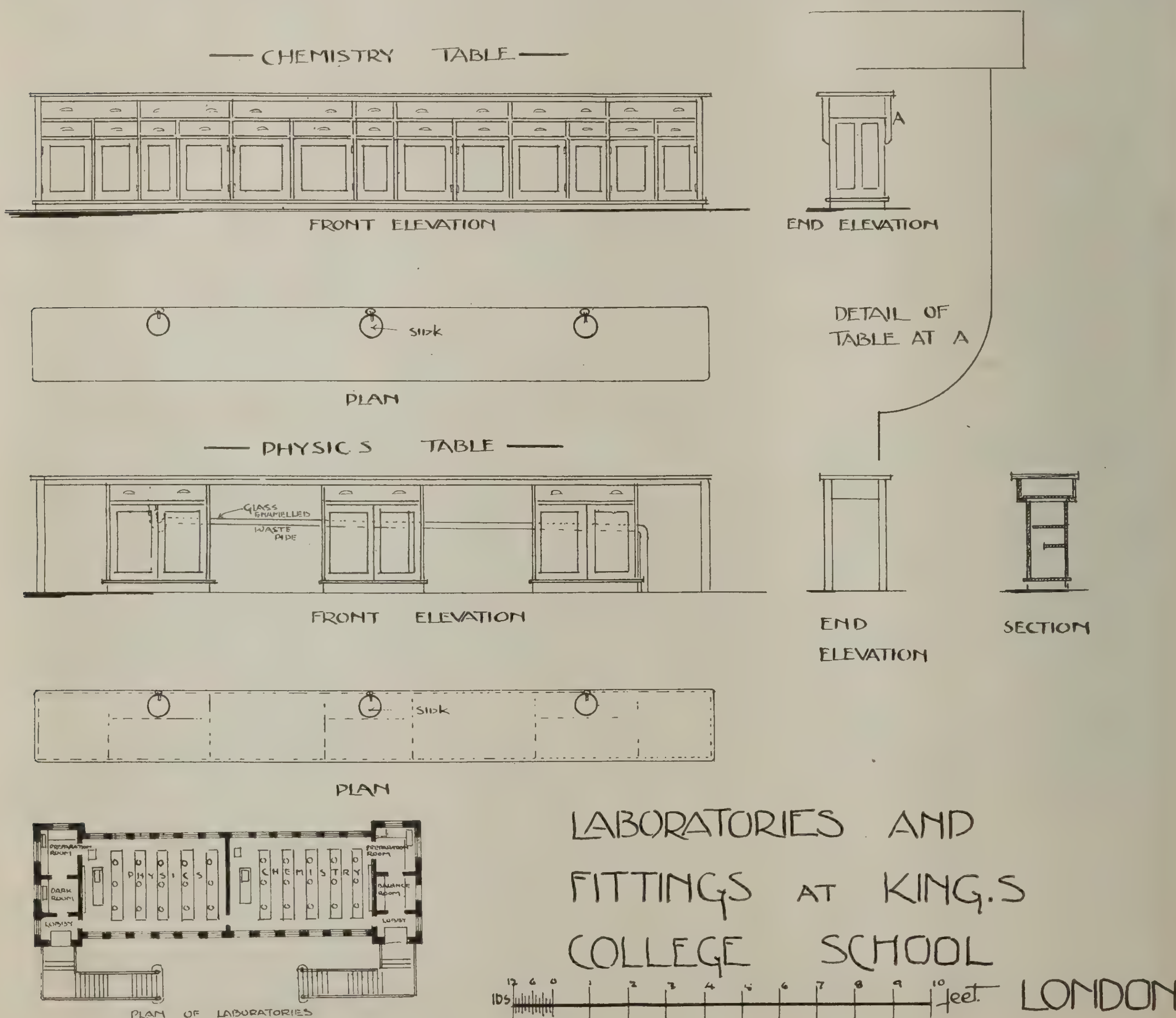
The drawers in the lecture bench and cupboards and shelving around the walls provide for the systematic storage of apparatus and material. The fume closets have a sliding sash in front, an acid resisting stone top, and a slate plinth against the wall.

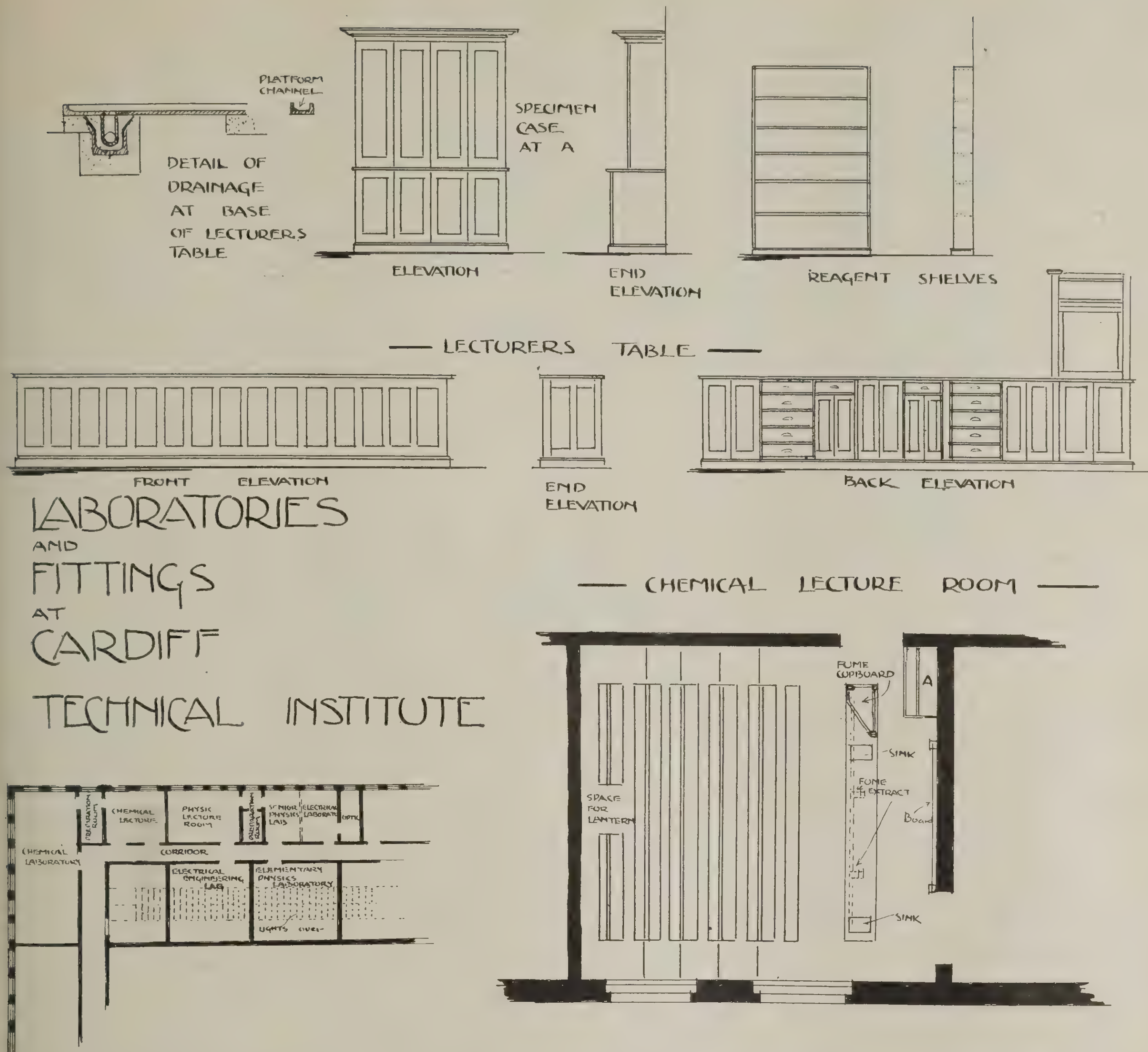
The fumes are drawn off by an electric blower in the roof and discharge through a dormer to the outside.

The floors throughout are of reinforced concrete paved with wood blocks except in the lobbies where they are of terrazzo with sinkings for the door mats.

Adjacent to the physics laboratory is the preparation room and a photographic dark room which are equipped with gas heaters for hot water.

Adjacent to the chemistry room is a preparation room and balance room—the latter being fitted with stone tables to pro-





tect the more delicate balances from vibration.

Lighting is by electricity and the switches are arranged so that the lights can be turned out simultaneously from the lecture bench, thus saving time and trouble when the laboratory is to be darkened for lantern work.

For experiments in photometry, electrolysis and various other branches of science, electric current is provided at every table in the physics laboratory.

Cardiff Technical Institute

This building, which is for evening school classes, is considered one of the foremost in the country.

The floors throughout are formed of concrete with rolled steel joists and floored with wooden blocks, except the halls, corridors, lavatories, etc., which are finished with terrazzo.

An enlarged plan of the chemical lecture room is shown with the gallery and fittings in position. The gallery has five tiers of seats and book boards, while the sixth seat is formed to allow for the projection lanterns.

The lecturer's table is in front of the students' seats and is arranged with a fume closet at one end. The fume closet has a glass front towards the student, while at the back is a lifting glass sash to give access to the closet. A fume extraction shaft is connected to the closet, and along with the other extractors is connected to the main outlet which has an electric blower. The wastes from the two sinks discharge into the cement channel which is formed along the floor at the base of the table and thus finds its way into the glass lined drains.

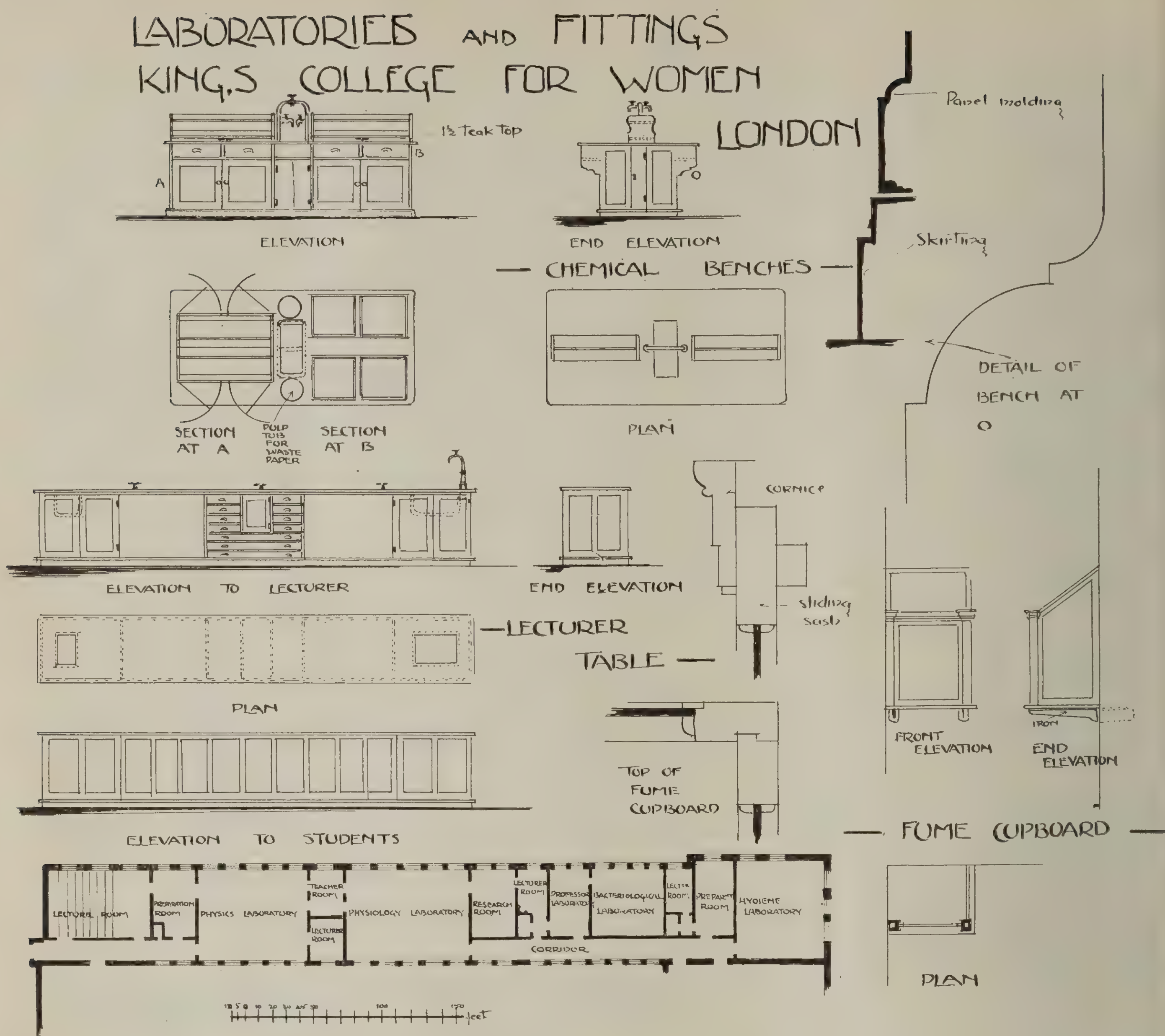
A sketch of a specimen case and a stand of reagent shelves are also shown for this room.

The planning of laboratories and their fittings differs very much according to the industrial nature of the district in which the school is built. This is more true of technical institutes than of other schools, since the technical schools form the scientific workshops upon the success of which the national welfare so greatly depends.

Kings College for Women

Courses in domestic and social science were instituted by Kings College for Women to provide education in science and economics of a university standard, and with a view to applying the principles thus taught to the management of the home, to the care of young children; to the hygienic and business-like conduct of institutions, and to study the laws and economic conditions affecting the employment of women in factories and workshops.

The subjects forming the courses now include (three year course) biology, chemistry, physics, hygiene, physiology, household work and economics. Thus it will be seen that this is an endeavor to treat all subjects connected with the household both



scientifically and practically, and in every case to link up the practical arts with the scientific principles on which they are based.

For instance, the teaching kitchen has different kinds of stoves for cooking with gas, coal and electricity. There are meters with glass fronts through which the workings of each type can be studied.

The laboratories in their equipment and finish show the same sound construction and careful attention to detail which is generally noticeable throughout the entire building. The sketches which are shown illustrate the design of the more important fittings.

Boiled and Raw Linseed

Pure boiled and raw linseed oils have the same degree of purity and are both high grade paint oils. They have somewhat different uses, depending upon the fact that they dry in a somewhat different manner. Raw linseed oil must have a dryer added, and it dries smoothly and evenly, hardening the film clear through to the under surface.

Boiled linseed oil has the dryer cooked into it, and no extra dryer is needed. It seems to dry more quickly than raw linseed, but the apparent drying is a surface effect, the paint becoming dust free rather quickly, but the oil remaining somewhat soft underneath because of the harder surface skin. Boiled linseed does not dry to the under surface and fully mature as quickly as the raw oil. The boiled oil contains more free fatty acid than the raw.

For all ordinary outside painting on wood, raw linseed oil is preferable. It gives better penetration to the priming coat, reduces the tendency to "check" and "alligator," and wears as well or better than the boiled oil.

On the other hand, a paint film in which boiled oil is used is softer and more elastic than one made with raw oil, and for this reason boiled oil or a mixture of boiled and raw oils is especially suitable for painting metal surfaces where the expansion and contraction are comparatively large. Boiled oil is also desirable for the priming coat on plaster, cement or concrete, because the large amount of free fatty acid tends to combine with and neutralize the lime in the material painted, and because it seals up fire cracks.—*The Dutch Boy Painter.*

The Man With the Paint Brush

The man with the paint brush can do more to add value to a piece of property at less expense than almost any other craftsman. That is because he can make an old surface look new and clean. He hinders decay and inspires a "look-see" into corners and dark places. The successful contractor loses no opportunity to show what the man with the paint brush can do to increase property value.

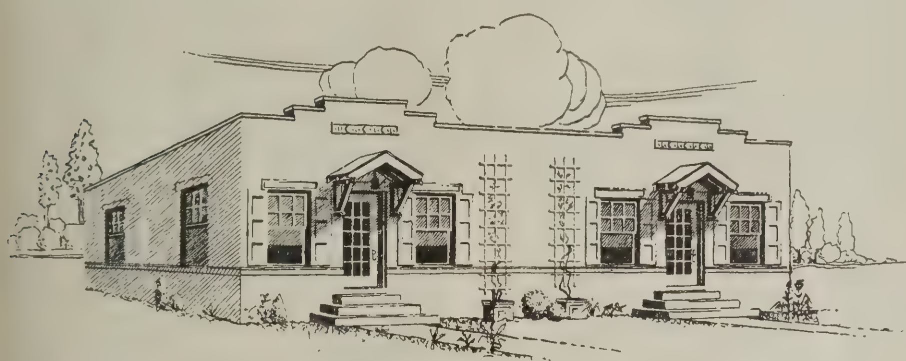
Low-Priced Houses in Omaha

WHEN you hear that a double four-room house with granite faced concrete block walls and high grade construction throughout, on a conveniently located 50-foot lot, can be bought new for $7,000, don't rub your eyes and conclude that you are dreaming of the good old days before the war. For $7,000 will buy such a house in the city of Omaha.

An initial payment of $500 to $700 and monthly payments on principal and interest amounting to considerably less than the rental value of the two apartments, pays for the home in eight to twelve years. Or a single house of the same kind, containing four rooms, bath and large finished basement, on a 50-foot lot, may be purchased for $4,000. If the house is located on a smaller lot, a proportionate reduction is made. Half ownership in a two-family house will cost $3,500. For the single house or half ownership in the double house, an initial payment of $500 is required. The two-family house makes a good investment for the owner who wishes to live in one side and rent the other.

The double houses have the two four-room apartments on one floor with identical plans reversed, as shown in the accompanying illustration. The extreme width is 42 feet, requiring 50 foot frontage. The depth is 28 feet with porches additional. The first purchasers will have their choice of 300 lots, all in convenient and desirable locations in various parts of Omaha. If it is not desired to build on one of these lots already acquired by the builders, the owner may have any other lot substituted, with an adjustment in price to cover difference in cost of lot. The single house is built on about the same plan, but being only 21 feet 6 inches in width, it can be erected on any lot as wide as 25 feet, but preferably on a lot 40 feet or wider.

Foundations, party and exterior walls of these buildings will be of hydrostone concrete block, double wall construction. The basement walls will be plastered on the inside and tarred on the outside. Party walls will also be of plain block with plaster applied directly to the block surfaces. Exterior walls above grade are to be of the finest granite mica spar marble faced block, with interior plaster applied to furring and lath. An ornamental belt course of lighter colored concrete trimstone is run around the building at the sill line and a similar belt of coping tops the walls. All sills, lintels and exterior thresholds are of precast concrete.



The least sacrifice of architectural qualities to provide a low-priced, permanent, well-built house is one of the most important problems before builders and architects today

Floors are of the usual wood joist construction carrying double selected pine flooring laid tight; for $150 additional good quality oak flooring will be laid throughout the double house. The roofs are practically flat and are covered with composition roofing. As a pecaution against fire, the under side of floor and roof carry cement plaster on metal lath. The basements will have concrete floors. The chimneys are specified of approved chimney block construction.

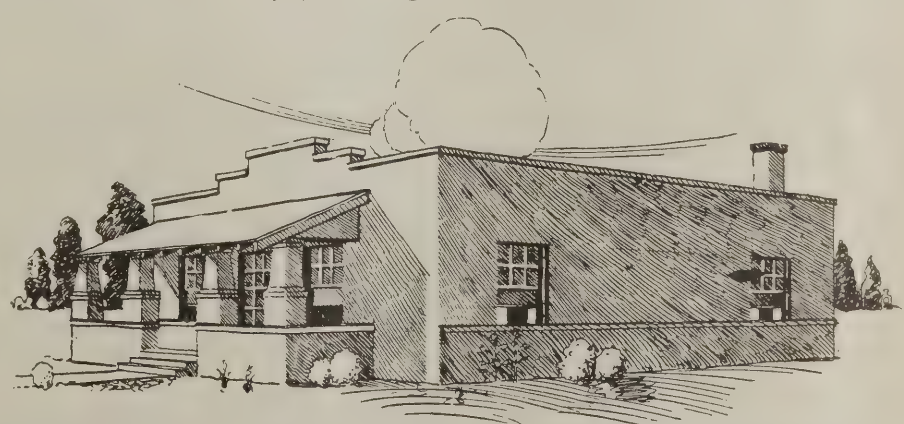
The front porches of the double houses as designed, are merely large enough to be classed as canopied entry ways, but at an additional cost of only $250 a larger porch, similar to that shown in the illustration of the single house, will be put on. The houses will be electric wired and fixtured throughout and equipped with hot water heat.

In an effort to give maximum value for the pre-determined prices mentioned in preceding paragraphs, the designers have kept down the cubage by an exceedingly compact and economical arrangement of rooms. The plan has many desirable features, including the large closet off the dining room for "put-away" bed; direct passage to bath from either bedroom or kitchen, and lighting and ventilating of the bathroom by skylight.

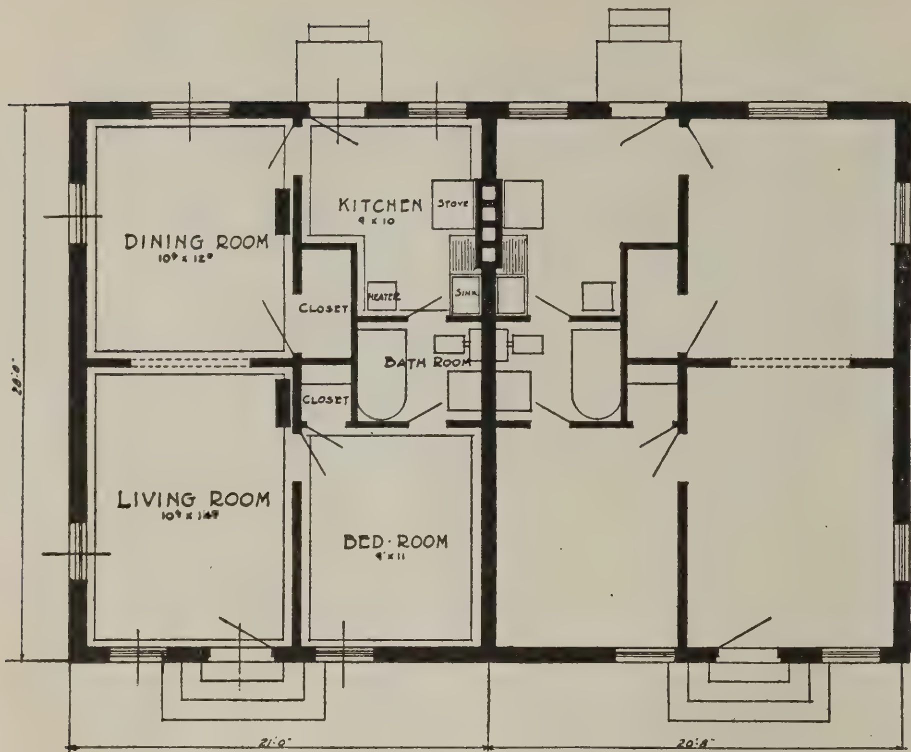
When it decided to add a small house department to its already large apartment building operations, the Drake Realty Construction Company made a careful investigation and then decided upon the prices at which it believed its houses would have to sell. After several months of effort the company feels that it is now able, by quantity production and efficient operation, to produce the houses at these figures without dropping below the standard of excellence maintained in its apartment operations. The conclusion of the Drake Company to go ahead at once on the basis outlined in this article was predicated on the belief that material and labor costs are now about as low as can be expected during the next two years.

Consequently the company has already purchased the necessary cement, lumber, plumbing, steamfitting and other materials for about 300 houses and has completed arrangements to run its new $100,000 concrete products plant all winter producing some 350,000 block and the required architectural stone, and to immediately make up the doors, windows, cabinets and trim in its own planing mill.

Ground was broken December 1 for the



A design that would give all the advantages possessed by this structure and give a more interesting exterior without increase of cost is a challenge to the practical artistry of the building profession



first of these houses and it is hoped that they can be turned over to owners at the rate of one a day after April 1. Nearly 300 applications for purchase have already reached the company through its selling agents and it is expected that houses of two or three additional types, possibly combining granite block with stucco-on-block and half beam exteriors, will be offered by way of variety in the near future.

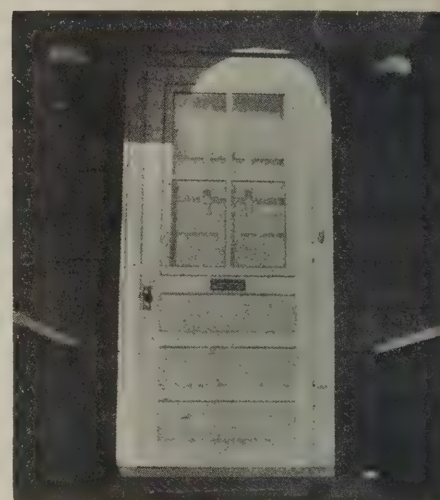
Industrial Housing in Springfield, Ohio

The Robbins & Myers Company, of Springfield, Ohio, are at the present time carrying forward an interesting experiment in building houses for their employes to purchase. A subsidiary company was created called the Warder Park Improvement Company, and Harry S. Kissel, an experienced real estate man, was made president. The construction of 110 houses was begun. Of these about 85 had been completed by the first of December, 1920, and the other 25 were under roof. Part of the houses are bungalows and the rest are two-story houses. The cost is ranging from $4550 to $7200 per house, including the lots. As these houses were built through wholesale operations, the cost was much less than would have been the case if they had been built singly.

The houses are being sold to the employes of the Robbins & Myers Company on the usual ten (sometimes much less) per cent down and one per cent a month. But for the purpose of keeping these houses in the hands of the employes of the company for at least five years, the Robbins & Myers Company has entered into an auxiliary agreement with the buyers of the properties to the effect that if the buyers of the houses remain in the employ of the company for at least five years, the above company will rebate sums varying from $525 to $825.

Storm Sash and Doors

Experiments on air infiltration have shown that with an outside air velocity of 10 miles per hour, the leakage of air around an ordinary window amounts to about 1200



Glazed storm door fitted with brass knob and letter slot

or 1500 cubic feet per hour. Quite a respectable item when multiplied by the number of windows affected in the average house throughout the winter.

Storm doors and sash will be found of value in remedying this condition, as they reduce the velocity of the wind before it comes in contact with the inner doors and windows, thus reducing air infiltration.

Robbins & Meyers' Industrial Housing at Springfield, Ohio

Apartment House Porches

IN late years designers of apartment houses and flats have paid considerable attention to porch design. Starting with the open porch extending across the entire

Fig. 1—Wide open porches are useful for only a short season in each year

front of the building, the porch has gradually grown smaller in size until in most late designs its width but slightly exceeds the depth.

The reduction in size has been accompanied, however, by an increased usefulness. That is, most of the porches are of the enclosed type with windows all around thus making them comfortable for year around use. In fact sun porches, as they are called, take on much of the character of other rooms and frequently contain wall beds so that they may be used for sleeping purposes if desired.

Casement windows are quite popular for sun porch use as they permit maximum

Fig. 3—The screened porch is another step in the evolution

ventilation when open. Special casement hardware which permits all of the sash in a wide opening to be shoved to one side,—accordion door fashion,—is now on the market. When the sash are opened the opening is entirely clear and no mullions nor other members obstruct the view. Then there is a type of double hung window in which both sash may be pushed up into a pocket in the head of the frame leaving the entire opening clear just as does the ordinary casement. This type of course requires a mullion between each pair of windows, but they provide an abundance of fresh air when open and are easily cleaned, and furthermore, they may be bought complete with frame and sash all ready to be set in place.

Fig. 2—In some sections only a small entrance porch is customary

Fig. 4—The final stage; an enclosed porch that is useful the year around

Bricklaying

By William Carver, Architect, and Andrew Pentland, Mason Contractor

THE first man who laid a brick had a great deal to learn. Every century since that time has added more and more to the accumulating knowledge of brick and how to use it. That knowledge carries with it a varied knowledge of related materials—and knowledge is power.

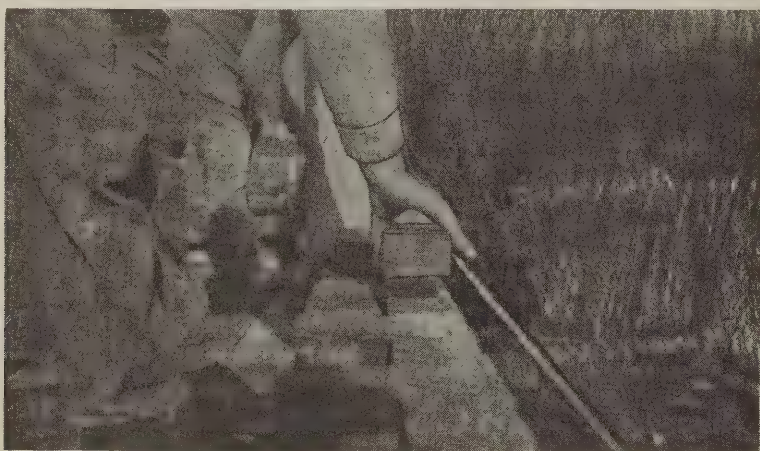


Fig. 1

Bricklaying is one of the skilled crafts that may be laborious or a continued source of satisfaction, according to the spirit in which the work is done. If the work accomplished brings nothing more to the heart of a man than the satisfaction of the pay envelope, the work is laborious; but if it brings the gratification of work well done, a consciousness of personal participation in creative work and the opening of a way to greater achievement and enlargement of individual latent powers, then indeed no detail will be neglected, no principle overlooked, and no toil too irksome to make the vision true of being able to direct others to the same singleness of purpose and highly developed skill.

A boy who decides to learn bricklaying has a great future before him if he will take advantage of his opportunities and of present conditions. The employer will make a better workman of his apprentice if he explains to him the possibilities ahead, and induces him to study with the idea of becoming a general contractor. To a boy who will do this, success is certain.

One of the first and most difficult things the boy must learn is to lay brick right up to the line without disturbing it. The line is placed to guide the brick laid not only by himself but by the other men working on the same stretch of wall. To touch it or disturb it in any way will interfere with their work. Unless the bricklayer is running the trig he must keep his hands off. One of the authors has had the misfortune now and then to work alongside men who didn't seem able to avoid hitting the line with the trowel or touching it now and then, and he can testify that such men cut down the production of their neighbors. By taking pains when learning, a boy will acquire the right habits from the start and will soon be placing brick to the line expertly and neatly without any trouble. To properly lay a brick to the line the brick is grasped so that the outside top corner is in contact with the fingers at about the middle joint, and with the thumb on the inside the fingers are raised as the brick is descending so that the line passes between the fingers and the brick (see Fig. 1). The further the brick drops the higher the fingers are raised. The natural tendency of the beginner is to grab the line with the fingers when brick is almost in place and expect that the line will guide the brick down. But the fingers should not come in contact with the line at all until they are extended straight out, and at that point the slightest touch will warn the bricklayer that the brick is down far enough (Fig. 2). These motions are accomplished by the expert bricklayer in a second, but the apprentice should practice slowly at first to get them right. He will not become an expert bricklayer until they become as automatic as his motions in walking across the street.

Special care should be taken not to push the brick out until it displaces the line. "Crowding the line," as it is called, will make the wall crooked. Especially in cases as shown in Fig. 3 should the apprentice be careful as to this. In this instance it will be observed that the line passes behind a pilaster. Slightly displacing the line at the back of the headers is very easily accomplished. The boy should always ask for assistance if he finds himself getting into trouble, and the foreman should be ready to give the boy some personal attention when learning to work to the line. He will produce a better workman if he does, for it is much easier to correct wrong habits at the start than after they have become fixed. Some men have the chronic habit of getting one of their fingers between the line and the brick. This does not, of course, speed their work.

Fig. 2

In last month's article reference was made to the economy of working always with a good line. Since then the illustration here shown (Fig. 4) has come to light, which illustrates the point very forcibly. When a knot in the line occurs opposite a joint the ends of the string get into the mortar at this point and have to be constantly pulled out, exasperating the workman. Many a bricklayer has cut the line with his trowel under such circumstances. By all means throw away any line with knots in it. You will be money ahead.

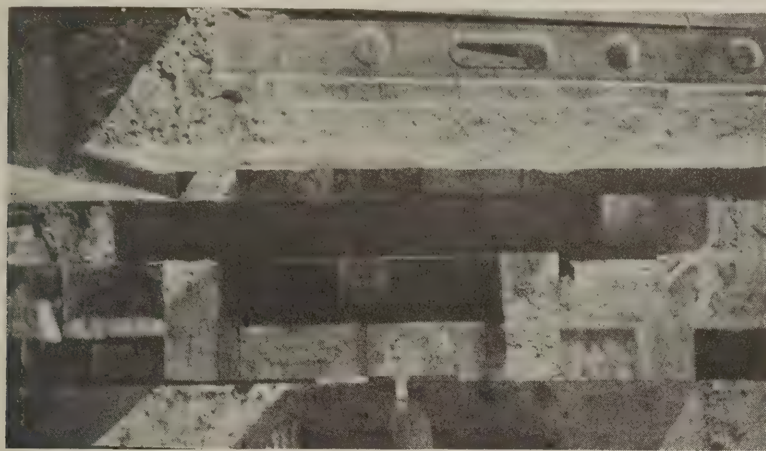


Fig. 3

Fig. 5 illustrates why many an apprentice boy, and even seasoned bricklayers, get sore fingers. Only very occasionally need the finger be placed on the trowel to spread out the mortar after it is placed. That occurs only when the mortar is exceptionally stiff. When the finger is placed on the trowel the lime and mortar get into it. The finger also gets wet and when picking up fresh bricks the friction will complete the job and produce a sore and even bleeding finger. A few bricklayers who have formed this habit always have a sore finger. Nobody can work at his best when his hands are sore, and the apprentice should start by resolving to keep his left hand off his trowel. The apprentice should devote some little attention to his hands if he wishes to keep them in good condition. Not only is soreness of the hands a hindrance to work, but is personally inconvenient and painful. The contractor will be repaid also if he keeps an eye on the condition of his apprentice's hands. Not only will the boy do more work if his hands are fit, but he will not be wasting the other men's time by having them tie up the strings on his finger stalls as they become loose. To keep his hands in good condition he must wash them well with soap and water five, six or seven times on his arrival home in the evening until every bit of the lime and cement have been cleansed from the skin. Then nature will have a chance to get in some repairs before time to go to work in the morning. Most hand trouble is simply due to carelessness in not thoroughly soaking out the lime and cement.

To return to Fig. 5 it will be observed that two courses of the facing have been laid, and on the backing is placed a course of loose brick. These brick also are face brick, so placed to expedite the work. If the bricklayer, after spreading the mortar, had to stoop down and pick up each brick singly and lay it to the line, not only would he work very slowly, but the mortar might have become stiff before he had come to the end of the bed, slowing the work still more. Throwing his trowel into the mortar on the mortar board, blade down, handle in a convenient position to pick it up again, he stoops and picks up his face brick, one in each hand, and lays them on the backing just behind the face work. Then he spreads the bed of mortar, lifts the face brick high enough so that he can "butter" the end adjoining the brick already laid and lays it in place. In addition to pressing the brick down to the line he also "shoves" it sideways so the end joint will be full of mortar and of the proper width.

Placing the loose brick on the wall, as described, is called "backing" the brick. It will be observed in the illustration that the brick are all laid correctly, with the frog down. They are also placed so that the most desirable side will face the weather when laid without having to turn the brick around. This selection must be done while the brick are being picked up, and placed exactly as they will appear in the finished wall. The illustration shows the construction of a 12-inch wall in common bond, and the method of placing the headers shows plainly, a header course being laid first on the inside face of the wall, and at the next course on the outside face. Thus the headers lap four inches over each other in the center of the wall, producing a very strong bond.

Another "trick of the trade" that the apprentice must learn is the art of getting a "roll" on his brick. Contrary to what might be expected, a well-built brick wall is not laid with the facing brick absolutely level. If it were it would look as though the bottom of each course were laid projecting and the work would appear to be roughly and crudely done. To satisfy the eye the brick are laid as shown in the accompanying sketch (Fig. 6), very slightly tilted toward the front of the wall. The impression then produced is that of an absolutely flat wall surface. To test this it is only necessary to examine the back wall of some building where, not being an important elevation, the wall has been "slapped up" with more speed than elegance, and the exposed brick laid absolutely level. The brick courses, as stated before, will appear as though they project at the bottom, but if a plumb rule is placed upon them it will be found that the face is exactly perpendicular. The only case where this treatment is not necessary is where a deeply raked joint is used, but on all ordinary work, whether the joint be flush cut, concave or struck, the "roll" is necessary. The finer the joint the more exact must the bricklayer be in this detail. The fine "buttered" joints of the old-fashioned pressed brick fronts were all laid with scrupulous regard to the correct "roll." The projection of the brick in the sketch is much exaggerated to make this point quite plain. To acquire the ability to so place his brick is one of the most difficult things a brick-

Fig. 4

layer's apprentice is called upon to learn; and it takes long practice to attain proficiency in it.

Although the "buttered joint" referred to is almost never used on modern work, except when laying enameled brick, it is a good joint for the apprentice to practice on in spare moments when he can obtain mortar fine enough, for the pressed brick wall with the buttered joint, from the purely mechanical point of view, was the most perfect wall, and a bricklayer who could qualify in that class of work could do any other kind of brickwork without difficulty.

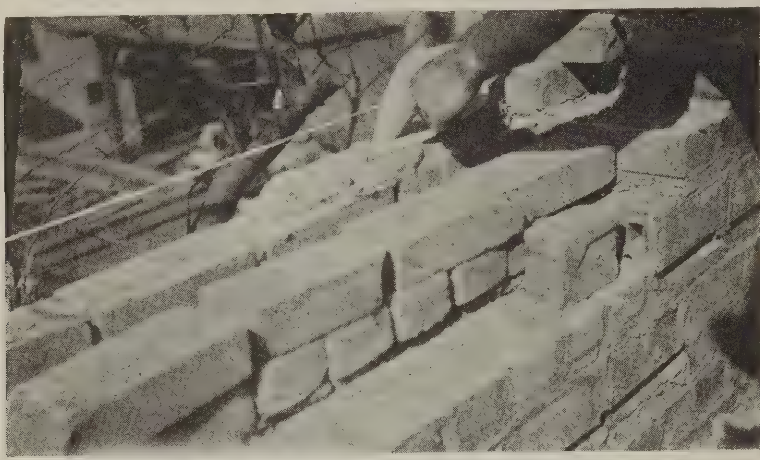


Fig. 5

As the joints averaged only about ⅛ to ¼ inch, it is evident that only the finest material could be used in the mortar. It was generally composed of lime putty and sand screened exceedingly fine and made into a very rich mix. Sometimes marble dust was used instead of sand. The mortar was picked up by rubbing the bottom of the trowel over the mortar, the putty-like mixture adhering to the bottom. The bottom and one end of the brick were then "buttered" and the brick placed. Nowadays the natural beauty of the brick is allowed to play its proper part in the appearance of the wall, and the exact and somewhat hard mechanical effects of close uniformity avoided. Brick are now laid with wider joints and the appearance of modern work is far more artistic than the old, besides having the advantage of being laid more quickly and therefore costing less.

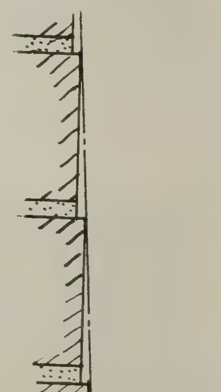
Answers to the Questions in the December Number

(1) There are many conflicting opinions regarding the relative effectiveness of a square flue, say 8-in. x 8-in., and a rectangular flue, say 8-in x 12-in. This is a much discussed matter among contractors, and we would welcome an exchange of views on this subject. This question will be held over until the next issue to allow time for more answers to come in.

(2) What is a damp course?

A damp course is a course of special waterproof material used where the soil is exceptionally damp or wet to prevent dampness rising up in a wall from below the grade level. In ancient brickwork sheet lead was used for this purpose. There are now several makes of asphalt damp courses which are effective unless the wall is very heavily loaded. Two courses of slate laid with broken joints makes a very effective damp course.

(3) What does the term "hog" mean, used among bricklayers?



The "roll" in brickwork (exaggerated)

If it is found that in working along a wall or around the building either a greater or lesser number of courses is used in one place than in another to attain the same height, the extra course is called a "hog." If there are windows or other openings between the points of difference the error may be covered up, but it becomes more serious on a straight wall without openings and will tax the foreman's ingenuity to overcome it.

(4) Why are brick wet before laying?

D. W. Daley, Parkersburg, W. Va., sends the following excellent answer to his question: There are several reasons why brick should be properly dampened when laid in the wall. But not too wet. If the pores of the brick are filled with water when the face courses of the wall are laid, the surplus water will leave the brick and run down the face of the wall, carrying the lime or cement with it, leaving the sand on top of the bed joint and there will be a very poor bond between the mortar and the brick. (Also if the brick are too wet they will slide on the mortar and be difficult to handle.—Editor.) On the other hand, if the brick are properly dampened when set in the wall, as the moisture leaves the heart of the brick a vacuum is caused which sucks the molecules of the mortar into the pores of the brick, thus giving an ideal bond.

If the brick are dry when laid in the wall by capillary attraction the moisture will pass from the mortar into the brick before the mortar has time to properly congeal, and under those conditions the mortar would be brittle.

Bricklayers Now Working Efficiently

The following resolution was passed at the annual convention of the Mason Contractors Association of the United States and Canada, at Detroit, December 6 to 8, 1920.

"Whereas, Wide publicity has been given by the newspapers of the country to articles calling attention to the low production basis of journeymen bricklayers of the United States and Canada, and

"Whereas, Such information has not been based upon facts, or knowledge, as to its truth, and

"Whereas, By reason of said publicity much injury has been done to the building business in general, and the mason contractors and the bricklayers in particular, and believing in the right of the public to receive the correct information; therefore be it

"Resolved: That the Mason Contractors Association of the United States and Canada, in convention assembled, go on record that it is the sense of this body that the journeymen bricklayers of the United States and Canada, as a whole, except in isolated cases, are now producing an amount of work that compares favorably with that of pre-war years, and that they are co-operating with the mason contractors to the end that the public may be given more production, which makes for lower building costs and more homes."

What Constitutes Good Concrete Floors?--By J. E. Freeman

EVERYONE is familiar with concrete floors, but few really understand the fundamentals of their construction; in other words, what constitutes a good floor—one that affords the greatest strength, durability and resistance to wear.

Take for example the matter of protecting a concrete floor during early hardening. Many feel that it is sufficient to leave the floor when finished without covering the surface or wetting down the floor frequently to prevent evaporation and as a result the floor dries out or "cures."

The statement often made that concrete should be thoroughly "cured" is misleading, since curing implies a drying action accelerated perhaps by heat. This is just the opposite of what should be done with concrete if best results are to be obtained. The moisture present in the freshly laid concrete is required for the hardening action and premature drying through lack of surface protection to conserve this moisture and supplement it, prevents the concrete from developing its proper strength and resistance to wear. Such conditions will also influence the watertightness of a floor particularly when subjected to a head of several feet of water.

The question may be asked, why is a concrete sidewalk left unprotected and still shows little sign of wear under traffic? Consider that a sidewalk is continually being wetted on the surface by rain, while a floor within a building usually remains dry when once the initial moisture within the concrete has been removed. Experience has developed the fact that the well-known resistance to wear of concrete roads and streets under heavy traffic conditions is largely the result of the retention of moisture in the concrete while hardening during the first few weeks after construction either by an earth blanket kept wet or by "ponding." Ponding divides the road surface into short sections by dikes so that it can be covered with water to the depth of several inches.

How many concrete floors in industrial plants or commercial garages, for example, are given any such protection during this period? It is safe to say that very few are so treated, yet such floors are *indoor* pavements subjected often to heavy traffic and therefore deserve the same consideration.

The writer has seen even porch floors that have given trouble by dusting, resulting from lack of adequate protection while hardening.

Basement floors are more fortunate in that their position below ground prevents as rapid an evaporation of the moisture in the concrete as occurs with unprotected surfaces above ground, yet if constructed during warm weather some protection while hardening is necessary to produce the best results.

The Structural Materials Research Laboratory at Lewis Institute, Chicago, has carried on extensive investigations of the properties of cement and concrete, and the results of one series of tests made there will serve to emphasize the importance of proper protection of concrete during the earl hardening period. On the accompanying chart No. 1 are shown the results of strength and wear tests all made at the end of 120 days on four series of samples of to a 1:1½:3 mixture. The first series was stored in air for 120 days and then tested, the second in damp sand 3 days and in air 117 days, then tested, the third in damp sand 21 days and in air 99 days, and the fourth in damp sand 120 days. Results for the first series for compressive strength are shown at a*s* and those for amount of wear at a*w*, results of the second series are shown at b*s* and b*w*, those of the third at c*s* and c*w* and those of the fourth at d*s* and d*w*. Thus the full line drawn through these points represents the compressive strength record and the dotted line the record of wear in inches; the drop in the dotted line shows a reduction in the amount of wear or an increase in resistance to wear.

Bear in mind that the wear indicated was produced by an accelerated test far more severe than would be developed under conditions in actual practice. The Talbot-Jones rattler used for the tests is fully described in the 1918 Proceedings, American Concrete Institute, page 22. In these tests also the specimens stored in air hardened under conditions much more favorable than those frequently found in construction during the summer months or in arid regions where there is a rapid evaporation of the water in the mixed concrete from the time it is deposited and finished. The concrete used was mixed with only enough water to produce a workable plastic mixture. Both of

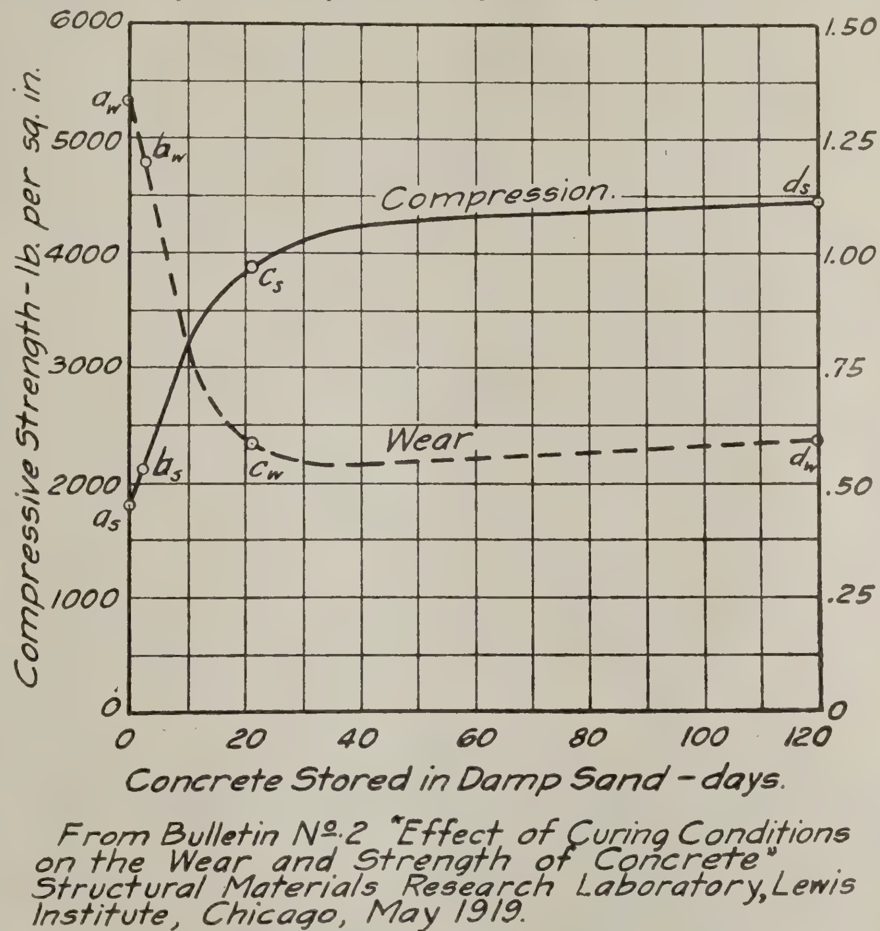


Chart No. 1

these factors make the difference in results less than would probably occur in the field.

However, the lesson is sufficiently clear at that. Considering that the best practice in concrete floor construction as recommended by the American Concrete Institute advises covering the surface of the floor with damp sand for a period of 10 days after the floor is finished, the chart indicates that such protection of a floor during the early hardening period will produce a compressive strength 75 per cent greater than that of a similar floor unprotected, and an increase in resistance to wear of over 40 per cent. An increase in compressive strength is accompanied by a corresponding decrease in the amount of wear or in other words an increase in resistance to wear.

What does this mean to the factory or garage owner for example? Simply this, his returns measured in service rendered by the floor in proportion to his investment or the amount of money he has spent for materials and labor involved in the construction of his concrete floor, are increased by over 50 per cent. "Dusting" and "Sanding" of the floor surface are eliminated and expense for repairs and maintenance reduced to a minimum.

Dusting of a floor may be due to other causes besides lack of proper protection while hardening, such as:

Sand used which is too fine grained or contains an injurious amount of organic impurities.

Mortar or concrete mixed too wet or too dry.

Excessive trowelling of floor when finishing, especially with a wet mix. This brings a thin film of the finest particles to the surface and interferes with the hardening action of the body of the mortar.

Sprinkling the surface of the floor when finishing with dry neat cement or with a dry mixture of cement and sand, in order to take up excess moisture.

Improper proportions and insufficient mixing.

An excess of water in mixing the concrete or mortar has a detrimental effect upon strength and resistance to wear that few realize. Considering that one definite quantity of water combined with a given mixture of cement and aggregates will produce the maximum strength possible for that mixture, the effect of any variation from this quantity of water upon the strength of the same mixture of concrete is clearly shown in chart No. 2.

For example, if the amount of water used is 20 per cent more than that needed to give maximum strength in any particular mixture of concrete, the strength of that same concrete will be reduced practically 30 per cent. Should the water used be slightly over 30 per cent in excess, only *one-half* of the possible strength of the concrete will be obtained. Too little water also has the effect of reducing the strength though not to such a marked degree. The tendency in construction, however, has rather been toward the use of an excess of water, producing a sloppy or soupy mixture, and this amounts practically to wasting cement.

Since Chart No. 1 shows the relation between strength of concrete and resistance to wear, it is not hard to understand what a detrimental effect an excessive quantity of water in the mixture has upon the ability of a floor surface to resist abrasion.

In actual practice the quantity of water producing the maximum possible strength in the concrete would produce a concrete too stiff to handle in many forms of construction, but it can probably be more closely approached in concrete floor construction than in most other classes of work. As a general rule the best guide to follow is to use the *smallest quantity* of

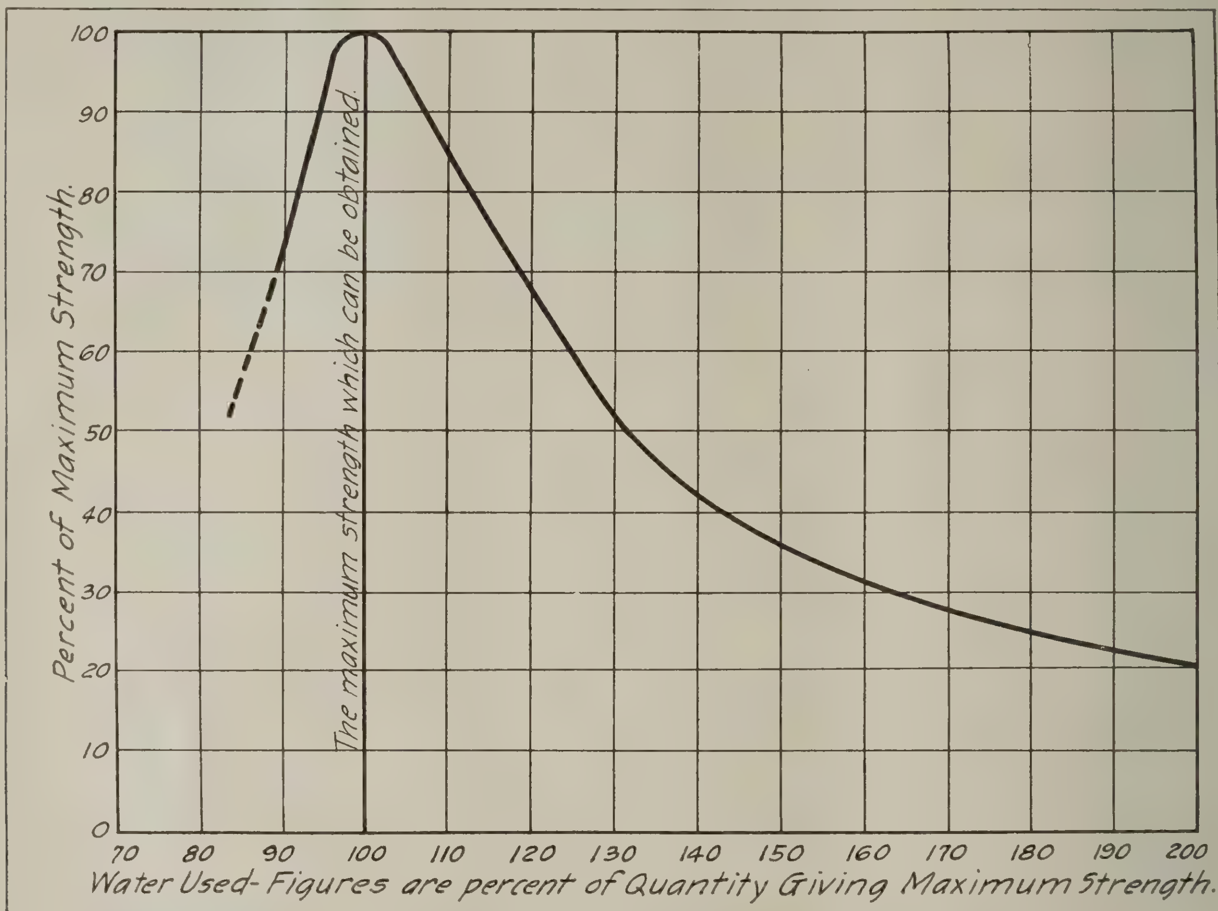


Chart No. 2—Effect of quantity of mixing water on the strength of concrete, the results of extensive tests by the Structural Materials Research Laboratory, Lewis Institute, Chicago

Protecting a concrete floor during the first ten days by a covering of sand or earth, kept wet, will add 50 per cent to its strength and resistance to wear

mixing water that will produce a workable mix.

These two points of reducing excess water in the mixture and properly protecting the floor surface during early hardening are the main points controlling successful and wear resistant floor surfaces, and might be summed up in the following rule: Put the excess of water *on* the concrete while hardening, not *in* the mixture.

A brief outline of other recommendations of a general nature relating to the construction of concrete floors should be helpful in understanding the various factors that combine to produce the best grade of concrete floors.

Any of the standard brands of Portland cement may be used, but the cement should be carefully stored on the work so that it will not be exposed to dampness, since dampness injures the quality.

The fine aggregate should consist of natural sand or screenings from hard, tough, crushed rock such as granite. It should be clean and free from any surface film or coating and well graded from finer particles to those just passing a ¼-inch mesh screen, the coarser particles predominating. The aggregate should contain not more than seven per cent by volume of clay, silt or loam and should be free from vegetable or other organic matter.

A simple field test for determining the presence of an injurious amount of organic impurities consists in filling a 12-ounce graduated prescription bottle to the 4½-ounce mark with the sand to be tested, adding a 3 per cent solution of sodium hydroxide (caustic soda) until the total volume after shaking is 7 ounces. After the bottle has been shaken thoroughly and then set aside for 24 hours, the color of the liquid above the sand is an indication of the amount of organic impurities that the sand contains. It should be practically colorless or at most a light amber color; if the liquid is darker, the sand contains too much impurities and should be rejected or used only after having satisfactorily passed a laboratory strength test.

This color test may seem an unnecessary refinement but investigations have shown that a sand which looks clean may contain one-half of one per cent of organic matter —an amount sufficient to reduce by 40 per cent the strength of concrete in which that sand is used; thus, the importance and value of such a simple test is apparent.

A simple test for silt may be made by filling a 32-ounce graduated bottle with sand to the 14-ounce mark, then adding water to the 28 ounce mark, shaking hard for one minute and allowing the contents to settle for an hour. The material represented by the sample should not be used if more than one ounce of sediment settles above the sand, unless it is washed to remove the silt.

The coarse aggregate should consist of hard durable crushed rock or pebbles from screened gravel, clean and well graded in size from ¼-inch to the maximum size permitted by the construction. In plain floors laid on the ground this size may be 1½ inches but in reinforced floors 1 inch is considered the maximum and for thin slabs with closely spaced reinforcement ¾ inch. Cleanness includes freedom from dirt or organic matter, also from any film or coating on the individual particles which would prevent a proper bond with the mortar. Bank-run gravel or mixtures of fine and coarse aggregates prepared before delivery should not be used because the relative amounts of fine and coarse material in any two loads are never the same and differ to such an extent that mixtures of greatly varying proportions result.

For floors in garages or in industrial plants, etc., that will be subject to heavy trucking, it has been found that the use of a somewhat coarser material with the fine aggregate in the mixture for the top or wearing course improves the strength and resistance to wear. Such material is similar to coarse aggregate but screened to sizes from ¼ inch to about ⅜ inch.

The water used in mixing the concrete should be clean, and free from oil, acids, strong alkali or vegetable impurities. If the water is drinkable it is safe for concrete.

The materials, including the water, should be measured by methods which will insure separate and uniform proportions, and in this connection it should be remembered that a sack of cement is considered to contain one cubic foot. A good method of measurement is by bottomless measuring boxes or by wheelbarrows whose capacity can be accurately determined.

The concrete should be mixed in a batch mixer equipped if possible with a suitable charging hopper and a water measuring device. Each batch should be mixed for one minute after all materials are in the drum before any part of the batch is discharged and the drum should be completely emptied before receiving materials for the succeed-

A concrete factory floor of considerable area, protected while hardening by the "ponding" method, often used for concrete roads instead of the earth cover

ing batch. In mixing, the least amount of water should be used which it is possible to put into the concrete and still obtain a workable mixture, because the use of more water lowers the strength of the concrete. For reinforced floors the concrete should be plastic or quaky so that it can be readily worked into the forms and about the reinforcement but an excess of water should always be avoided.

When mixing mortar by hand the materials should be mixed dry on a watertight platform, until a mixture of uniform color is obtained, then the required amount of water added and the mixing continued until the mass is of uniform consistency and character.

Where the concrete is to be used in the base of a two-mix floor laid on the ground the consistency should be somewhat stiffer. In such floors the slabs or independently divided blocks should not be over 10 feet square as a rule; if made larger, a reinforcing mesh weighing about 2.8 pounds per square foot with the metal equally distributed both ways should be embedded in the slabs, making each slab independent.

When the concrete for the base is deposited, individual sections should be constructed complete, care being taken to produce straight clean-cut joints. Where such floors are subjected to heavy trucking, it would be desirable to construct the floor in alternate slabs, laying the intervening slabs after the former have hardened and finishing the surface up smooth and even at the joint with no marking groove for truck wheels to pound over.

The mixture to be used for the base of two-mix floors should be no leaner than 1:2½:5—that for reinforced concrete floors should be as rich as 1:2:4, while the top or wearing course for each should be mixed 1:2 if fine aggregate alone is used or 1:1:1 if ⅜-inch material is added as noted above.

Floors laid on ground can often be built of a single mixture throughout as in concrete road or sidewalk construction and when so constructed a 1:2:3 or 1:1½:3 mixture should be used. Such a floor requires little or no additional amount of material compared with the two-mix floor, and requires less labor to build.

The thickness of reinforced floor slabs will naturally depend upon the span and the load to be carried. A plain concrete floor should have a total thickness of at least 5 inches; the top of two-mix floors should be ¾ inch for floors under light traffic and 1 inch for other cases.

Concrete should be deposited in its final position as soon as possible after mixing and within 30 minutes after water has been added to the dry materials and should be brought to an even surface at grade or in a two-mix floor sufficiently below grade to allow for a mortar top. Care should be taken in building reinforced floors to work the concrete thoroughly around the reinforcement and into recesses of the forms and insure a smooth ceiling. Plain floors should have individual sections completed in a continuous operation, producing clean-cut joints between, so as to make each section an independent unit. Do not place concrete upon a frozen sub-grade or sub-base. Concrete for two-mix floors laid on ground may be tamped in place, that for single course floors should be more plastic so that it can be struck off with a strike-board.

Top mixtures should be deposited in place as soon as mixed and before the base concrete has appreciably hardened. Sometimes it is necessary to delay the placing of the top for reinforced floors beyond the time of hardening of the base. In this case it is essential that the hardened surface be roughened by picking, swept clean of dirt and debris and thoroughly moistened so that it will not absorb water from the top mix. Free water on the surface is bad, however. With the clean surface in moist condition, brush a neat cement grout of creamy consistency over it and immediately follow with the top mortar. The mortar in either case should be of the driest consistency possible to work with a sawing motion of the strike-board.

In finishing the floor surface, first work it with a wood float after it has been struck off to grade and should a steel trowel finish be desired, use the trowel without excessive working as that injures the quality of the surface obtained. Do not sprinkle dry cement or a dry mixture of cement and sand directly on the surface as this is a frequent source of trouble later through dusting, etc.

Protect freshly finished floors from hot sun and drying winds until they have hardened sufficiently to be covered without injury to the surface by a layer of wet sand or earth. This covering should be kept wet for at least 10 days to produce the favorable conditions for maximum strength and resistance to wear described at the beginning of this article.

Floors can be laid during freezing weather provided the water and aggregates are heated and the temperature of the concrete kept above 50 degrees Fahrenheit for at least three days by a moist heat to prevent damage by freezing. A longer hardening period will be needed, however, before such a floor can be used, unless this favorable temperature is maintained over the 10-day period, as low temperatures greatl retard the hardening of concrete.

With this understanding of the fundamentals of good floor construction, prospective owners should inquire of contractors whether their price for the work provides for proper protection of the floor during hardening, etc., knowing that such methods will bring far greater returns on the money invested in the floor construction. Contractors in turn will benefit by the reputation for first-class floor construction gained as the result of their careful, conscientious workmanship. As one advertiser has stated, "The quality is remembered long after the price has been forgotten."

A Garage and Wall

The illustration shown above is that of a double garage combined with a wall across the rear of a lot in St. Louis, Mo., presenting an appearance as attractive as unusual.

Both the garage and wall are built of brick and covered with roof tile to harmonize with the house which is built of similar materials.

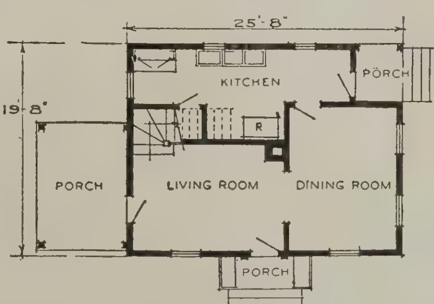
Housing at Indianhead, Maryland

Fig. 1—A typical street view of the houses at Indianhead. Donn & Deming, architects

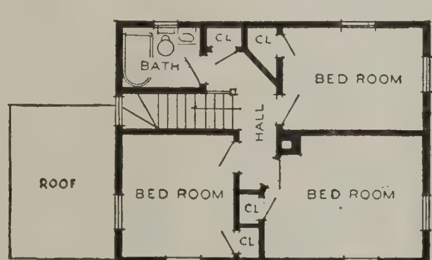
THE U. S. Navy proving grounds and smokeless-powder works are located at Indianhead. Several hundred skilled workers, chemists and the like are employed, about half of whom are married. At the time this housing project was begun there were only about forty dwellings in the community and the majority of the workers were forced to live miles from their work. Transportation of the men to and from Indianhead was in many cases of a makeshift character usually involving a 15- or 20-mile ride by jitney.

In an effort to overcome the housing shortage that was largely responsible for such a condition, 100 houses have been built. Also dormitory accommodation for about 100 men have been provided.

The project is rather unusual from the fact that only six-room, detached houses are used, thus differing from the varied accommodations consisting of four, five and six-room houses that are common to most projects of this type. It is, however, becoming quite generally understood that the six-room house is highly desirable from the married worker's standpoint, and that wherever possible he will make it his choice. This is especially true if the houses are to be sold to the workers; if the houses are to be rented, a demand for smaller houses is sometimes found.



FIRST FLOOR PLAN

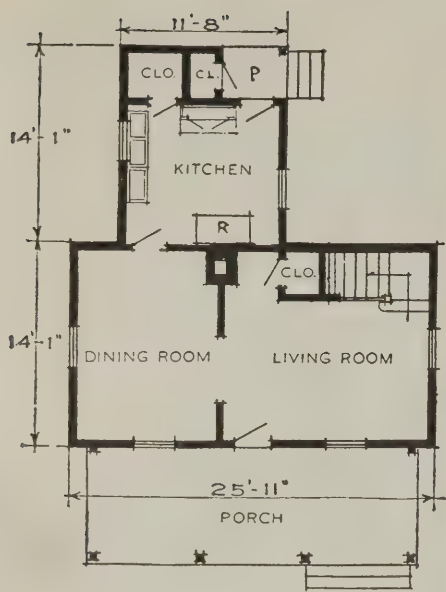


SECOND FLOOR PLAN

In some of the more successful developments a sort of compromise arrangement has worked well. That is, small houses, apartments and so forth are provided for rental purposes, and larger houses are available for those who desire to buy. The small dwellings serving as stepping stones toward the ownership of a larger house when the the growth of his family, stability of employment or other considerations point toward home ownership.

The Indianhead development is also unusual from the fact that but four exterior designs, based on two plan types, are used. This has led to some criticism because of the sameness of effect that is said to result.

Of course, it is probable that more variation in the designs would prove more interesting, but it should also be remembered that the appearance of many projects suffers from an over-abundance of designs. Too much variation in roofs and so forth frequently results in a conglomerate composition in which the individual characteristics of each house are too pronounced. This causes a loss of dignity and arouses a



FIRST FLOOR PLAN

Fig. 2—This house is based on Plan 1, reversed

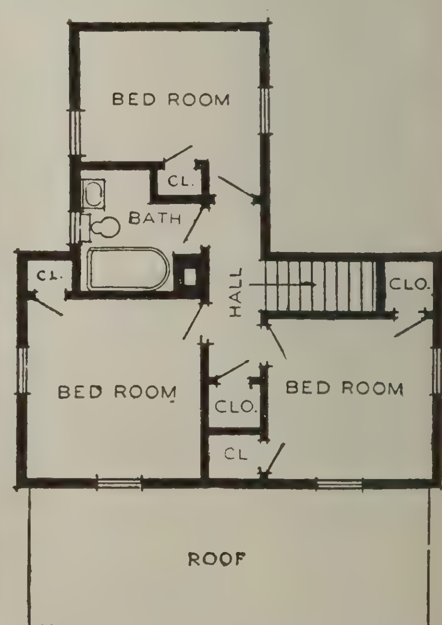
Fig. 3—This house is similar to Fig. 2, but has an arbor entrance

feeling that the designer was endeavoring to show his entire bag of tricks.

The setting of the houses at Indianhead is in itself favorable to considerable repetition in the designs, as the curved streets and the heavily wooded character of much of the site overcomes any feeling of stiffness or undue formality in the composition.

All of the houses are shingled and have roofs of slate-surfaced asphalt roofing. All walls are painted white, but some variation is obtained by green roofs on some houses and reddish-brown ones on others. Different colored blinds are also used for the the same reason.

The plans cover approximately the same area and variations in the appearance of the exteriors is produced by altering the



SECOND FLOOR PLAN

Fig. 4.—This house is also based on Plan 1, but has the porch across the front

positions of porches and entrances by reversing the plans.

Plan 1 is rectangular in shape. A small entrance porch leads to the living room which also opens onto a large covered porch at the side. The dining room has a cased opening into the living room and a door to the kitchen. The kitchen is of the long, narrow type that is favored by many housekeepers. The range sets in a sort of niche and a storage closet opens under the stair. A combination wash tub and sink and a built-in cabinet are provided. By changing the positions of the cabinet, a breakfast alcove could be installed in this end of the kitchen. A rear porch opens from one corner of the kitchen.

The second floor is reached by means of a stair from the living room. There are three bed rooms and a bath connected by a small hall. Each bed room contains a small closet and a linen closet opens from the hall. All rooms have cross ventilation.

Plan 2 is of a modified ell shape. A wide porch extends across the front and opens into the living room. The living room contains a handy coat closet and opens into the dining room through a wide cased opening. A door from the dining room leads to the kitchen which is almost square in plan and is excellently ventilated by means of windows in opposite walls.

The kitchen also contains a combination sink and tub and a built-in cabinet. A storage closet opens from the kitchen, and another closet opens from the rear porch which adjoins one corner of the kitchen.

The second floor arrangement is somewhat better than that of Plan 1. The hall is straight and the closets are more roomy. All rooms have cross ventilation, that of the rear bed room being especially good.

Donn & Deming were the architects for this development. S. Child was the town planner and E. V. Coonan the engineer.

Cost of Living

The cost of living is the keystone of the cost of labor. A resolution was introduced by Senator Walsh of Massachusetts (S. Res. 366), on May 18, providing that the president of the senate appoint a committee of five senators to investigate and report to the senate on the question of high prices. This question is still in the hands of the Committee to Audit and Control Contingent Expense.

New Materials and Methods of Construction as a Means of Reducing Costs

By Leslie H. Allen

Fred T. Ley & Co., Inc., Springfield, Mass., and New York

(An address delivered before the Eighth National Conference on Housing in America, held in Bridgeport, Conn., December 9 to 11, 1920, under the auspices of the National Housing Association, New York City, N. Y.)

Although a great deal of interest has been focused upon the problem of building the small house, and during the war many eminent architects gave to this problem an intensive study such as had never been given before, it is a striking thing that very few advances in our methods of building have been made and very few new methods have been employed or new materials used in this line of construction.

With the passing of the war emergency and the cessation for the time being of building large groups of houses, it is not probable that many further advances will be made, unless the attention of the home owner is drawn to the advantages of such new materials as are available at the present time.

Any new material, or change in the method of building a house, has to be justified by one of three reasons: Is it cheaper? Is it more permanent? Is it more comfortable? A new material must satisfy one of these points; the public usually looks for the cheaper material rather than the more permanent or more comfortable one.

It is a striking fact that of all the necessities of life, the average quality obtainable in the dwelling house, is the poorest

Fig. 5—Another Plan 1 house, but with a corner porch

Fig. 6—This house is based on Plan 2

in relation to what might be termed "good quality" that can be found. Food, by government and state inspection is kept up to a reasonably high average quality. It is just as easy to purchase clothes of good quality, as it is clothes of poor quality, but when it comes to the best house that 75 per cent of our population can afford to live in, the average quality of construction is found to be very poor indeed, and very cheap. Today, we talk of 6-room houses at $6,000, a price that represents good construction. This price looks outrageous to the public—they are still expecting to buy such a house for $4,500. The local builder has to cater to this demand but cannot build a house of good quality for so low a price.

Partly owing to the fact that rents are so low that few landlords can make any proper provision for maintenance or amortization, most builders have to cater to this low price to get any work at all, because the owner of the 6-room $6,000 house cannot get any more rent for it than the owner of the $4,500 house of the same size.

The work of the Bridgeport Housing Co. in Bridgeport is a striking proof of the value of good construction. Built on a large scale by first class contractors, these houses are solid and permanent and although they do not command very high rents, the expense of maintenance will be very much less per annum in 10, 20, or 30 years' time than the maintenance expense and appraised depreciation of the average frame house.

New materials are put upon the market from time to time but very few of them come into general use; most of them are substitutes for the ordinary carpenter work that goes into a house. The parties producing them are very seldom contractors themselves and have to rely upon selling them not only to the prospective house builder but to the builder who puts the house up. The ordinary house builder is the carpenter. It is his desire to do as much of the work in the house with his own men and sublet as little as possible. He usually sublets the cellar, the plumbing, plastering, wiring, and painting, and does the rest himself. Substitutes that call for masonwork, slater's work, or other trades, are not attractive to him because it reduces the amount of his possible profit. We, therefore, find a hostility sometimes passive, sometimes active, against new materials from the producers of the small house, which helps to explain the reason why new materials do not make much headway.

The principal new materials used recently for wall construction are concrete blocks, tile, monolithic concrete, unit concrete, frame and stucco, and gunite.

None of these materials are exactly new, but they have not come into general acceptance, and some features of them will be new to many of those who are studying these problems.

The tile wall has been used in many places, the best jobs being of tile construction covered with Portland cement stucco on the outside and plaster on the inside. Such a wall is not wholly satisfactory, as it does not give a perfect insulation to the interior of the house. In order to insure good insulation, the inside has to be furred and lathed before plastering, and the extra cost of doing this is sufficient to wipe out its advantages. Further advance in tile construction has been the burning of tile with a surface or texture that does not have to be covered with plaster. Various forms of tapestry textures have been used for this purpose. This is slightly less expensive.

Although concrete blocks have been used largely for cellar wall construction, they

Figs. 7 and 8—Side and rear views of houses based on Plan 2

Fig. 9—Much of the charm of these houses is due to the wooded nature of the site and to the planting

have not been used very much for superstructures. The average concrete block is porous and not satisfactory for the walls of dwelling houses. A steam-cured or a wet process block is much denser and practically waterproof, and if furred and plastered on the inside, makes a satisfactory wall. Construction of this kind has been used in Morgan Park, Duluth, and the rebuilding of Halifax, Nova Scotia, with marked success. The concrete block being a large unit is difficult to treat architecturally in the design of a small house, but some of the work above referred to has shown that this block has been satisfactory.

The "hydro-stone" concrete block used at Halifax is a steam-cured wet block made under pressure and gives satisfactory results. It has a continuous air space but the insulation is not perfect, and it is doubtful if this method would be perfectly satisfactory unless furring and lathing are used with the plastering.

A good deal of attention has been given the last few years to the building of small houses in monolithic concrete. A large number of patented systems have been introduced by enthusiastic inventors, but very few of these systems have appealed sufficiently to the average contractor to make him desire to use them. Most of the monolithic houses built, have been built by employers of labor in large factories, who, familiar with the possibilities of reinforced concrete in factory construction, have desired to see its advantages worked out in dwelling house construction. Two or three of the systems now on the market enable concrete walls to be built for a price slightly exceeding frame construction and one system gives a hollow concrete wall with a continuous air space and perfect insulation that compares very favorably in cost with any other method of construction, and in this case, the lathing can be omitted for interior plastering.

No way yet has been found of producing satisfactory surface for concrete walls in houses of this kind, and all the successful developments, so far, have been covered with Portland cement stucco.

In several cases, cinder concrete has been used instead of the usual concrete with stone for aggregate. Where cinders are used, they should be hard, well burned, and well screened—and under such conditions, have proved quite successful and economical.

Stucco has been used in very many cases where frame construction was still desired, but a more permanent outside covering was wanted. A frame house covered with stucco needs to be exceedingly well braced in order to secure a satisfactory result. A good many unsatisfactory jobs in stucco are traced to the use of wood lath instead of wire lath, and many more to a lack of understanding on the part of workmen in the proper methods of mixing and applying Portland cement stucco. Two companies have recently put on the market a preparation of stucco in which magnesite forms the base instead of Portland cement and this material though more expensive in first cost, is more easily applied, and being absolutely waterproof can be used with a wood lath with satisfactory re-

Fig. 10—Compare with Fig. 2 and note the improvement in home-like character caused by the nearby trees in this photograph

sults. Wood lath in combination with tar paper, known as "Bishopric Board," has been successfully used with this form of stucco without requiring sheathing underneath, and provided the framing is properly braced, this form of wall covering is no more expensive than shingles or clapboard and has the advantage of not needing periodical painting.

Portland cement stucco shot with a cement gun onto wire lath is another method of covering the outside of house walls. It has been used in two or three places with success. The difficulties attending the use of the cement gun are such that it is not probable this method of placing stucco will come into general use.

The use of adobe, sun-dried brick, in parts of California, is of interest. Where climate permits, this is an economical wall material for one-story structures.

Roofing

The standard roof covering in country districts of wood shingle bids fair to be soon supplanted by the asphalted felt shingle with slate coating. Where shingles are made of a heavy felt, saturated with asphalt with crushed slate rolled top surface, and can be purchased singly, or in strips of four, or in rolls (the best method is apparently the strips of four). These shingles are undoubtedly fire resisting to a greater extent than the wood shingle, although they cannot be classed as fireproof. The lighter weights have a tendency to curl up, and the slate surface is liable to wash off some of the poorer makes. The heavier makes of asphalted felt shingles made with a good quality of asphalt appear to be perfectly satisfactory, although until they are tested by the lapse of time, it cannot be stated with certainty that these will be as durable as the wood shingle.

It is not generally known that the cheaper grades of slate cost very little more than felt or wood shingles. Probably the reluctance of the small contractor to introduce another trade (the slater) into the building of a house has hindered the use of this kind of roof. We have used this slate roofing (Sea Green Slate) on many recent housing jobs, at an extra cost not exceeding $50 per house, to the great surprise and extreme satisfaction of the owners.

The asbestos slate (not to be confounded with the asphalted felt shingle) is somewhat more expensive, comparing more nearly in cost with the better grade of slate. It seems to be difficult to get a satisfactory color in this material, but apart from this, they seem to be entirely satisfactory.

In the framing of floors, there is very little change to report. Some firms are attempting to introduce so-called "metal lumber" (joists made of pressed steel) to replace wood joist construction. The cost, however, is considerably in excess of wood construction, but this method has been used in apartment houses that under the building laws were required to be built of fireproof construction.

Interior Plastering

One of the items that adds considerably to the cost of a house and delays its progress is the interior plastering. The bringing in of wet plaster into a house, especially in winter and springtime, is a disagreeable job and adds considerably to the difficulty of completing the house, and any substitute for plastering that would prove entirely satisfactory would be welcomed everywhere. Various forms of wallboard are on the market for this purpose. It has been found, however, that the wallboards made of wood pulp are not satisfactory for permanent construction. There are, however, two makes of gypsum wallboard on the market. These are formed of gypsum about one-quarter inch to three-eighths inch thick covered on both sides with a heavy well-sized paper. One of the firms putting this wallboard on the market has patented a rounded-edge board which allows of a plaster joint to be run, giving a perfectly flat surface suitable for painting or papering. We have used this on several houses with satisfaction and considerable saving in expense.

In England, where the government has set itself a task of building 500,000 houses in the next few years, a large number of systems of construction are being advocated and used experimentally; many of them consist of concrete slabs of various sizes provided with insulation either by air spaces or impervious insulated material.

One enterprising firm of steel manufacturers is marketing a steel frame house covered with wire lath and cement plaster. It is able to produce these houses that compete favorably with brick houses, owing to the fact that although there is a shortage of brick masons, there is no shortage of steel workers, and as the contracting firm is producing the steel they are able to furnish this at a very low price. This special condition, however, would not apply generally.

A good deal of interest also has been evoked by the return to older methods of so-called "cob" walling and "pise de terre." These methods consist of ramming clay and loam between wood forms, the forms being afterwards taken down.

Another method is the use of chalk (which can be dug in many parts of the south of England) with a little dry cement. There is sufficient moisture in the chalk to hydrate the cement, and the result is said to be a solid, permanent wall. The writer, however, doubts the permanence of this method of construction, especially in such a moist climate as in England.

The English people, also, are giving a good deal of attention to the standardization of windows, doors, hardwood, fireplace fittings, etc.

They are also endeavoring to standardize kitchen stoves and parlor fireplaces. It is not likely that the English workman's house will ever be equipped with the hot air furnace or steam heating boilers, such as we have. In this connection, the so-called pipeless, or one-pipe furnace, ought to be mentioned in the new American developments. This furnace, which first was received by the public with skepticism, is now becoming popular, and the better make of this furnace, in which the interior radiators are of cast iron and not of sheet iron, have proved very satisfactory.

New Material

In conclusion, it should be said that the tendency in new materials in American construction is to lead away from the frame construction that we have been content with for 100 years. Most of the new methods and new materials tend to substitute something for woodwork, of a permanent nature. The public, however, and the local builders will not buy these unless they can be bought just as cheaply, and the efforts of those producing these materials should be either to bring their price down to the same range, or else to so popularize them by publicity and advertising that the public will demand them, and builders wish to install them because of the greater value given a house because of their use.

Carving Wood by a Special Sandblast Process

A California concern has developed a process of carving wood by a special sandblast process, the effects of which are shown in the photograph reproduced on the opposite page. Redwood has been found to give the best results in this process on account of the character of the grain and the quality of the wood. The distinctive quality of the work promises to commend itself strongly to architects and designers. Several different types of carving are shown in the illustration.

This etching method produces very rich effects if used in paneling the walls of a dining-room, hall or den. It is equally well suited to ceiling decoration. In the case of this ornamental nook the walls show three large panels with plain backgrounds in the center of which are conventionalized classic figures. The plain background is produced by allowing the sand to eat away the surface uniformly. The figures are the portions of the wood surface protected by the stencil.

While much of this work is done in the natural color of the rich, reddish brown redwood, striking color effects can be used. The makers use paints with great success in carrying out various decorative schemes. Deep blues, reds, browns and gilt are particularly pleasing.

In addition to the uses for this carved wood suggested above it is excellent for folding screens, grills and inside blinds.

This business office booth illustrates several of the effects that can be produced with redwood carved by a sand-blast process. Here are door casing, wall panels, a border, a wainscoting and a frieze, all done in sand-carved redwood

Unwise Building Laws--Written and Unwritten

Grosvenor Atterbury, Architect, New York

An Address Delivered Before the Eighth National Conference on Housing in America, Held in Bridgeport, Conn., December 9 to 11, 1920, Under the Auspices of the National Housing Association, New York City, N. Y.

THE HOUSING PROBLEM is above all the construction problem, and the construction problem in the elimination of waste. And one of the causes of building waste is arbitrary and unintelligent regulation—which is what I am asked to discuss.

Now, unwise laws are *taxes,* and fall like rain on the just as well as on the unjust. And the unjust fellow is the one who usually gets the umbrella! The incidence of building codes like the incidence of taxes is apt to work injustice. It is the honest builder and the innocent public who pay the Jerry builders' penalties.

So one is tempted to say that all building laws are unwise. But of course that is not quite true. In so far as they are teaching codes and not taxing codes, they are beneficial. And, if we could be sure of honest and skilled administration, our building codes could consist of just two words—"anything safe."

But since, unfortunately, we cannot yet write our building laws on this basis, we must content ourselves with certain obvious improvements in the existing system. As far as possible our codes should be standardized throughout the country. "Factors of safety" should be reduced to the basis of honest construction. And in the analysis, to lower our "factors of safety," we must raise our standard of morals.

"One-two-four concrete" should not have to compete against "One-five-ten-twenty concrete." The $20 ingredient should be eliminated. This means honest, well-paid inspectors.

Superintendents of construction should be licensed—like drug clerks—and held responsible. The burden of protecting against fraudulent construction should be transferred from the building departments, maintained at the cost of the taxpayer, to the building—at the cost of the dishonest constructor.

We should have special sections in our codes governing the little house—the laboring man's house. Generic laws are sure to pinch somewhere, and the smallest house deserves the greatest consideration. In the aggregate, it represents the greatest investment, quite aside from its paramount importance in welfare of the community.

But besides the written building law, there are certain unwritten laws that actually control building operations today, and I am going to take the privilege of extending the content of my subject so as to include these invisbile codes, for the simple reason that, in my judgment, they much more vitally affect the cost of the workingman's home than the written laws.

The written laws consist of the building and housing codes and the insurance regulations, while the unwritten law is based on the rules of the labor union, the trade agreements of the material producers, distributors and contractors, and certain "unholy alliances" between them all.

To illustrate, let me tell you a single instance that occured about a year ago in my own practice. I shall give it in outline, using round figures only to illustrate, and the general substance only of conversations.

I wanted to use some stone as a lining in the interior of a building. It was what we called "seam-faced stone," so that it did not have to be touched with a chisel, and I got an estimate of about $10,000 for doing the work with stone-masons.

Then, I was reminded that the labor unions did not permit a mason to lay up stone inside a building—even if it were field stone—but that such work had to be done by marble setters! So, I told the builder to get figures on the basis of marble setters. And for the same work, the same stone, the same design, and the same specifications, he brought in an estimate for $20,000! Thus far my story illustrates the financial potentialities of union regulations.

Twenty thousand dollars being prohibitive, we called up the marble setters' union and said "Give us a list of all the concerns that are 'fair' and to whom you are willing and ready to furnish mechanics," and from one of the men on that list we got an estimate of $15,000.

Then we called up the builder and said: "Here, we have a man that will do this work for $15,000. The best bid you have given us is $20,000." He said: "Who is the man?" I named the man and said he had done work for me 10 or 12 years ago and was all right. "Well," this builder said, "I do not believe he is financially responsible." I said: "Let us look him up." We did. We found that he had a small bank account, but although he was not strong financially, he paid his bills and did a good deal of work. So, I said again, "What is the matter?" "I am afraid," said the builder, "he cannot get the mechanics." "But," I said, "we have called up the union secretary and are told that this man is on their 'fair list' and they will permit their marble setters to work for him."

In the meantime, in comes the $20,000 bidder and says: "I understand you are thinking of awarding this contract to so and so?" We said, "Why not?" He said, "That isn't fair, he is not a member of the Employers' Association. We members have been to all the trouble and expense of stabilizing labor and protecting the owner for years, and now when this contract comes along you want to give it to some fellow who is not a member of the association, and who has not done anything for the owner."

"That would be a reasonable view perhaps, providing your tax was not too great —5 per cent," we said; "even 10 per cent, but 40 per cent or 50 per cent is another matter!" "Well," he said, "I think it is only fair to tell you that this man cannot do the work." "Why?" "Because he cannot get the mechanics"—which meant that if we gave that contract to a man outside the Employers' Association he would see to it that he could not do the work. And this part of my story shows that the employers can do some profitable regulating themselves.

Now, in these instances, I went to the owner—and here, gentlemen, is where the owner comes in as one of the "unwritten laws." I said to the owner: "Here is the situation; can we fight this thing out?" He said, "I must put the entire responsibility on you. We have got to get into that building on July 1st. If you can fight this thing out and get us in then, all right; but, you will have to take the responsibility of the decision!"

So, I went back to the office and thought it over. Next day, we asked the $20,000 bidder to come in and we appealed to his sense of humor somewhat as follows:

"We have figured this up—we have calculated all the quantities and we think you must have made a mistake. We find, for example, on the basis of your bid, that you have allowed a mason and a helper a day and a half to cut and set each stone 13 inches high and 12 inches across. Suppose you go back and think it over again." He did, came back next day, took $4,000 or $5,000 off his bid and we closed the contract!

That illustrates what I mean by the "unwritten law," and you can see it is a serious matter and one that goes deeper than building regulations. It honeycombs our entire building industry.

In other words, in the last analysis, our troubles are not so much in our building code as in our code of morals. Too many of our buildings are laid up in graft instead of honest old-fashioned mortar!

It is the same kind of malady that has caused a good deal of our present business depression. I was talking with a banker the other day and he said the same thing, apropos of America's foreign trade—that South American merchants would buy goods from American agents on sample and then get goods that were nothing like what they bought. He said the only trademark in the world that was 100 per cent good was the English trademark. We are losing our foreign trade and we will never recapture it until we are honest in our trademarks and deliveries.

That is a very unfortunate thing to have to say to your own countrymen, but I am afraid it is true. And it runs through many of our industries, and much of our construction work, and the point of incidence where it hurts and pinches as much as anywhere else is in the workman's own housing!

The unwritten laws in my judgment are the most sinister and the greatest surtax on the small house. The big fellow can afford to pay those taxes, perhaps, but the little man cannot.

Let us make a guess, for example, at the price which the little fellow, usually the workingman himself, is liable to pay for all these factors of dishonesty and waste—we might call them "surtaxes." They might be roughly but conservatively apportioned as follows:

To Unwise Building Codes—probably not more than 10 per cent.

To Labor—stifled production—6 hours' real work for 8 hours' pay, and arbitrary rules against economic use of labor and materials — (the workingman's own contribution) let us be charitable and say 25 per cent.

To Material—through "unholy alliances," between producer, distributor, builders, and certain "misleaders" of labor—to put it modestly, 25 per cent.

In short, for every $100 worth of home he pays $160; in many instances, of course, a great deal more, but my figures are simply to visualize the situation. And of this surtax of $60, the greater part, let me repeat, is not paid under the written but the unwritten law. The great bulk of it must be charged to our code of morals.

Yet there are certain sections in many of our building laws that are as disgraceful to our intelligence as those dishonest practices are to our morals.

I read recently the interesting statement that the foundations normally placed under a small house would if properly designed support 23 houses of the same size. That is a little misleading, because, of course, the writer meant that if you could arrange the 23 houses so as to bring the load down to a point of concentration and meet it with a concrete pillar, you could put 23 houses on a pillar containing no more concrete than that put in the cellar of one of the houses; but it is an illustration of the situation.

I read also a discussion as to whether six-inch cinder concrete walls cannot be substituted for the eight-inch wall of brick or gravel concrete; also as to whether certain co-efficients and factors of safety could not properly be reduced for special cases.

I might add that, as an illustration of what can be done in economy of material, some years ago I put up 15 or 16 houses with a concrete wall section in which there was 60 per cent of voids, the inner and outer shells of the sections being but an inch and a half thick.

As to the "Unwritten Laws"—we should have a trade union reformation. We should have membership on the basis of efficiency like the old guilds. We should substitute leveling up for leveling down, and in place of the slogan, "An injury to one is the concern of all", we should put "The benefit of all is the concern of each one". Obviously we should eliminate all rules restricting output and savings in construction.

To sum up, there are a half dozen very obvious things for us to do:

1. Standardize Building Codes throughout the country.

2. Base co-efficients on honest construction and engineering practice.

3. Put the burden of "protecting the public" on the builder—license the building constructor and superintendent.

4. Eliminate the "Unwritten Laws" of Waste, Limited Production and Graft.

5. Provide a special section in the building code covering the little house—the laboring man's home.

6. Secure the aid of the Government in scientific research and study for the housing industry.

And in explanation of this last item on the program, let me add that we do not want subsidies from the Government to build houses. But on the other hand, we are entitled to the same kind of aid in the housing problem that the Department of Agriculture gives to the farmer. Let us hope that they organize such a department.

New Stucco-Surfaced Concrete Blocks

The latest innovation in concrete structural units is the stucco-surfaced block, produced with rough-dash stucco texture. When laid up in a wall with three-eighths inch bed of tinted mortar with raked joints, the effect is decidedly pleasing and considerably out of the ordinary.

New stucco-surfaced concrete block

A single rough-dash coat of Portland cement stucco is applied to each block individually after removal from the curing chamber and while the block surface is thoroughly damp. Rough, flat face block are used for this purpose and the application of the stucco coat before the block have become dry insures a bond which makes the stucco coat practically monolithic with the body of the block. The block is placed in a mask and the stucco mixture projected either by hand or by machine.

Contracting and Jobbing

No. 1---By Chas. Anderson

The Business of Building has Features that the Otherwise Competent Craftsman Must Faithfully and Constantly Study if He is to be Financially Successful

THIS article is the first of a series of experiences and suggestions about the business end of building, with particular reference to contracting and jobbing.

With the advent of spring each year there is a new crop of employing builders. Some worry through, but more wither and die financially, and in their more or less brief career help to retard the chances of success of those better qualified in a business sense than themselves.

It is a worthy ambition in any man to get into business for himself, and many craftsmen in the building trades conscious of their skill and technical knowledge are prone to think themselves fully equipped to launch out as contractors. But it is one thing to know how to build and another thing to conduct a building business, and it is a question if a good business man who knows little, if anything, about building does not make a better financial success as a contractor than the man who knows how to build but knows little or nothing of business.

Leaving this thought as a drag on the haste of those who contemplate entering in the contracting business, the writer proposes to put himself in the position of a punching bag by describing the things that have happened to him in starting in the business of contracting in that interesting and varied department known as "jobbing."

In entering the arena as a "punching bag" the writer wishes to express the idea that he invites criticism of every kind and the experiences of others who have found the results work out differently from the courses he describes himself to have pursued. While 30 years in the building trade and 12 years of that time in the contracting and jobbing business have not brought him into the millionaire class, yet the modest success achieved has been bought very dearly because of lack of business training. Business training is of two kinds: That obtained by our own experience and that obtained from the experience of others. Of course most of us know the old adage, which touches the first named class: "Experience is a dear teacher, but fools will learn in no other." As I have never met a builder whom I could safely call a fool, though I have met a good many foolish ones (and sometimes, as I shave myself), which may be a distinction without very much difference, we will leave that as it lays in the expectation that "the experience of others" will supplement my own to help the readers of these pages who may need it most.

The whole idea of this series is to show the traps. When one man gets caught in a trap the least thing he can do is to warn his fellow-man to keep out of the same fix. It is not with the idea to discourage but to truthfully warn the contractor of little experience or the prospective contractor of the dangers that beset his path. And the writer cordially invites brother contractors to check him up and add the weight of their experience to his own.

Indeed, it would not be a bad idea if some of our dealer friends would chip in and tell us of some of their experiences with contractors whose business methods tend to put them in a hole. No names need be mentioned in any case, nor any reflections cast on any one. What we are after is more light and a better guidance to help make our business a sounder business and less of a game of chance.

Before we begin to dig into this job let us plat it out. Here is about what we have to consider:

Qualifications and capital of the contractor;
The contractor vs. the jobber;
Equipment necessary to start;
Making and taking contracts;
Estimating work and profits;
Buying supplies and your relations to the supply man;
Hiring and handling of help;
You vs. your competitor;
Working with other trades;
Keeping accounts and records;
Advertising your business;
Credit, honesty and reputation;
Methods of dealing with your customers;
Making your collections, etc.

QUALIFICATIONS AND CAPITAL

As already stated, most of us know that many successful contractors have risen from the ranks of the journeymen; we also know that many first-class mechanics have proved utter failures as contractors; while again some who were not mechanics at all have made the biggest success at contracting.

Why should this be?

Because the greatest contributing factor to the success of a contractor is his business ability.

The contractor can hire plenty of good mechanics—but when it comes to hiring business ability he finds it mighty scarce. Should he find it he will find it too expensive to make the business pay unless his business has already grown to such proportions that he has passed the experimental stage.

The mechanic who has the mechanical and business ability has a tremendous advantage.

Nevertheless, we find the general impression among workmen that the boss has an easy life and that the workmen are the ones who are making the money for the boss. But what a difference when the journeyman becomes a contractor! Then he finds out what a false idea he had when he discovers how hard he must work to make the business pay.

The qualifications of a contractor can hardly be described without seeming to brag. It is perhaps impossible for any one man to know all that a contractor may be called upon to know—but there is one thing sure, he ought to be able to know where to find the information required, and keep growing like an encyclopedia of the loose-leaf kind—ready with advice, adjusting misunderstandings, preparing estimates, making out material bills, keeping his accounts, making his collections and hustling for business all at the same time; and last, but not least, keeping his men at one with him as a smooth-running organization. But this latter belongs to another section of this discussion.

As to Capital—Capital with a big C—! Quite true, a good-sized bank account is a very fine asset to have, as it makes the beginning much easier. However, many have started on a shoestring and made good. At the same time too much capital at one's back has a tendency to make the fortunate one less cautious than he should be. Capital can easily be lost, whereas, without much capital the budding contractor will be disposed to be more cautious and build a better foundation for his business.

Right here, let me tell you, the banker—who may be a little hard-boiled just now—estimates your credit not so much on your capital as on the foundation stones of your business represented in your business sense, character, honesty, skill and the confidence of the community in you. Upon these you can build a business that will endure almost any kind of a storm.

It cannot be denied, in place of all this, that with these qualifications, plus capital, the business can be built much easier and quicker. We just want to punch the fact home that capital isn't everything, as most of us are too much inclined to think.

One of the most common mistakes by the

beginner is to try to take more work on his hands than he can carry through. Either with or without capital it is dangerous to grab everything in sight. Make haste slowly.

One job properly executed will make you more money than two partly neglected. When you are done you have laid another foundation stone to support your reputation. It is mighty easy to tie yourself down with a lot of work that you cannot properly supervise. That is the time it costs you a lot of money to get it done. Until you have secured the proper kind of dependable help to carry out your orders when you are not on the job, take only that which you can look after yourself.

How did the writer gain this wisdom? By going far enough the other way to learn how to come back.

How is it with you, brothers?

Terrazzo Floor Chips

THE following specification for terrazzo flooring is furnished *Rock Products* by Starret & Van Vleck, a prominent firm of New York City architects:

The marble chips used shall be as selected by architects, from samples to be submitted, and shall be of such size as will pass through a ⅝-in. mesh and be retained on a ⅜-in. mesh.

The mortar shall be composed of one part of approved portland cement to two parts of clean white sand.

The fill will be brought to within approximately 1 in. of the finish floor under another division of the work.

Immediately after the fill has been placed and before same has set, spread a bed of mortar containing as large a percentage of marble chips as possible.

Screed to a level surface and sprinkle over the top with enough seeding chips to allow as large a percentage as possible to show on the surface. Roll in the chips and when set rub with an approved machine to a smooth, durable surface.

Wash clean and finish with a coat of oil.

Lay the floors in sections, with joints extending through the layer of terrazzo.

The part of this of most interest to rock products producers is, of course, the specification for the chips. Nearly all specifications for terrazzo are based on experience with Italian marbles. American marbles and crystalline limestones, however, are gaining rapidly in favor and in many cases need merely to be shown to be accepted.

Some terrazzo floors are composed wholly of white chips, but the more common have various colored chips. The preparation of these chips is chiefly a screening proposition and any of the vibrating screens on the market are satisfactory for this purpose.

Probably clean white limestone grit could be used in many instances in place of the white sand called for in the specification quoted. Both chips and sand for this purpose must be absolutely clean and free from all dust. These materials are usually shipped in burlap bags of about 100 pounds or more capacity.

"Are Most Architects Impractical?"

St. Paul, Minn.,
To the Editor— December 16, 1920.

The sharp and pointed article that architects are impractical as published in a late issue brings to my mind the story of the "Cheese Box Man" I had the honor of hearing from one of the leading factory representatives who "made" my office. He related it in about this way:

Do you know that the public is clamoring for a change in building style? Well, they are. So our firm has provided a means which from an engineering standpoint is most novel, using only materials we have directly at hand. It is not a bit beautiful nor is it a lovable structure. Its beauty (what there is of it), lies in the fact that it has openings in the walls for doors and windows put where our engineer thought best. He is not an artist, you will admit, but his foresight of engineering serviceability has produced a structure, which, if

not used for home purposes, may be employed as a section of a factory chimney with its orifices closed and floor and roof removed, or may be used as a big sewer pipe if laid on its side.

Here, look at it. Give me your idea. Isn't it a wonderful engineering feat? A three-purpose structure all in one. Yes, it is an eyesore, but our present generation, living in an engineering age, can have glasses fitted by an optical engineer to alter the delineations should the present state of design not please his vim.

Now see, this entire structure is turnably mounted so that each of the several rooms can have any light—north, east, south or west—as desired by the tenant. All he does is pull this lever and his house swings around to the desired point.

Show me another structure in which this is possible. Our engineering force consists of the best men in their special lines, and since you know our firm's past products we would desire your opinion before venturing into production of these in standard form. Yes, we are still manufacturing the best ventilator on the market and the same barn equipment that is hard to beat. Some of these products may have been forgotten by you so I brought miniature models of our ware to show you that all of these have answered their purposes for cattle all these years without a complaint. Our engineers deem them sufficiently good for human beings since the cattle are content with the same. Therefore, we have employed them in that structure.

This salesman, I dare say, is the best the firm has, and though his "Cheese Box Home" was only a concoction of his own had in reality nothing to do with his products. This is about the way the sales forces take to heart the services of engineering powers in general.

Walter D. MacLeith, Architect.

To Teach Bricklaying

The following resolution was adopted by the annual convention of the Mason Contractors Association of the United States and Canada at Detroit, December 6 to 8, 1920:

"Resolved: That it be the sense of this convention that each local association forthwith take the necessary steps to have the art of bricklaying taught in public, technical or vocational schools, where such exist in the various cities."

"Resolved: That inasmuch as the brick and tile manufacturers are now engaged in an intensive and expensive publicity campaign, our Executive Board be instructed to confer with the officers of the associations to the end that they secure certain financial assistance in teaching bricklaying in order to be able to supply the demand for the laying up of their product."

This resolution is in line with the letter addressed by Senator Calder to the governors of the several states urging the establishing of building trade schools.

Harry Has Now Shingled His Roof

Two women in particular were walking along Monroe Street in front of the Gaiety Theater when one of them suddenly uttered a cry of exclamation. Harry Thornton, manager of the Gaiety, was standing on the sidewalk nearby. Suddenly Thornton took off his hat as the gaze of the women was concentrated upon it. Much to his surprise the top of the hat was smoldering as a large piece of burning wood carried from the fire had dropped on it and started to burn the material. He quickly dropped the hat to the sidewalk and proceeded to stamp out the fire with his foot.

Certainteed shingles will prevent nearly all roof fires. Sold by Springfield Roofing & Supply Co.—Adv.—*Illinois State Register.*

A Concrete Mixing and Distribution Layout

A CONCRETE mixer should be thought of as a very compact factory rather than as a mere machine. Only in size and mobility does a mixer differ from more complex manufacturing plants. The economical operation of either depends primarily on proper methods of assembling raw materials and of distributing the finished products. In other words a mixing plant—even on a small job—should be so arranged that the minimum of time and effort is required to "charge" the mixer and to place the concrete in the form.

When a string of foundations,—as for a row of houses,—are to be put in, the work is often divided into units and the mixer plant is moved frequently from one spot to another. On the face this method appears good, but on recent work the mixing plant is set up at one point and is not moved until the entire string of foundations is poured.

The followers of the latter method claim that only in exceptional cases does it pay to move the mixer, as the saving in the time of distributing the concrete is more than offset by the expense of moving the plant. It is held that moving demoralizes the men to a certain extent and that the delivery of materials is made more complex. It is of course recognized that on many jobs a single location for the mixing plant is impractical, but that for jobs where the placing of distribution runways does not require much special work, there is no saving in changing the location of the mixer from time to time.

The accompanying illustrations show a mixing plant used on a large housing project. In this case the method of using only one mixing plant location for each row of houses was followed. All of the foundations for a row were poured before the mixing plant was moved to another row.

The material piles were placed convenient to the material runways which led to the charging platform. Both the material runways and the charging platform were made wide to avoid congestion.

The loading platform was also made large and the distribution runways were supported by the foundation forms. In only a few cases was additional support found necessary.

It is also well to note that two types of barrows, each suited to a special type of work were used on the work. The charging barrows differ considerably from those used in placing the concrete.

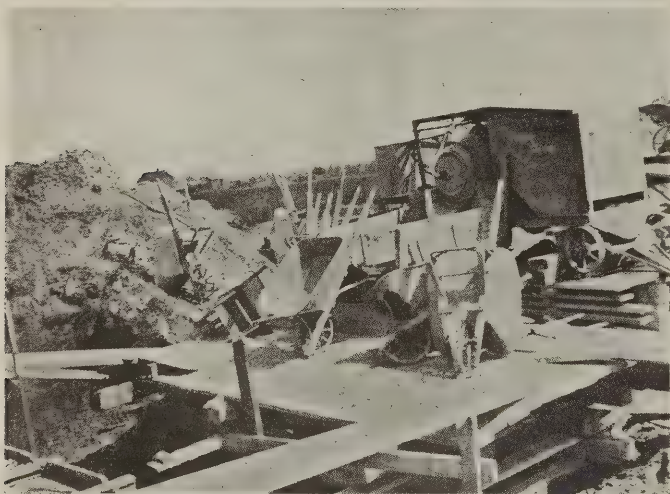


Fig. 1—View showing the material runways and the charging platform

Fig. 2—View showing the loading platform and the ends of the distribution runways

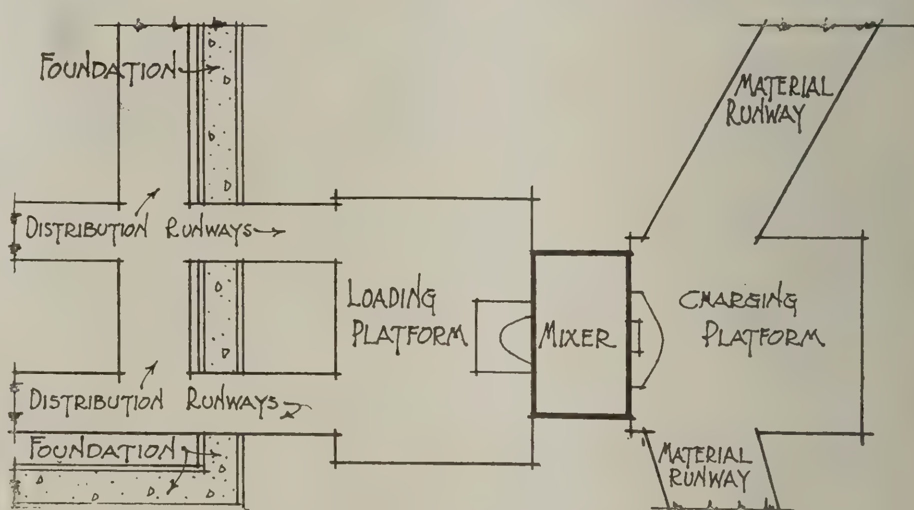


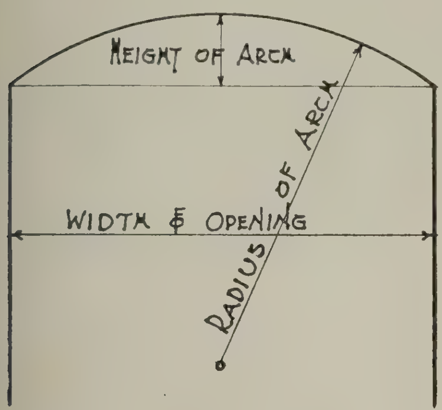
Fig. 4—A sketch layout of a concrete mixing and distribution plant

Fig. 3—Where foundations are close together, only a small amount of extra framing is required for supporting runways

Finding the Radius of an Arch

A subscriber wants to know how to find the radius of arches similar to the one shown in the accompanying sketch.

To find the radius by the following rules, the height "h" of the arch and the width "w" of the opening must be known.



Rule 1—Square the width and add four times the height squared. Divide the sum by eight times the height. The result is the radius.

For example, to find the radius of an arch six inches high for an opening 36 inches wide: 36 times 36 equals 1296, and 6 times 6 equals 36, and 4 times 36 equals 144; adding 1296 to 144 equals 1440; then 8 times 6 equals 48, and 1440 divided by 48 equals 30. Therefore, the radius of the arch is 30 inches.

Rule 2—Square one-half the width and add the height squared. Divide the sum by the height. The result is the radius.

For example, using the same dimensions as before: One-half of the width equals 18, and 18 times 18 equals 324, and 6 times 6 equals 36; adding 324 to 36 equals 360, and 360 divided by 6 equals 30, which corresponds to the former answer.

[Editor's Note—Perhaps some of the readers know a method of solving such problems with the steel square. If so, pass it along.]

Top and Bottom Ventilating Sash

Here is a method of hanging sash that is suitable for sleeping porches and so forth. It might even be used in school houses.

This sash may be left open during all except blowing rain storms and no water can get in. If properly hung it will stay in any position it is put without using catches. An ordinary transom catch may be used to fasten it when closed.

Sketch 1 shows one jamb and a portion of the upper corner of a sash in a partly open position. At the upper part of the sketch is the swinging arm, one end of which is fastened to the jamb, and the other end to the sash. It should be fastened to the sash just below the center so that the sash will stay open. The sash should have a 3/16x1-inch rabbet on the back edge for the swinging arm to lie in when the window is closed.

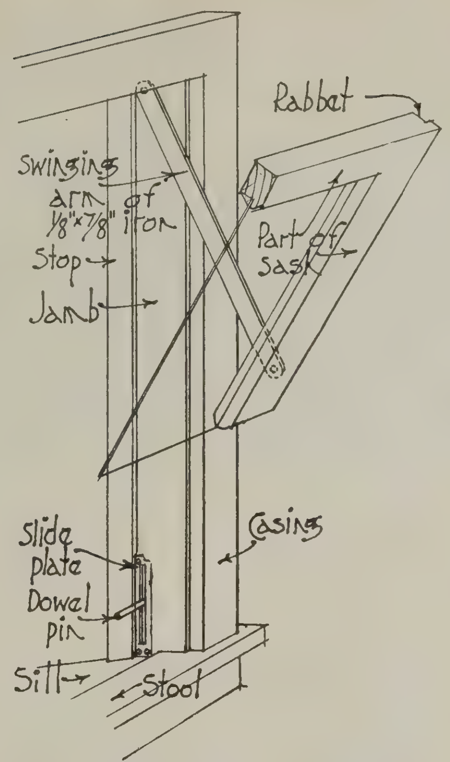


Fig. 1—Top and bottom ventilating sash

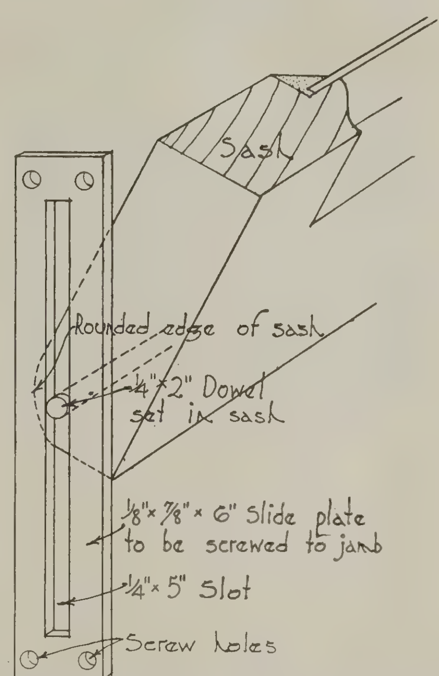


Fig. 2—Top and bottom ventilating sash

The slide plate at the bottom of the sketch is let into the jamb-flush, and has a slot in it for a dowel pin to slide in. The dowel is set in the side of the sash, near the bottom. For the sake of clearness, the bottom part of the sash is not shown in Sketch 1. The outside edge of the bottom rail of the sash should be rounded so that it will not bind against the stop when it begins to tip out.

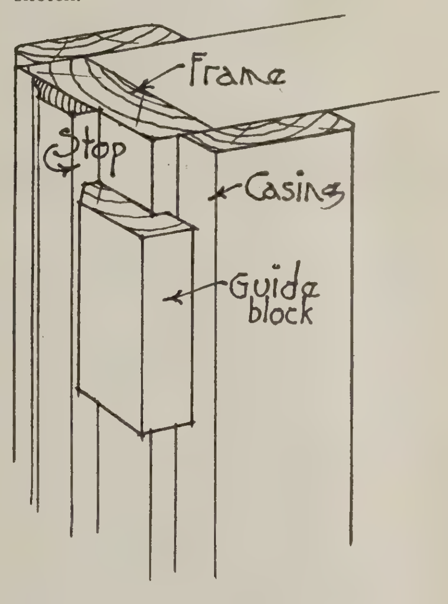
Sketch 2 shows a lower corner with the jamb omitted. All screw holes should be countersunk and the sash should fit closely. The swinging arm and the slide plate and dowel should be used at each side of the sash.

I copied this method from a job I saw some time ago. I don't know whose idea it was. Since then I have used it on at least two dozen sash—one 30 by 48-inches, and it works fine. Any blacksmith can get out the metal parts.—E. G., Minnesota.

Note.—The five dollars E. G. gets for this kink will keep him in tobacco for several weeks. How about sending in one of yours?—*Editor.*

Setting Door Stops

When I start fitting the stops on door frames I stick my rule and gage in my kit and use a guide block like the one in the sketch.



The block is about four inches long and I have several to correspond to doors of different thicknesses, such as 1⅜-inch, 1¾-inch and so forth.—S. F. B., Ohio.

Haven't you a "kink" like this that you are willing to share with other builders? Send it in!—*Editor.*

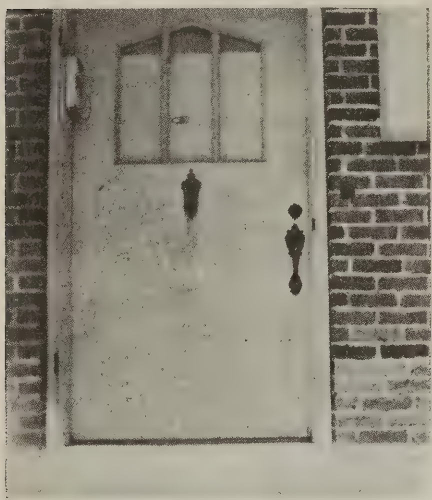
Cast Iron Gutters

Gutters in England are sometimes made of wood, but as a rule cast iron is preferred. Lighter gutters of galvanized wrought iron and of zinc are also used but they are not considered as durable as cast iron.

The cast iron gutters are screwed to a fascia nailed to the ends of the rafters, or hung by means of wrought iron hangers nailed to the upper side of the roof boarding.

Bower-Barff Finish

A. H. wants to know what is meant by "Bower-Barff" finish as applied to builders' hardware.

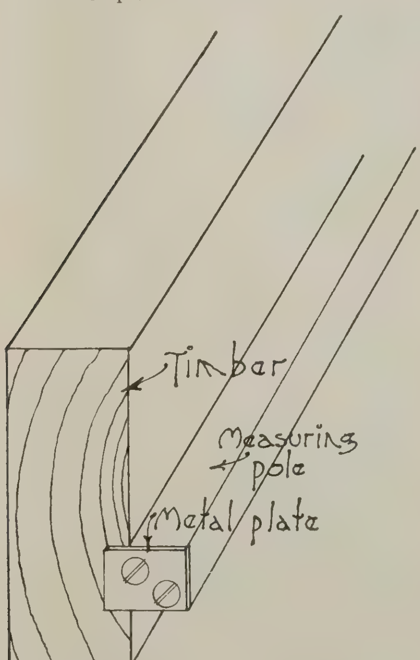


"Bower-Barff" is a method of treating iron or steel in a special furnace. It is distinguished by a lustrous black finish that is quite popular for use in connection with colonial work.

The accompanying photograph shows a door pull and escutcheon of Bower-Barff. The knocker is brass.

Improved Measuring Pole

Here's another "kink" that has saved me a lot of steps.

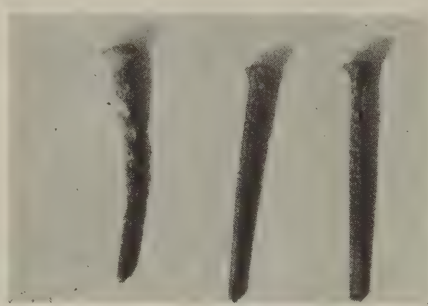


Screw a metal plate onto the end of a measuring pole and it will not be necessary to walk to the end of a timber to see if the ends are even when laying out framing.—S. F. B., Ohio.

What kind of a step saver can you send in to match this one?—*Editor.*

The Long Life of Cut Nails

John Grow, carpenter-contractor, Sioux Falls, So. Dak., writes: "I think Mr. Black's sample of cut nails in the August



Nails from roof of church built 34 years ago

issue are very good, and I am enclosing a few I took off an old church roof I was repairing that had been on there for 34 years and still seem to be in fair condition. Compared with the wire nails, I think they are far superior, as I was re-shingling a roof that was put on with wire nails nine years ago and the shingles were blowing off on account of the nails being rusted off. And I think the argument is a good one in favor of cut nails."

A. D. Rouse, contractor and builder, Warehouse Point, Conn., writes: "Please

Nails from roof of a house built between 1777 and 1782

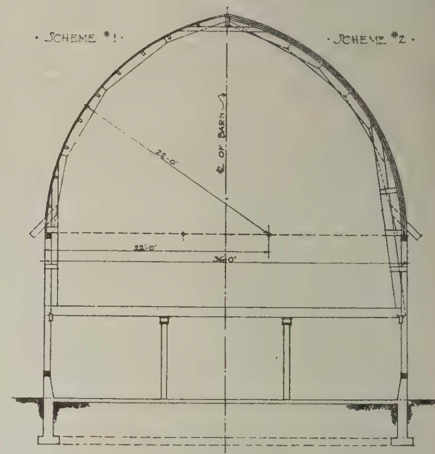
find enclosed four shingle nails taken from the roof of a house erected between 1777 and 1782. I was making some repairs on the above house and thought they might be of interest to the readers of the BUILDER. I was not able to get the exact date of when the house was built, but it was between the above dates."

Boxing Framed Structures

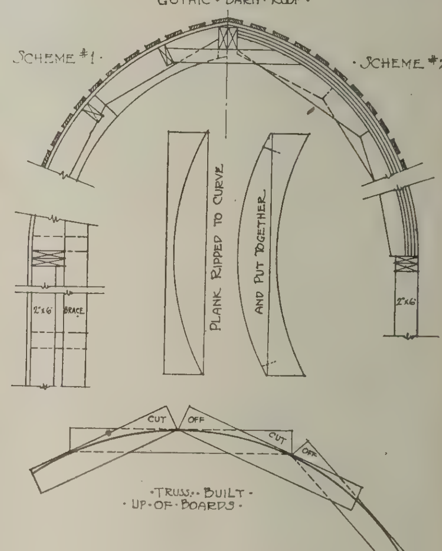
ANSWERING the question of Mr. Henry Borger in the December NATIONAL BUILDER concerning boxing of a building, I believe putting boxing on diagonally will make the strongest braced frame, as when so placed the thrust caused by any attempt of the frame to rack out of plumb will be transmitted by the boxing boards directly to the sill and foundation which will stop the thrust and the frame stays plumb. When boxing is put on horizontally and high winds or other pressure causes frame to attempt racking the thrust is transmitted from one stud to another by the boxing boards, and the nails holding the boards to studs shear or twist a little and the boards slip endwise in their tongued and grooved or shiplapped joints and readily permits frame to rack out of plumb.—T. C. H.

Gothic Roof Barn Details

In answer to F. W. S. of Washington, who is building a Gothic roof barn 36 feet



GOTHIC · BARN · ROOF ·



· DETAILS · OF · GOTHIC · ROOF ·

wide, 48 feet long and 16 feet high, we are republishing the details of Gothic roof barns which appeared in NATIONAL BUILDER for November, 1919.

PROBLEM OF CONDUCT—WHAT SHOULD JOHN DO?

The "Line-o'-Type" column of the Chicago *Tribune* notes that a citizen of Oak Harbor, O., got himself last week. The local paper relates:

"Instead of getting up on the roof, John stood on a 2x4 with his head up between two rafters, and his arm around one of the rafters, while he drove the nails in firmly. Driving his last nail, he tossed the hammer to the ground, and it was then that he discovered that he had placed the boards so close together that he could not withdraw his head through the opening."

City Hospital, Ashland, Ky. J. W. Clinger, builder

Residence, Ashland, Ky. J. W. Clinger, builder

Postcard Advertising Profitable

J. W. Clinger, brick contractor and builder, Ashland, Ky., writes: "I have just received the December NATIONAL BUILDER and it is a dandy. I notice that Bro. Bailey, a builder, is using the same method of advertising that I have used for several years—cards and postcards. I find these a profitable and pleasing way to advertise my work, and send a few specimens." Mr. Clinger uses both printed and photographic cards, and three of the latter are shown herewith.

Up-to-date Builders

C. J. & A. E. Johnson, of Gowrie, Iowa, are builders who specialize in the use of up-to-date methods of construction. This is reflected by the accompanying photographs which show a barn and a garage built by them.

The barn is 40 feet wide by 64 feet long and the walls are 20 feet high. The barn has a roof of the Gothic type and both buildings are constructed with hollow tile walls and concrete floors and foundations.

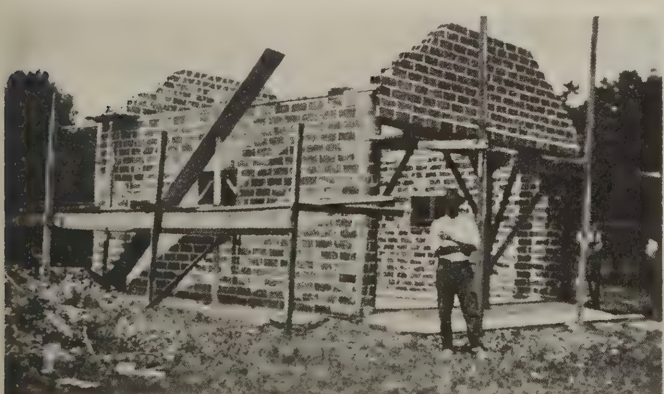
Second National Bank, Ashland, Ky.
J. W. Clinger, builder

Mr. A. E. Johnson is shown standing in front of the garage and one of his chief aids—a concrete mixer—takes the foreground of the barn picture.

Building Activities Near in Cincinnati

According to expert opinions secured by a correspondent of NATIONAL BUILDER, a resumption of building activities on a large scale is nearer in Cincinnati than in any other of the large cities. Many business men of the city declare that Cincinnati is still the cheapest big city in the country, though many of the prices are yet too high and must come down. There has already been a substantial cut in the wages of some of the unionized trades. According to a new wage scale already signed by two-thirds of the unions, the carpenters, electricians, engineers, lathers, plumbers, steamfitters, and stone masons, are to receive only $1.00 per hour, and building laborers 50 cents per hour. It is also agreed by both sides to the wage scale that any workman not producing 100 per cent efficiency is to be discharged, and it is declared by some of the organization officials that "there is going to be a lot of discharging."

Several kinds of building material have been declining for some weeks past. In the case of brick, Cincinnati is not far from localities that produce large quantities of brick.



Built by C. J. and A. E. Johnson, Gowrie, Iowa

An enormous quantity of building is already financed and ready to go ahead, but a waiting policy has been deliberately adopted to force prices of labor and material to the desired level before going ahead. Some Cincinnati business men speak of it as "the boycott against high prices." But all of them express their belief that the end of the waiting period is near. One manager of a commercial establishment said to the representative of NATIONAL BUILDER, "We have been waiting for prices to get down to where we can build, and we think they are about there. I have just been looking over our plans today, and we feel like going ahead."

A Contractor's Weekly Wage Statement

E. J. Southworth, contractor and builder, Galesburg, Ill., writes: "I am enclosing a weekly statement I get out for my trade, or rather for myself. All my work is by the hour, and I pay every one of my men Saturday night. Then I collect for the week's work on the following Monday. Every man's time is itemized and every man paid according to his worth."

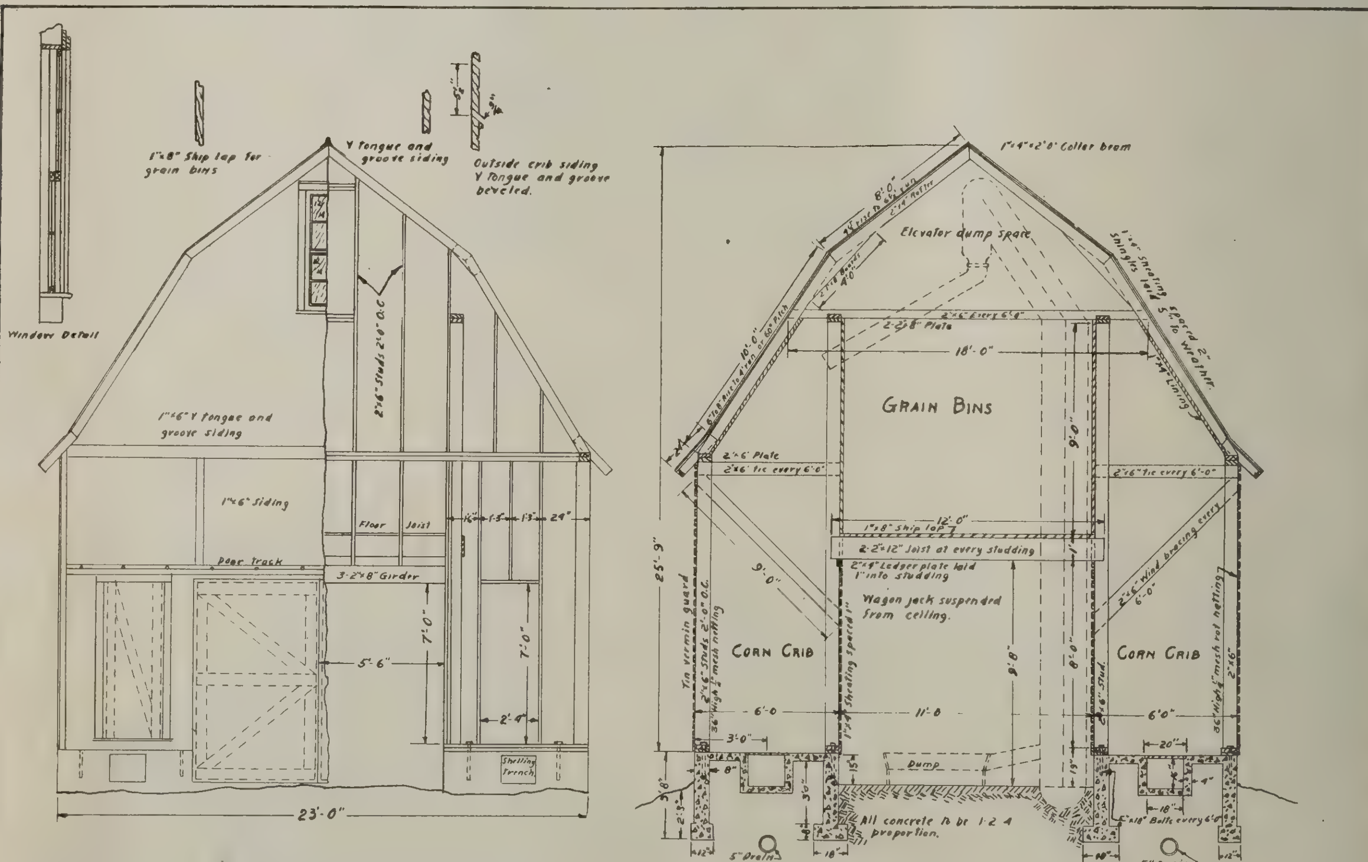
Oct.	E. J.	Tom	Fred	J. T.	Geo.	Harry	
18	8	8	8	8	8	8	
19	7	8	8	8	8	8	$ 36.00
20	7½	..	8	8	8	8	36.00
21	5½	..	8	8	8	8	39.60
22	8	8	8	8	8	8	43.20
23	8	8	8	4	....	8	32.00
hrs	44	32	48	44	40	48	44.00
	$1.00	1.00	.90	.90	.90	.75	$230.80
	$44.00	$32.00	$43.20	$39.60	$36.00	$36.00	

A Modern Combined Crib and Granary

Capacity, 2,000 Bushels Corn, 2,700 Bushels Grain—To be Used With Any Type of Inside Elevator

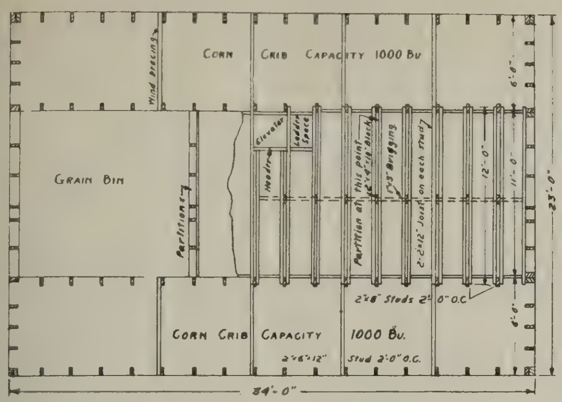
A thoroughly serviceable, practical and labor saving structure, sufficient to accommodate the grain and corn on the average 160 acre farm is illustrated and described in the following article:

The low price of grain and corn at harvest time and the difficulty of the small local elevator to handle grain at this rush period has made it advisable for the average farmer to provide some sort of storage for his field crops. Such a structure can be built at moderate cost if proper methods are used and very often the increase in price alone will pay the farmer good dividends on the money invested in a convenient crib or granary. The rapid advance in the cost of materials and labor has given impetus to the construction of high, modern, combined grain and corn storage in place of the long row cribs. Building such a structure short and high rather than long

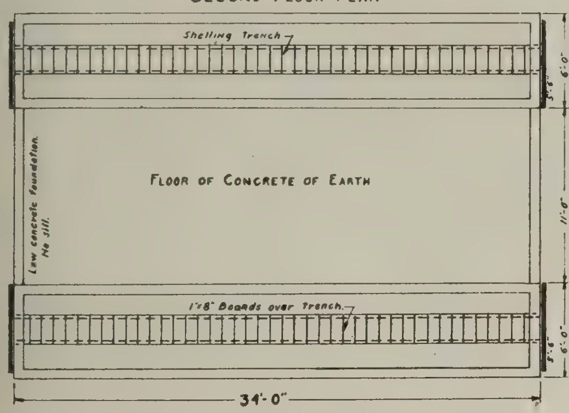


End Framing and Elevation

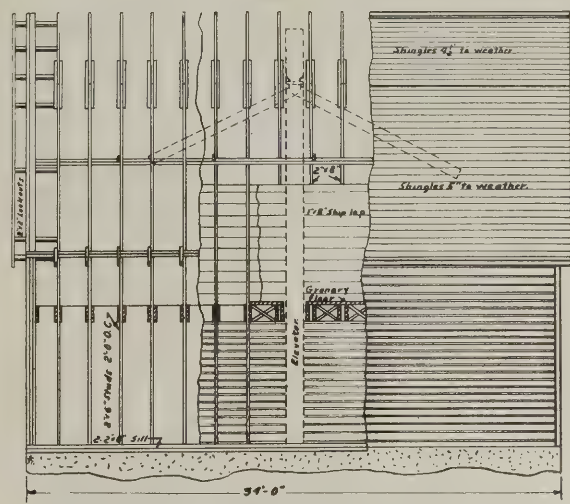
Framing Section



Second Floor Plan



First Floor Plan



Side Elevation and Framing

and low secures greater capacity at a much less building cost. At the same time elevating and conveying machinery can be used to better capacity. The crib and granary can be combined to good advantage, making it possible to use elevating machinery for both types of grains at a single minimum cost. The building described will accommodate 2,000 bushels of corn and 2,700 bushels of small grains. Any type of inside elevator equipment can be used in it.

The plan followed in the design of this structure incorporates two corn cribs, of 1,000 bushels capacity each, with three 900 bushel grain bins. The cribs are arranged at the sides of the driveway while the bins are placed directly over it. Elevating machinery is located at the edge of the driveway near the center of the building, so that the greatest distributing range may be secured at the elevator head.

The foundation is constructed of 8-in. concrete walls with 12-in. footings. Care must be taken to place the footings below frost line and deep enough to secure a firm footing on the soil. ⅝-in. bolts, 18-in. long, are inserted in the wall every 6 feet as a means of securing the sills to the walls. The crib bottom, the shelling trench and the floor are 4-in. thick. All should be constructed of 1-2-4 concrete.

The sills are made up of two 2x8. The studs for the outside crib walls are 2x6x12, placed 2 feet on centers. The inside studs are 2x8x18. Joists supporting the grain bins are formed of two 2x12x12 spiked and bolted to the inside studs. 2x6 ties and windbraces every 6 feet are spaced uniformly across the cribs as shown in the framing detail. 2x6 ties every 6 feet across the top of the bins serve to brace the inside studs and the rafters. In order to secure maximum capacity for the cribs, a gambrel roof is used. Rafters are 2x4, spaced 2 feet on centers, sheated on the outside with 1x8 material and on the inside with 1x4 sheating to a heighth equal to that of the grain bin. The building is covered with shingles. The bins are lined with shiplap while the cribs are covered with regular crib siding, with a spacing of ¾-in. between pieces. Rat netting ¼-in. mesh is placed between the studs and siding of the crib to a height of 36 inches.

BEWARE
OF
Snow and Ice on Scaffolds
Last winter several serious accidents resulted from slipping and falling from icy scaffolds.
A few minutes' work will prevent these accidents
Keep Your Scaffolds Clean
Post Where It Can be Read by Employees

Text of a poster issued by the Builders' Limited Mutual Liability Insurance Company of Wisconsin.

Houses "Figured Out of Their Rights"

A mid-west builder, commenting on work done in a row of houses, said: "Blank has put more into that job than appears to a man that doesn't know building. I don't know what kind of a contract he has, but Blank will do a job right or not at all. I am sorry for a man that has to figure a house out of its rights. The time will surely come when the little things that count will show up. Then people will ask, 'Who was the builder?' and that gives a jolt or a boost to a builder's reputation, and believe me there is nothing that a builder needs more than a good rep."

Hollow Walls of Concrete

A. S. of Ohio, would like to see a discussion in National Builder from those who have had experience with hollow wall concrete machines used in building houses.

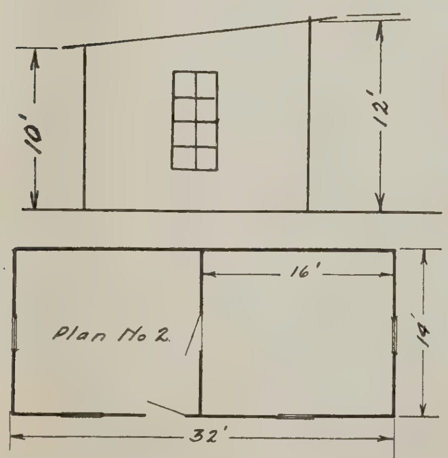
The following points are of special interest: Comparison of cost and speed of construction with other materials. Value of the air space as a non-conductor of moisture, condensation, heat and cold. Use of cinder concrete in such walls. Use of metal ties, straps or wires; painted, galvanized or uncoated. Construction of corners, frames for openings and so forth. Also any other points regarding this type of construction.

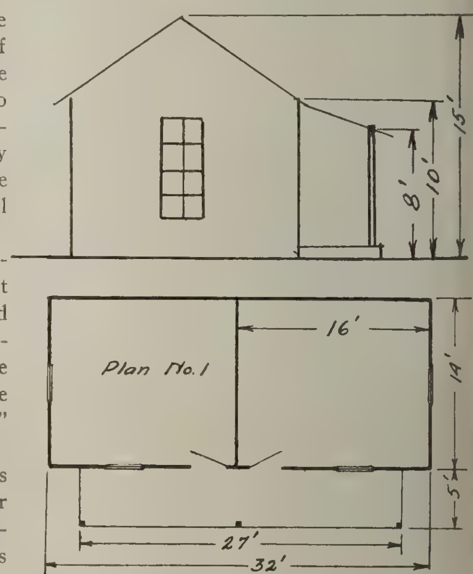
Improved Southern Lumber Camp Houses--By M. P. Dickore

Type of House Affects Morale of Working Men in Southern Lumber Camp

Shed-like house for working men in Arkansas and Texas

Bungalow type house for working men—G. W. Eaton Co., Neal Springs, Ark.





THE psychological effect of a better made home with a far more attractive appearance is being capitalized by G. W. Eaton in housing his men who work in his saw mill at Neal Springs, Arkansas.

All through the South a shed-like structure is furnished the help in any industry, be it saw mill, cotton or farming. Mr. Eaton, however, had the fact pointed out to him by Mr. Dickore, a contractor of Cincinnati, that the same amount of lumber feet, cut differently, would make a more attractive home for the mill help and their families would be more contented in them.

Accordingly, Mr. Dickore set out to build a two room house of the bungalow type, as shown in the plan marked No. 1, to replace the shed-like house shown in the plan marked No. 2. The same amount of lumber is used and, what makes the scheme a still better proposition economically, so many of the "mill ends" are utilized, particularly the 2x4 and the 1x10. An especially good feature of this bungalow type house being the gable in which the short 2x4 mill ends are used for rafters.

Another advantage is in the use of clapboards for roofing. These are sawed out of mill ends on the rough saw. This method of roofing makes a better and cheaper covering than the long boards used on the sheds, besides lending a certain distinctive air of being different and more "homey" to the bungalow.

This type house contains two rooms as does the shed, but each room has a door opening into the porch which gives a certain amount of privacy. The two windows give plenty of light and air and a connecting door between the rooms is added in those houses occupied by families.

These plans are not necessarily to be adhered to in building houses of the bungalow type for working men. It is really anticipated that they should vary with the local conditions and requirements, and with the mill ends of lumber used, which will be the controlling influence in any changes in the plan of the house you wish to build for your working men.

In the experience of the G. W. Eaton Company these bungalows have been a determining factor in the operation of their saw mills during the labor difficulties met with in the past year all through the South, in that they have made the men more satisfied not only with their living conditions but with a slightly lower wage. Particularly where the men have families has this type of house, although not especially distinctive in design but of better construction and a more home-like appearance, had a psychological effect which has been turned into a profitable advantage by one resourceful mill owner.

Announcements and Publications

The W. E. Dunn Manufacturing Company of Holland, Michigan, announce that they have disposed of their line of molds and hand machines to the Concrete Equipment Company of Holland, Michigan, and hereafter will direct their entire attention to the manufacture and sale of their improved power equipment.

The Creo-Dipt Company of North Tonawanda, N. Y., make a feature of thatch roofs and are prepared to furnish upon request working drawings and standard specifications with their "Book of Thatch Roof Beautiful Homes."

The Fairmont Machine Company of Fairmont, West Virginia, has recently become the property of the Austin Machinery Corporation of Chicago and New York, manufacturers of earth-working, concrete-mixing and material-handling machinery. The Fairmont plant will continue to make its own line of machinery besides contributing to the manufacture and distribution of the complete line of earth-handling and cement-mixing machinery manufactured by the Austin Machinery Corporation.

Bird & Son, Inc., of East Walpole, Massachusetts, have gotten out a very interesting anniversary book commemorating their one hundred and twenty-fifth anniversary. The growth of this firm from the first small paper mill built in 1795 to the wealthy and important corporation it is today is graphically portrayed by photographs and chronological records.

Carrere & Hastings, Architects, 52 Vanderbilt Ave., New York, N. Y., announce a change in the firm name which now reads, Carrere & Hastings, Architects, Shreve, Lamb & Blake, Associated.

The L. T. Smith Company, whose general sales offices have been located at 470 Old Colony Building, Chicago, has moved this entire department and its complete personnel to Milwaukee, Wisconsin, where from now on it will be located at the factories, 1125 32nd St. General Sales Manager R. E. S. Geare will now have direct jurisdiction over the Service Department at the factory. Part of the new service will include the services of experienced engineers who will arrive with each paver or excavator, to instruct the contractor's operator and insure maximum production efficiency from Smith machinery from the day it starts on the job.

The White Pine Series of Architectural Monograph, Vol. VI, Number 6, shows some fine photographs of old houses in Essex, Connecticut.

The Ross Heater & Manufacturing Company, 1407-1411 West Ave., Buffalo, N. Y., have just issued their Catalogue "F" which illustrates and describes the various types of Heaters, Condensers, Expansion Joints, Coolers and Airjector Pumps manufactured by that company.

"Minerva" Fountain Ruling Pen—A circular from Kolesch & Co., 138 Fulton St., New York, N. Y., tells of a fountain ruling pen which they are putting on the market. The pen carries a guarantee and, according to the announcement, can be filled with any ink, will suffice with one filling a day, and will not leak or clog.

The Bostwick Steel Lath Company of Niles, Ohio, has issued their 1920 edition catalogue of the complete Bostwick line of metal building materials and illustrating and explaining their uses.

"Country and Suburban Houses" is the title of a plan book recently gotten out by the architect, William Dewsnap of 334 Fifth Ave., New York City. This book is intended to afford suggestions to the potential builder, and contains perspectives or photographs and floor plans for forty-five different styles of dwellings, ranging in cost from $7,290 to $83,000. Each sketch and floor plan is accompanied by a brief description of the interior finish, main features of the building, and the kind of site desirable for that particular type. General specifications covering both the interior and exterior of all designs illustrated are given in the front of the book, as well as a short outline of the main points to be considered in successful interior decoration and furnishing. An estimate sheet covering the forty-five designs accompanies the book, which may be procured from the author at the retail price of $3.00.

"The New Stone Age," by Harrison E. Howe of the National Research Council is unusually readable for a scientific book dealing with building materials. The history of cement and concrete is traced from the time the cave-man discovered that rocks smeared with mud would hold together and afford shelter, through the various phases of the buildings of antiquity, to the present age of miracles in artificial stone. The chemical nature of the raw material is explained, with the chemical reactions which govern the use of the commercial product. The processes of quarrying and manufacturing are described, with the best methods of handling the building material obtained and the scientific reasons for these methods. The adaptability of concrete to various types of construction is discussed in chapters on Highways, Railroading, Bridges, Waterways, Ships, Reinforced Work, and Farm Needs. Though written in an easy and non-technical style the book is thoroughly authoritative and instructive. There are a number of excellent photographs. The Century Company, 353 Fourth Ave., New York, N. Y., are the publishers for this book, which retails at $3.00.

Concrete Houses and How They Are Built, edited by Harvey Whipple, Editor of "Concrete," and compiled from articles which have appeared in that magazine recently, has appeared in its second editio[n]. The book is 9 inches by 12 inches and co[n]tains 215 pages abundantly illustrated wi[th] photographs, sketches, plans and det[ail] drawings showing concrete houses [of] various types and costs, the methods [of] construction, and the finishes and deta[ils] possible. The subjects range from spacio[us] mansions to four-room cottages, from pr[i]vate dwellings to industrial housing d[e]velopments, from the ice-box type of hou[se] tried in Canada to the bungalow of th[e] Philippine Islands. Methods of constru[c]tion are explained simply and clearly, th[e] many floor plans and designs shown furni[sh] abundant suggestions to prospective buil[d]ers, making the book a valuable additio[n] to the library of any worker in concre[te] and particularly to the builder more or le[ss] unfamiliar with this type of constructio[n]. This book retails for $3.00 and may be ha[d] by writing to "Concrete," New Telegrap[h] Building, Detroit, Michigan.

"The Powerox," a new improved in[dustrial] dustrial tractor, is announced by the Ba[r]rett-Cravens Company, 169-173 North Ar[...] Street, Chicago, as about to be placed o[n] the market.

The Stine Screw Holes Co.'s announce[]ments are in respect to so new an ide[a] that the full significance of the value o[f] the article is not easily comprehended unt[il] the article itself is seen and tried. Sampl[es] and price list will be sent on request by ad[]dressing the company at Waterbury, Con[n].

Lufkin Extension Spring Joint Bo[x]wood Rule, Saginaw, Mich., announce [a] new article in a six-foot rule particular[ly] designed for taking inside measurements o[f] openings. It is known as No. X8536 an[d] taking the place of a common rule in add[i]tion to the extension feature commen[ds] itself by its rigidity and other desirab[le] features.

The O'Brien Woven Wood Lath is th[e] title of a leaflet presenting a report (on th[e] merits of a new base for all forms of pla[s]ter and stucco) made by Karl D. Norri[s], architect, to the members of the chamb[er] of commerce of East Chicago, Ind., an[d] issued by the O'Brien Woven Wood Lat[h] Company, 175 West Jackson Boulevar[d], Chicago, Ill.

Metaloyd is the title of a leaflet an[]nouncing a double unit metallic compos[i]tion sash weight manufactured by th[e] Economy Sash Weight Co., 175 West Jack[]son Boulevard, Chicago, Ill.

Catalog of Standard Books on Archi[]tecture, Construction, Building Practic[e] Engineering etc.—Chas. Scribner's Son[s], 597 Fifth Avenue, New York.

Hodgen Thermostone Stucco and Hod[]gen Air—Tight Window and Door Fram[e]—Illustrated circular describing the prin[]ciples. Issued by C. W. Hodgen, 300 Hunte[r] Street, Kansas City, Mo.

National Builder

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NATIONAL BUILDER

Volume 64 — Chicago, March, 1921 — Number 3

The Situation

BUILDERS' interest and the interest of the general public in building and housing are centered in the question: "Is it safe to build now—or will construction prices decline further?"

The answers which appear on the two following successive pages from a variety of building supply interests bear all the evidence of good faith and full understanding of conditions. They show that with few exceptions the tendency of prices will be upward, and the only anxiety is to achieve means to avoid a market in which those who need material will be bidding against each other.

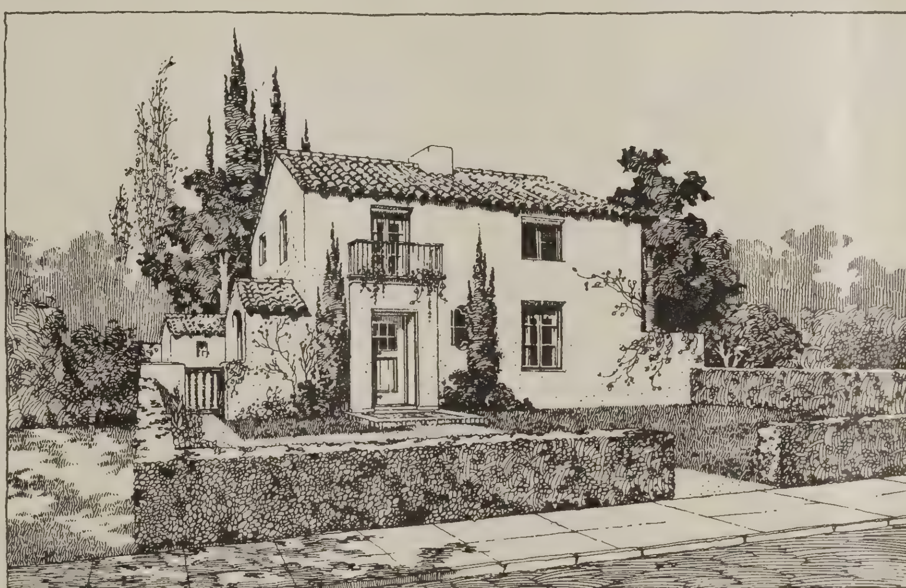
The builder who is giving thoughtful consideration to general conditions will do well to lose no time in doing what he can to inform his prospective customers of the actual condition as here indicated. Most favorable opportunities are afforded him in the building exhibits held in various sections, and notably in the "Own Your Home Exposition," which will open in the Coliseum, Chicago, on March 26 and continue to April 2, to be re-opened in New York, April 16 to 30.

It has been amply proved that notwithstanding the prevailing idea that business is dead, it is dead only to those who allow themselves to think that way, and that business can be made by those who have faith in what they can do and what they have to offer. The hesitation about building is largely a state of mind, and to change that state of mind no one is better fitted than the builder. One of these, in a comparatively small way of business, stated the other day to NATIONAL BUILDER that while business had been slack, he was too *proud* (his own expression) to look for work, but that he had overcome his pride sufficiently to ask certain customers about houses they had spoken to him about months ago, and practically secured the order for three bungalows. Now, if one builder can do this, others certainly can. Builders who are content to sit back in their britches and wait for customers to come to them are delaying building revival. They have the knowledge and skill, and it is not sufficient to advertise, but to make that advertising potent by a systematic hunt for the men who have the money and the desire to build or make repairs. A building market can be made by builders who will study how to sell their knowledge and skill, and make it worth while to that vast army now vegetating, for they are not truly living, in cramped and uncomfortable and unsanitary quarters.

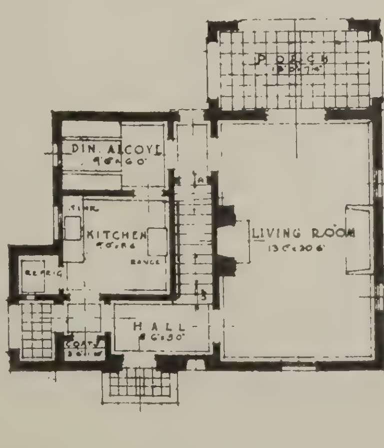
The effort of the Own Your Home Exposition managers, backed by the American Institute of Architects, to provide small house plans at a moderate cost is of particular interest to builders. The competition for that purpose produced 1,800 small house plans as reported on page 52 of this issue. One of the first prize plans, that for a stucco house is shown below.

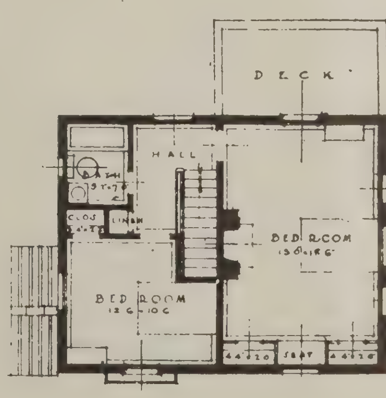
At the time of going to press, Mr. Ernest T. Trigg, president of the National Federation of Construction Industries, Drexel Building, Philadelphia, telegraphs to NATIONAL BUILDER, of a meeting to be held at the Hotel Sherman, Chicago, on March 2 and 3, in order to take up and carry on the results of a conference recently held in Philadelphia at which all pertinent facts were arrayed regarding the present condition of the building industry. It is hoped from this and other activities that building will be resumed in every center in the country.

The way to resume, however, is to resume. There is not wanting evidence that there are many men who properly approached will blaze the way to the resumption of building and who only need a little stimulating to stir them into activity.



First prize stucco house—Louis Justement, Architect, Washington, D. C. Copyright, 1921, by Own a Home Exposition, Inc. (See report on page 52.)





Prices are Stabilized

The Following Answers Condensed from Letters Received in Response to Questions About Possible Price Reductions Sent Out By National Builder Go to Show That the Time to Build Is Now

L. R. Putman, Directing Manager of the American Wholesale Lumber Association, Chicago, Ill.—From a letter addressed to Mr. William Butterworth, vice-president of the Chamber of Commerce of the United States, Washington, D. C., treating the price situation comprehensively, we select this significant statement by Mr. Putnam: "To insist that some of the building materials be reduced in price by the manufacturers before the price of labor is reduced seems to me like attempting to build a house by starting on the third floor. We must begin on the foundation and go up, and the foundation for the price of labor is the cost of living."

Robert B. Allen, Secretary-Manager, West Coast Lumbermen's Association—West coast forest products including Douglas fir lumber have depleted fifty per cent.

Geo. A. Houston, Manager Lumber Sales, The Long-Bell Lumber Co., Kansas City, Mo.—As the selling price of yellow pine lumber has been under the production price for several months, it would seem to us that the next change in prices is bound to be upward.

Anderson Lumber Co., manufacturers of window and door frames, South Stillwater, Minn.—We feel that our present prices on frames are rock bottom.

Charles C. Kellogg & Sons Co., sash, doors, and specialties, Utica, N. Y.—An educational campaign to promote building will be staged in Utica beginning March 1 as the result of efforts by leading citizens. A model house will be constructed, and everything that goes to make a complete home will be exhibited without sales solicitation. We are not laying stress on prices but we are making a strong appeal to the class of people who can afford to own their own homes to either build or buy, thereby making room for those who cannot afford to own.

Blaw-Knox Co., Pittsburgh, Pa., by H. B. Loxterman, assistant general sales manager—In this steel business, all prices are based on the U. S. Steel base price, and the public looks to manufacturers in which this steel is used to reduce prices as steel prices are reduced. We are however, guaranteeing prices on such materials as road forms, buckets and light wall forms, until June 1, 1921.

R. D. T. Hollowell, Secretary-Treasurer, The American Face Brick Association, Chicago, Ill.—Personally, I do not think our industry should gamble on anticipated reductions of cost, and with present added overhead for idle time, the prices which I have seen lately are certainly reasonable.

Wm T. Mathews, Sales Manager of The Claycraft Mining and Brick Co., Columbus, O.—Refers to a bulletin issued by his company to dealers on January 28, which calls attention to the fact that the company did not raise its prices since August, 1919, but absorbed all the increases in cost, and they were many. At the present time there is not sufficient brick stock in the country to supply anything like a normal demand for sixty days, and this demand will appear just as soon as the public is satisfied that all the supposed profiteering is squeezed out of building materials.

Anti-Hydro Waterproofing Co., New York City, N. Y.—We are ready to guarantee the prices of our products against any decline during the present year.

R. B. Creighton, Sales Manager, Plastergon Wall Board Co., Buffalo, N. Y.—There is nothing in the cost outlook that would justify our anticipating any further decline in prices. The great volume of new building which is sure to come will furnish the wall board manufacturers with an ample volume to keep their factories producing at capacity during the present year. We are and have been guaranteeing our prices against a further decline to give our customers confidence to carry stock adequate for their current needs.

Wheeling Wall Plaster Co., Wheeling, W. Va.—Mr. R. Walter Marshall, of this company, sends a copy of a newspaper interview, from which the following is selected:

"If anyone will take into consideration the freight rate increase of approximately 100% and the labor increase since 1914, they will realize the impossibility of building at the 1914 normal at least for years to come. In fact we will never see the 1914 building costs again. Freight on building supplies, on account of the heavy tonnage, enters into the cost of construction to a very considerable extent; and naturally the 100% increase over 1914 affects building costs accordingly. The freight increase does not amount to much on lightweight commodities, such as shoes and clothing, but it does amount to considerable on a building. Labor cost of a building amounts to approximately 65% of the total cost, and everyone knows the increased cost of labor over 1914 levels. The labor cost of producing and handling supplies increased about 150% through no fault of labor, for living expenses increased accordingly. This leaves 35% of the total cost of building for fuel, oil, freight, repairs, depreciation, overhead expenses and net profit to the producer, dealer, architect and contractor. Everyone knows the enormous increase in the overhead expense of doing business due to increased taxes, double amount of capital required and other items too numerous to mention.

The Hollow Building Tile Association, Chicago, Ill.—Mr. J. S. Sleeper, service director, states that his company has distributed to thirty thousand addresses a circular giving a national view of the building situation. From this circular the following statements are taken: "The reductions in building material prices for which the public has been waiting for some time have largely taken place, although this fact is not yet generally recognized. Lumber is selling at about 40% less than last spring prices; common brick are approximately 20% cheaper; hollow tile has come down 25% to 30%; some recessions in the price of face brick have already taken place; iron and steel prices are being revised at this time. When it is taken into account that freight on all commodities advanced a minimum of 35% on August 26th, these lowered quotations show that the manufacturers are keeping their promise to reduce prices as soon as they were able to do so. * * * There are strong possibilities that those who *postpone* the completion of their plans and the placing of contracts for both materials and construction work will find it impossible to do so, and that the conditions of last spring when buyers were bidding against each other may be repeated. Sight should not be lost of two important facts: 1st, since the almost total cessation of building operations some months ago, manufacturers have made no more material than required to fill their bona fide contracts, and have closed down their plants rather than accumulate stocks which would have been manufactured at peak costs. 2nd, in order to get into operation again as soon as possible, manufacturers will make lower prices during the comparatively dull winter months than they will be willing to accept when the big spring demand resumes."

The Rocbond Co., Van Wert, O.—Mr. H. T. Webster, of this company, states that the magnesite stucco industry never went up, though forty per cent rail increase bears heavily on the product.

Wisconsin Lime & Cement Co., Chicago—The consensus of opinion seems to be that there will be very little if any change in present prices of building materials such as we handle. There has been a considerable decline in the last four months, and we can tell you frankly that the difference between our cost price and what some materials are selling for on the job barely takes care of handling. One feature that some people lose sight of is that building materials are bulky, heavy commodities, and the increase in freight rates has been largely responsible for increase in contractor prices.

North Western Expanded Metal Co., Chicago, Ill.—The company, through its advertising manager, E. Drage Browne, submits a statement by the president, Mr. Howard W. Foote, published in the company's house organ, "Expanded Metal Construction." In this statement Mr. Foote points out that in 1919 there were slight reductions in the price of sheet steel, and that his company promptly made corresponding reductions in prices of metal lath. Since that time there has been no change in price of sheets by the United States Steel Corporation, and it is now well understood that there will be no change for at least the first half of 1921—if then. The wisdom of stocking up to meet reasonable demand is made obvious by Mr. Foote.

Franklyn R. Muller & Co., Asbestone Guaranteed Products, Waukegan, Ill.—Mr. Muller of this company states that he is sorry that the prices on flooring and stucco as quoted by his concern will continue through the balance of the year. Materials have been sold on a very close margin for the past four years and all ingredients used in the manufacture, under all contracts closed for the company's requirements for 1921, have not decreased. Several of the articles used in large quantities have increased slightly, so there is very little likelihood of a reduction of present quotations during the year.

The Youngstown Sheet and Tube Co., Youngstown, O.—Mr. R. J. Kaylor, publicity manager for the company, while agreeing that it would be highly desirable for some method to be found that would stabilize the market, believes that any price decline must be preceded by a reduction in costs, and this will probably only be accomplished by a gradual readjustment.

The Philip Carey Co., asphalt, asbestos, magnesia, Cincinnati, O.—Mr. O. A. Bigler, assistant sales manager, states that the prices on raw materials used in the company's manufacturing processes are at their low points, and feels sure that any change in the company's prices will be upward.

National Lime Association, Washington, D. C.—Mr. E. O. Fippin, secretary of the association and manager of the agricultural department, points out that the association has no contact with the prices at which the products of members are sold, but from notices received understands that some lime manufacturers have found it possible to reduce prices in the neighborhood of one dollar a ton. The price of lime was not advanced to as large an extent as some building material and consequently manufacturers are not in a position to reduce the price influenced by the high price of coal and other items that enter into the cost of production.

National concerted action to start building activities in all centers being now essential, a national conference to promote such action is called by Ernest T. Trigg, President National Confederation of Construction industries, approved by Joseph H. Defrees, President National Chamber of Commerce. Meeting March 2 and 3 at Hotel Sherman, Chicago, Ill.

J. E. Porter Corp., manufacturers of hay tools, friction hoists, door tracks and hangers, garage door sets, and barn equipment, Ottawa, Ill.—Mr. Jacob F. Wertz, advertising manager, states that the company has made every possible reduction consistent with sound business and good merchandising, and look for no further reductions for some time, the company guaranteeing prices against its own reduction up to the date of shipment.

The Sykes Metal Lath and Roofing Co., Niles, O.—Mr. Thos. P. Parker, manager of sales, says that as manufacturers of expanded metal lath the company is not in a position to guarantee against price declines as the semi-finished raw material entering into this construction is not controlled by the company. As a matter of opinion no further reduction is anticipated for several months. It is now up to some source, says Mr. Parker, to advise the public that building construction will be lower in 1921 than for any period during the next five years.

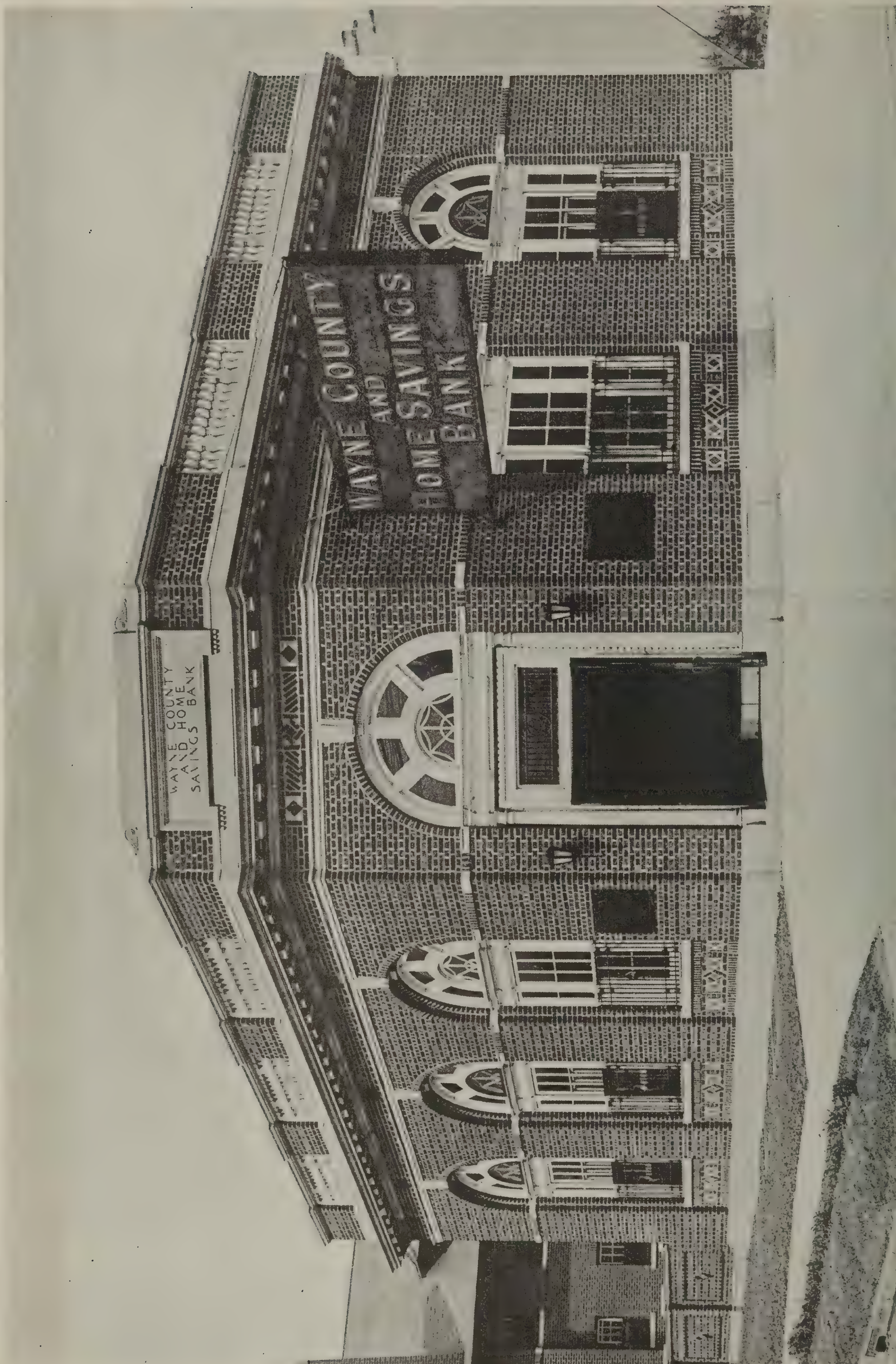
The Bishopric Manufacturing Co., Cincinnati, O.—Mr. C. H. Dreyfus, secretary of the company, states that appreciating the desirability of getting the company's materials down to the basis of present market conditions regardless of loss of materials on hand, so that the man who wanted to build could use Bishopric materials with full economy and without fear of drastic reductions later on, the company stabilized its market by making prices based on present cost of producing materials which it uses and the labor it uses. Mr. Dreyfus points out the desirability of this procedure in selling to the consumer on present market prices, and warns against trying to make profits based on the past four years, otherwise the reductions made by producers and manufacturers will be of little benefit to the consumer and building will be seriously restricted.

Allen E. Beals, of the Dow Service Daily Building Reports, said recently:

"The various building investigations are not going to bring about a millenium. They are causing a temporary paralysis of new construction work, but there is nothing that can now be foreseen to indicate that any of these inquiries can accomplish anything in the way of checking railroad, export and domestic building demand or speeding up building material production. Without one or the other it is folly to wait for lower building material prices. In textiles and other commodities the mills are overloaded with no buyers. In the building material industry the situation is largely reversed.

Albert M. Wolf, secretary of the Condron Company, engineers, says in a recent interview:

"Those who base their beliefs that building costs must soon come down on the facts that shoes, clothing, grain, etc., are selling at considerable reductions from their war-time levels are doomed to disappointment, such argument being based on fallacy. This premise is that building materials are comparable with other trade lines at this particular time. The facts are that the clothing and shoe industries have suffered from great over-production and the old law of 'supply and demand' is therefore taking its natural course. In the building material industry, however, there is no such over-production."



A Small Bank Building. B. C. Wetzel & Company, Architects

See descriptive article on following page and Complete Working Drawings in Detachable Blueprint Insert in this issue

AL BUILDER

rch, 1921

PLANS FOR A
LL BANK

el & Co., Architects
Detroit, Mich.

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-8 inch equals one foot

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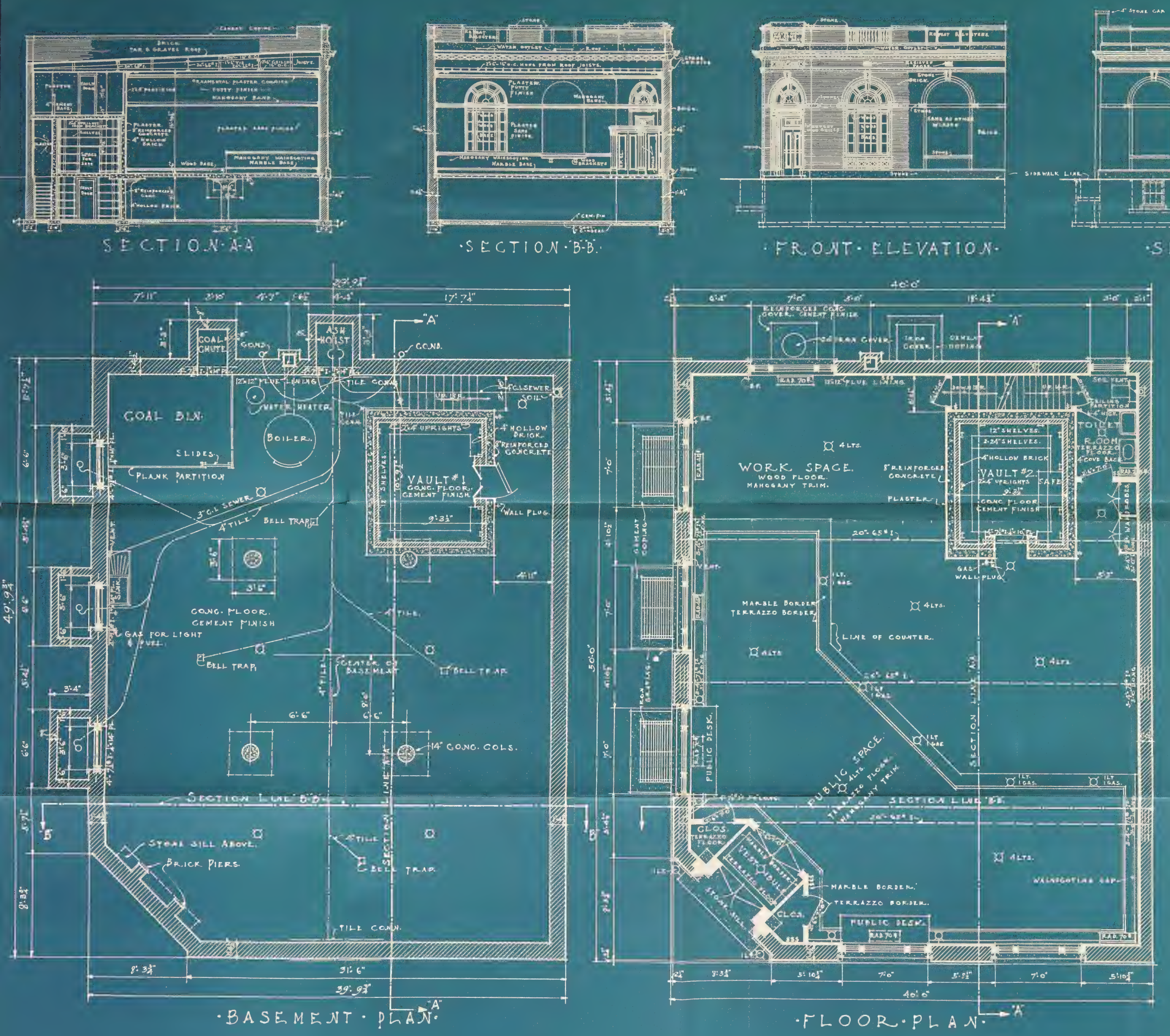


NATIONAL BUILDER

March, 1921

WORKING PLANS FOR A SMALL BANK

R. C. Wetzel & Co., Architects
Detroit, Mich.

Scale: Floor plans, 1-4 inch equals one foot, elevations, 1-8 inch equals one foot

See Photograph and Descriptive Article in Reading Pages

A Small Bank Building

B. C. Wetzel & Co., Architects

Complete Plans of this Building are Shown as a Suggestive Study in the Detachable Blueprint Insert in this Issue

THE majority of designers feel that a building of more or less monumental treatment is essential in expressing the dignity and trustworthy character of a banking institution. There is no quarrel with this contention as a whole, but certain mannerisms that have become established in this connection are deserving of criticism.

Take columns, for instance. Almost all modern designers seem to feel that massive columns are as essential to the exterior of a bank building as a vault is to the interior. This has resulted in a similarity of treatment that is monotonous, to say the least. Then, too, large columns are frequently "out of scale" with a small building and give a feeling that one can't see the forest for the trees. Besides this, they are an expensive item, and their cost often causes some other portion of a building to be slighted.

The Wayne County & Home Savings Bank, designed by B. C. Wetzel & Co., architects, of Detroit, Mich., is an example of a small bank building in which the absence of massive columns and other conventional trappings results in a design that is refreshing when compared with the average building of this type.

This design also shows that a corner entrance—a frequent source of ugliness in old-fashioned bank buildings—may be made an attractive and practical feature by a skillful designer. The advantages of a corner entrance are obvious, but it is difficult if not impossible to reconcile such an entrance with a columnar treatment, therefore most designers choose the easiest way and use a center entrance on one or both street fronts.

The exterior wall construction of this building is of brick, laid up in English bond, thus adding interest to the wall surface at slight additional expense. The panels under the windows and above the doorway are of brick and colored tile, set with wide joints.

The window and door frames are of wood; beautifully detailed, with the exception of the transom muntins, which are entirely too heavy. The wrought iron grilles at the lower portion of the windows serve a practical as well as an ornamental purpose, in that they offer a safeguard when the lower sash are raised.

The wall trim is of stone, well spaced to prevent a chopped-up appearance. The balustrade and stone panel of the parapet are well designed, but the appearance would probably be improved if no brickwork were exposed above the cornice.

It is perhaps needless to mention that the huge signboard was not a part of the original design.

The floor plan is very simple, being divided into a public space and a working space by a grille partition with a marble and wood base. All trim and other exposed woodwork is mahogany. The walls are plastered and have an ornamental plaster cornice at the ceiling line.

The floor is of concrete constructed on the flat-slab principle, thus permitting a shallower basement than would be practicable if a beam and girder construction were used. The floor of the public space is finished with terrazzo with a marble border. The floor of the working space is finished with wood.

The working space contains a reinforced concrete vault with the inner walls furred with hollow brick to provide insulation in case of fire. A similar vault for less important papers and documents is provided in the basement, and a mezzanine floor at the rear of the building also has a small vault.

A toilet room and wardrobes for the bank force are provided in one corner of the working space.

The basement is lighted by means of area windows and contains the heating plant as well as considerable storage space. A chute is provided for putting in coal and there is a hoist for the removal of ashes.

Notes on Building

By Charles Cressy

AMONG the minor items of life that interest me is the suggestion that lies behind the names of men and things. No man lightly discards his famliy name, holding, as it does to him, a million memories. I am moved to plead for the family name of the man who builds. In unbroken history the name "Builder" has been held in honor and respect, full in its meaning, fragrant in thought of earnest apprenticeship, journeyman's skill, and manly standing among masters in the craft.

Thoughtlessly, perhaps, that traditional meaning is being lost, both in impression and in fact and it is worth the effort to regain the dignity of name alone, if in some measure the desire for worthiness to bear it is re-born. To make a builder is the work of years; to make a contractor but the stroke of a pen. One is a basic fact, the other but a supplement. In no sense does the name "Contractor" imply a "Builder," for a contract is, after all, a legalism which applies equally to fish, cheese or fruit as much as to building. If the lawyers must have a "Contractor" as a party of the first part, let us cheerfully bow to the inevitability of the law, but smilingly use for letter head or sign that good old name for the game of skill and scorn the flag of the game of chance. Be a Builder!—road builder, bridge builder, or any special kind of builder—but if you build, say so in your family name, jealously and without compromise, building for character and for the honor of that worthy craft that carries history to the future, as your fathers carried history to you.

Contract Documents and the Courts

There is food for thought and some amusement in comparing what is expected in the way of perfect documents for building contracts and the drab reality of imperfections disclosed by evidence. Looking backward, I doubt if I ever have known a perfect set of these fateful pledges between man and man and am truly skeptic if even the youngest amongst us could rise in claim to chemical purity of perfection. It is a tremendous testimony to the widespread decency and tolerance of the building fraternity, that in the immensity of our great industry so few real fights occur, when every mark and move is potent with the spirit of war.

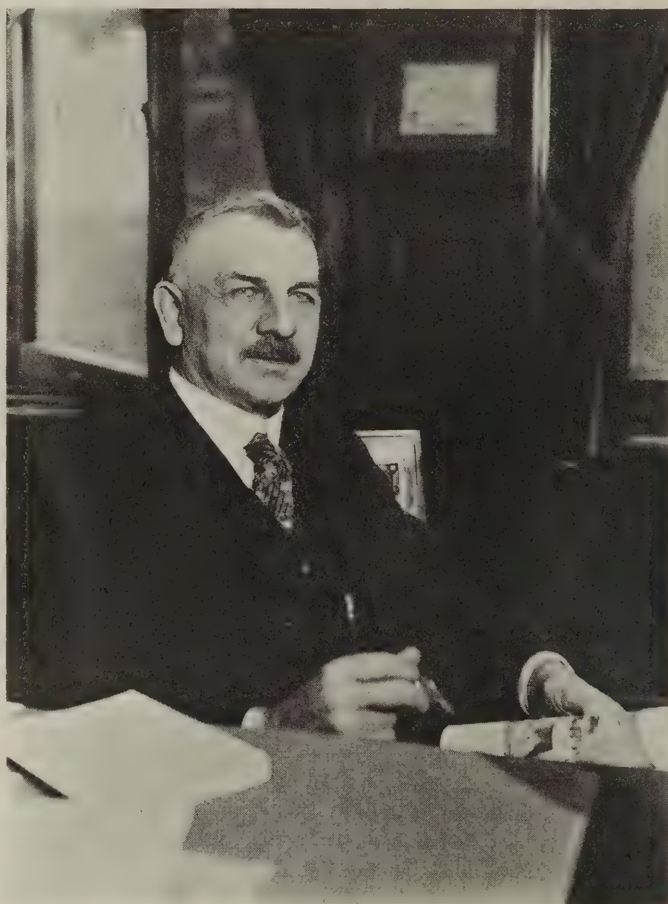
I suppose that few in calm thought would ever hope to present a clear statement of that mass of unwritten law which really guides and rules the progress of a building. Would drawings ever be completed if all details were shown—would specification ever be contained in manageable bounds if every detail were fully described? Every blue-print and every written clause in our contract documents is in the final analysis, but a mass of generalization based upon a common understanding of intentions.

From Panic to Prosperity

This is the Story of a Man Who Refused to Accept Hard Times as an Excuse to Lie Down, but Who Took Hold of the Job of Conquering Hard Times by Putting His Skill and Knowledge to Work Where They Would be Most Effective

THE financial panic of 1907 may be said to have kicked A. Moorman into prosperity, although at that time the kickee probably felt that the initial velocity was a trifle excessive and would probably end in a first-class smashup. A perfectly natural state of mind for a man who suddenly found himself out of a job after 17 years of service with a single concern.

Although conditions in 1907 were far more alarmng than are those of the present time, an approximate parallel may be drawn between them. A brief sketch tracing the remarkable success of Mr. Moorman may therefore serve to let a ray of light into the gloom that has apparently settled in some quarters, hiding from view any promise for the future.



A. Moorman, of A. Moorman & Co., Bank Builders

In 1907 Mr. Moorman was a wood carver for a St. Paul furniture company that was forced into bankruptcy by the money stringency of the period. He was thus left high and dry at a time of life when most men have charted their future course and begin to drift with the tide. Now, Mr. Moorman's reputation and skill were such that he could have shoved off into the old channel and landed another job, either as a wood carver or as a terra cotta modeler—another trade that he had followed for five years—but after the passing of the first shock of being cast ashore, he decided that he could see more open water in another direction. He felt that he didn't want anyone to *give* him a job—he wanted to *make* one.

Therefore he" shoved off" on his own. The beginning was tame, marked by the opening of a small cabinet shop specializing in super-millwork, such as banking and store fixtures, special furniture and the like. His training in the manufacture of furniture stood him in good stead in this new venture and before long the products of the small shop became noted throughout the Northwest for their uniform excellence of design, construction and finish.

The business grew apace; doubled, then trebled in volume, but unlike many enterprices, its growing success did not cause its founder to lose sight of the fact that the history of business is crowded with examples of concerns that failed because they grew too fast. Mr. Moorman soon realized that his personal attention could be given to only a certain amount of work and that he must rely largely on other men to maintain the reputation borne by the products of the shop. The business was allowed to grow only in proportion to the number of competent men who were available and could be depended on to uphold the shop's standards. In many cases this meant special training of men, but in the long run it has paid, as the cabinet work of today bears the same stamp of quality that it did in the beginning.

Although the cabinet shop in itself constitutes what most men would consider a marked success, it is really only one phase of Mr. Moorman's achievement. The services rendered by the shop required considerable knowledge of the working requirements of banking institutions, and before long it had gained a reputation for the excellence and practicability of its layouts for fixtures and general arrangement. From this grew a demand for complete designs for banks and their construction until finally Mr. Moorman built up the proper organization and launched into this wider field.

In this work his success has been even more marked than with the cabinet shop. The company which he formed is known as A. Moorman & Co., Bank Builders, with offices in St. Paul and Chicago. It has operated in 14 states and builds about 40 banks a year, involving the expenditure of more than $2,000,000 annually.

The organization is complete, ranging from the architectural department, where all plans and specifications are prepared, to the decorating department which finishes up a job. All millwork is got out in their own mill and the fixtures are, of course, a product of the cabinet shop. Even the plumbing and heating work is carried out by the company.

The organization comprises about 400 men in the field and about 100 in the factories. Nothing but bank buildings are undertaken, but the millwork, cabinet and decorating departments do considerable outside work for other types of buildings.

The company undertakes work under either the lump sum method or the cost plus percentage plan. In either event their services are complete and include every portion of the work from the preliminary sketches to the final dusting off of the equipment. They provide everything except the bank's customers and are even indirectly responsible for a good many of them. The company also does considerable remodeling and alteration work.

Not the least feature of the company's organization is its publicity department. One of its most noteworthy publications is a handsome brochure of 72 pages excellently printed on heavy paper and containing illustrations and descriptions of about 60 of the banks recently built by the company. Another publications is "The Bank Builder", a bi-monthly house organ of excellent type. Each of these publications is

Fig. 2—A corner of the St. Paul general offices of A. Moorman & Co.

designed to attract the attention of bankers and thereby further the interests of the company. If excellence of presentation is of any value they should accomplish their intended purpose.

Taken in all, Mr. Moorman's success is notable. Not alone for its element of profit, but also for the courage which he displayed at a time when the future loomed with doubt. There are men today who might profit by his example.

Housing Cost Less in the South

W. C. Frederic, an architect of Pensacola, Fla., tells the NATIONAL BUILDER that the housing situation is much easier to relieve in the South than in the North on account of the greatly reduced cost of construction. No attention has to be paid to insulation to keep out the cold. Said he, "We have been building bungalows as low in cost as $1500. Each one of these has three rooms, a big porch and a bath room. The five-room bungalows are costing about $2800 each. These rest on brick piers. I

Fig. 3—Bank of Somerset (Wisconsin). Designed and built by A. Moorman & Co.

Fig. 4—First National Bank of Burlington Junction, Mo. Designed and built by A. Moorman & Co.

Fig. 5—Exterior view

Fig. 6—Interior view

Grant County State Bank, Herman, Minn. Designed and built by A. Moorman & Co.

Fig. 7—Exterior view

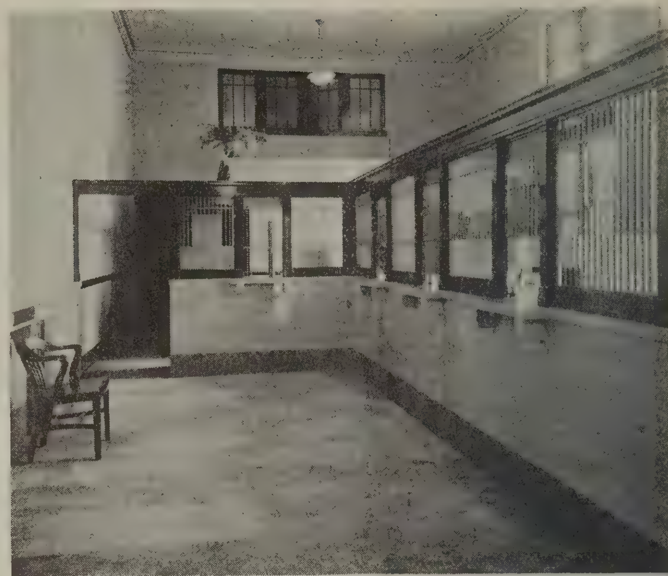


Fig. 8—Interior view

Bank of Scranton (Iowa). Designed and built by A. Moorman & Co.

Fig. 9—Exterior view

Fig. 10—Interior view

People's Savings Bank, Vinton, Iowa. Designed and built by A. Moorman & Co.

have even built cottages costing as low as $500; and it is common to build nice-looking cottages costing under $1000 each. So while Pensacola needs more houses there is nothing in particular standing in the way of her getting them."

National Building Trades Employers' Association

The National Association of Building Trades Employers held ts second annual convention in Savannah on February 14.

No formal addresses were made and the convention got down to business at once and continued to work hard during the entire period of the meetings.

Many matters of interest were taken up, and will be discussed in these pages later, the labor question being paramount.

The officers elected were as follows:

President, Walter Klie, of Cleveland.

First vice-presdent, A. E. Coleman, of Chicago.

Second vice-president, R. V. Gould, of Omaha.

Third vice-president, G. C. Mills, of Webb City, Mo.

Treasurer, Max Bauman, of New York City, N. Y.

Members of the Board of Control: C. C. Pierson, of Indianapolis; W. F. Hennessy, of Cleveland; C. F. Simmons, of La Salle, Ill.; Geo. Donley, of Cleveland; F. M. Davis, of Youngstown; Fred Bully, of Chicago; D. T. Riffle, of Pittsburgh; Paul Fogel, of Kansas City; C. J. Kelly, of New York, and J. E. Tusant, of Des Moines.

The work of the Board of Jurisdictional Awards, which meets in Washington, D. C., from time to time brought forth much discussion as to the question of any person or organization being able to enforce the decisions of this board.

The question of policy in regard to open and closed shop was also discussed at length and there were many arguments from both angles which seemed to be influenced by the power of the labor unions in the respective cities of those doing the speaking.

Colonial Houses

Fig. 1—A gambrel roof house with wide siding on the walls and a paneled living porch

Fig. 2—A slate roof without dormers. Narrow siding on the walls and French doors in the living porch

Fig. 3—A Dutch Colonial house with brick walls and clapboarded gables and dormer

Fig. 4—Another Dutch Colonial with white stained shingles on the walls and dormer

Fig. 5—Brick walls with a slate roof and well proportioned dormers. The curved entrance porch is well designed

Fig. 6—A Louisiana house of the Southern Colonial type

New Type Wall Cuts Cost of Brick Homes

By Wm. Carver, Architect, Common Brick Manufacturers Ass'n

AN entirely new type of wall construction which brings the first cost of a brick house below that of other standard construction was demonstrated at the recent convention of the Common Brick Manufacturers' Association held in New York City. With the Ideal wall it is also impossible to have a mortar joint running right through the wall, and even without the ventilation principle, it would be impossible for any degree of moisture to be conducted the length of a brick by capillary attraction. ordinary brickwork, and no individual taste is involved.

The Ideal wall is recommended not only because it is theoretically correct, but because its actual use has proved it to be satisfactory.

House at Phillipsburg, N. J., built on the Ideal bricklaying system. Paul R. Smith, Architect

It was predicted by the engineers and building officials who examined the exhibit that the new wall, called the "Ideal" wall, might well revolutionize the construction of homes.

The brick home has, of course, always been the least expensive of any type of home that could be erected, all factors considered.

The Ideal wall now materially reduces the cost from that of all previous types, by saving brick, mortar and furring. It introduces an absolutely sound principle also—that of ventilated wall. There is positively no dead air space in this construction, the wall having a current of air flowing through it, absolutely ensuring its dryness.

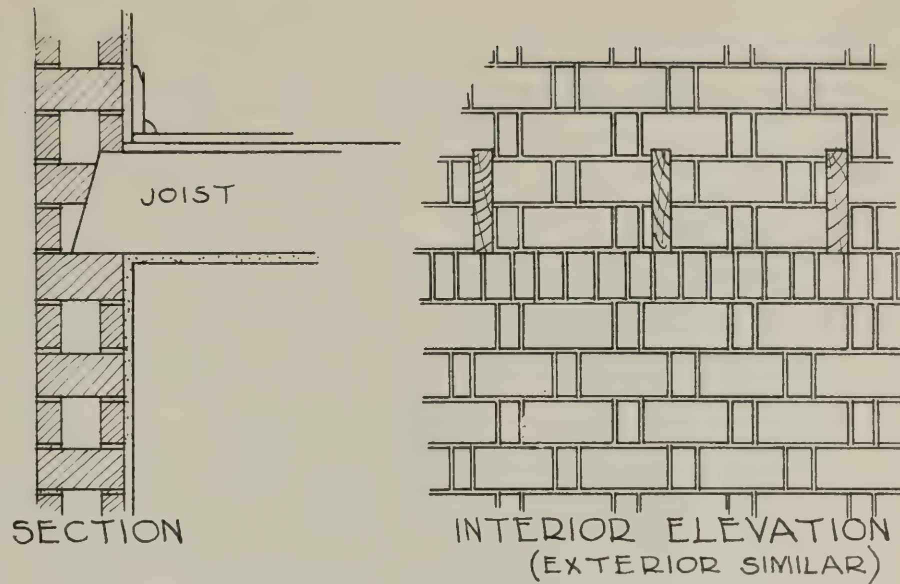
Ideal walls are over eight inches in thickness, moreover, there is not a positive break in the mortar joint, nor in the brick—there being no material in continuous direct contact through the wall.

The principle underlying this new construction is that of laying the wall either wholly or in part of brick on edge. The exposed surface of the wall can show either the "rowlock" face of the brick or the ordinary appearance of brickwork may be maintained and rowlock backing used. The latter type allows the use of any of the ordinary bonds, and the appearance of the wall differs in no sense from that of

The idea, originating with the Common Brick Manufacturers' Association has been taken up in Southern California very extensively, and the all-rowlock type of Ideal wall, showing a face of brick on edge, has now become the prevailing type of masonry construction for homes in that section of the country.

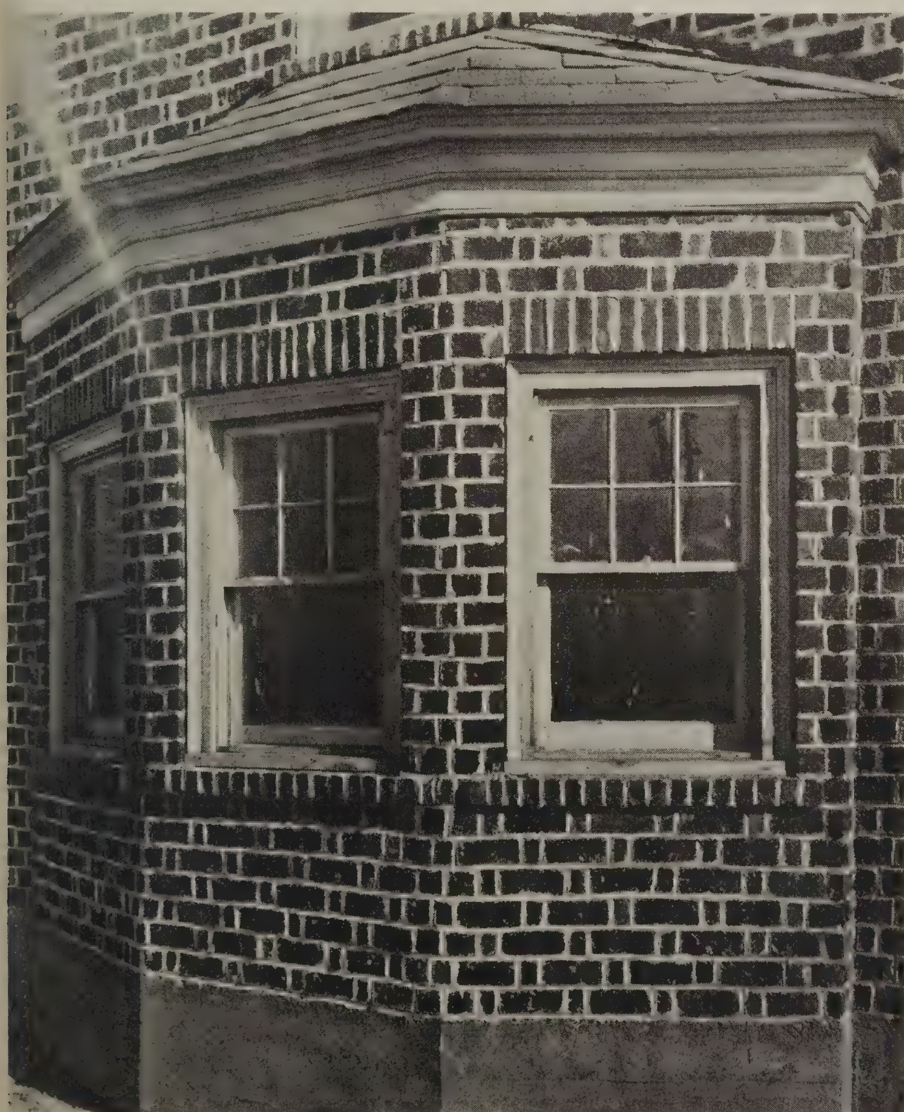
The many Ideal homes in actual occupation there have now passed through the first period of the rainy season and no sign of dampness has become apparent on the inside of the walls, which are plastered direct on the brick.

Just before the opening of the convention it was discovered that a development company in New Jersey had independently stumbled upon this new idea and were having such remarkable success with it that they were specializing in it and using it exclusively in their operations. Some of the New Jersey houses (one of which is illustrated here) have been occupied from periods ranging from several months to one year and no moisture has appeared on the inside of any of them, despite the fact that the walls are plastered directly on the brick without the use of furring. Mr. Paul R. Smith, the architect for this development, states that the Ideal wall is a great success and in his opinion will in a short time come into general use all over the country. The bricks used in the Phillipsburg operation were common brick "culls," twisted and deformed so that in many cases they could not even be used for backing in an ordinary wall. These brick give an excellent texture and color to the wall. More square feet of wall were laid per man per day than with the ordinary type of wall.



Detail of the Ideal wall in house at Phillipsburg, N. J.

The New Jersey houses have walls of the Ideal all rowlock type eight inches thick, but no effort was made to introduce the ventilation feature, but as stated before the walls have proven absolutely dry without the use of furring, according to the occupants.



Showing the effect of the all-rowlock type of Ideal wall

One of these houses, Mr. Smith states, was being built in winter. On a bitter cold day with the wind blowing very hard, a long length of unsupported wall was erected, followed by a night of exceedingly cold weather and a warm rain the next morning. The architect, worried about the safety of this wall arrived on the job early the next morning and found the mason foreman and carpenter foreman already there—all of them for the same reason. On test, however, no weakness could be found and the wall was in satisfactory condition. The house was completed and is now occupied, and is satisfactory in every way.

Complete data on the Ideal wall is now worked out by the Common Brick Manufacturers' Association and full literature upon it will be ready shortly.

Moral Risk as a Building Asset

Recently A. J. Nelson, president of the Reliance Homestead Association of New Orleans, talking to a representative of NATIONAL BUILDER, said: "The moral risk counts for a good deal with us in the loaning of money. For that reason the amount we loan on property varies all the way from 50 per cent up to 80 per cent. In our ordinary loans, we try to make them on 50 per cent of the value of the property. In the case of the housing operation being carried on by the Association of Commerce, we loan up to 70 per cent, because we think that with the supervision they are giving the matter, the moral risk is so good that we can safely loan that much. We now and then have a case where the moral risk is so exceptionally good that we loan up to 80 per cent for the building of a home. In that case the man need only have 20 per cent to be able to finance his whole operation on a straight first mortgage."

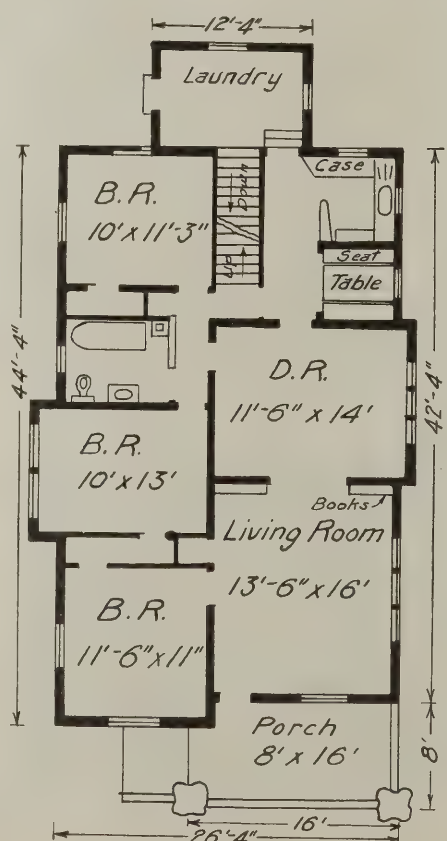
A Bungalow of Hollow Tile

By Arthur F. McCarty

A bungalow of hollow tile

THE house illustrated was carried on the ledger as "Number 2" among the eight designed, built and sold by the writer in Salina, Kans., but it was the last one finished. Its story may sound like a brief for hollow tile construction, and, if so, it is accounted for by the ease, facility and economy with which I built the house, although I had had experience with but one other hollow tile structure. The low cost of the walls of this bungalow is accounted for in part by a favorable price on tile which happen to be made in the town and were furnished me at a lower price than would be possible if shipping costs had been added.

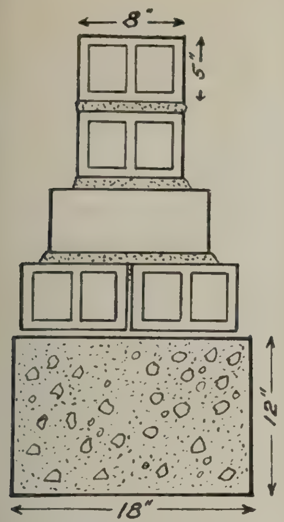
The basement was excavated from the rear wall line to a point under the partition between the living- and dining-rooms; the remainder was left unexcavated. Trenches for the heavy concrete footing were dug all around, in the excavated part 12 x 18 in., and in the unexcavated part, 18 in. width and 3 ft. deep to get below frost. The two levels of the footing were reconciled by finishing that in the unexcavated part to level on top with the last course of tile in the wall around the excavated part, and then the wall went up level all around. Before the main wall was started a double row or course of tile was laid, with another one crosswise. This footing is illustrated by sketch.



The tile used were the standard 8 x 5 x 12, with the openings horizontal, laying an 8-in. wall, 5½ in. to the course; but a retaining wall at the front line of the basement was built of them laid on edge, making a 5-in. wall. No corner or short tile were used in the building, but the corners were built as a brick wall is built, leaving the open ends show, but these were all carefully sealed up later by sticking a brickbat in the hole, then plastering with mortar. The wall is 8 in. thick from the footing to the plate.

The foundation wall was extended around the porch to provide support for the cement slab floor, which is 5 in. thick, reinforced with ½ in. round rods 7 in. cc. each way. This cement floor is marked off in 18-in. squares and enameled with special concrete enamel in two shades of gray to simulate a tile floor, and is very attractive. The porch walls are of the tile on edge, with the top course laid flat, or the 8-in. way, to give a finish rail. The porch piers are of old stone from an old foundation.

The window and door frames are of box form, with a brick mold like frames for any brick building. The wall was built up to these frames by using common brick, and a weather tight job resulted. Two common brick equal one tile in width and two courses of brick equal one of tile in height.



The Footing & Foundation (Cross Section)

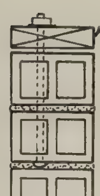
The course of tile being laid stopped one tile length from the frame and that space was laid with brick in the same manner as if the whole wall were of brick, leaving no open tile end against a frame and permitting the outside brick to reach past the box frame and against the brick mold.

The lintels over all openings are steel angles, those for the narrower openings 2½ x 2½ in. and for the larger ones 3 x 3 in., all of ¼-in. gauge steel. These angles were used in pairs, back to back, and one course of brick on each flange brought the wall to the height of the upright flanges, after which the wall was continued with the tile. The height of all openings was carefully figured to permit this course of brick to come out even with a course of tile. The angles for the building cost $33.50 laid down on the job.

Two courses before the plate line was reached, bolts ½ x 14 in. were set to reach through the last two courses and through the plate, a bolt every 4 ft. and two at the corners, between the end joints of two tile, well cemented in. The next tile broke the joint, of course, therefore had to have a hole through the tile for the bolt. The holes were made with a small punch and hammer. The plate was embedded in mortar, a washer placed under the nut, and when the wall was thoroughly set the nut screwed down tight. The gables are of frame construction, shingled.

The end studs of all cross partitions were bolted to the wall with three bolts spaced equi-distant. This prevented plaster cracks at these points. The cross partitions were lathed, but all outside walls were plastered directly on the tile. As to this practice let me interject here that I have built another house of tile plastered in the same way. In both some small cracks appeared in the lathed walls, but nowhere in either is the smallest crack in the plastering on the tile walls. The exterior of this house was stuccoed with portland cement and sand, 1 to 3, with 10 per cent of hydrated lime, for all coats except the dash, which omitted the lime, and was thrown on with steel brushes 10 in. long. The stucco was colored and made waterproof by two brush coats of stucco stain in buff or deep cream color. The wooden parts of the exterior, except the sash, were stained with bungalow brown shingle stain. The sash were painted deep cream.

The writer worked with the masons in laying these tile, and, though he had never before handled a trowel, he laid 420 in eight hours, keeping up with the fastest mason. Building a wall of units of this

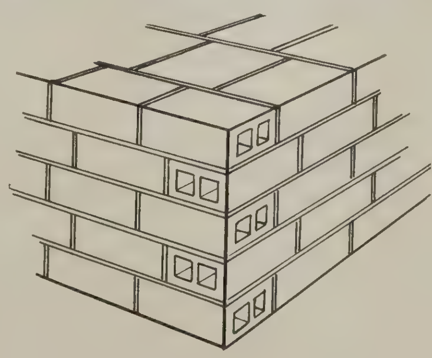


Bolt through Plate and Two Last Courses (Cross Section)

These are staggered alternating inside and outside the cross-web.

size is easy, as they tend to keep the wall straight of themselves. The end joints were all struck, but if I were doing it again I would use no mortar between ends, but leave them to be filled by the stucco, which would thus clinch better, and by the plaster on the inside. The stucco on this house is a perfect job, but the work of striking that end joint is nearly half the labor of laying tile, and, I believe, is wholly unnecessary for a building to be stuccoed.

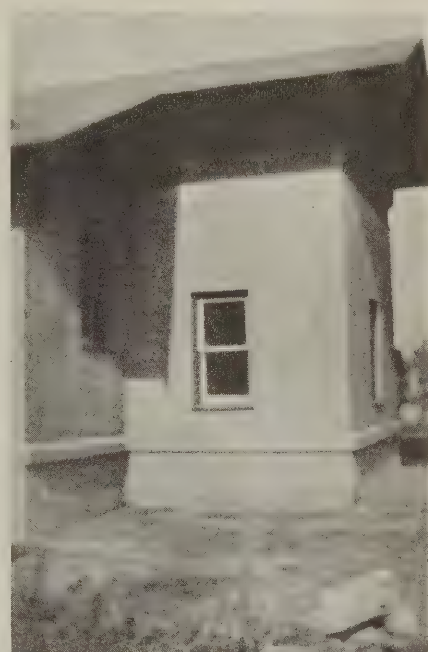
With tile 6 cents each, cement 60 cents net per sack or $2.40 per bbl., sand $1.50 per yd., hydrated lime 50 cents sack, mason $1.00 hr., helper 60 cents hr., the completed wall, including the cost of the steel angles, cost, ready to stucco, 21.6 cents per sq. ft. The eighteen corners, which had to be kept plumb, increased this cost slightly over a rectangular building. The stucco cost, for material and labor, including the painting, 6.1 cents per sq. ft. At the time dimension and boards were $55.00 per M and lath $15.00, siding $60.00 and shingles $7.50. Nails were $6.25 base and carpenters' labor 75 cents per hour. This wall of hollow masonry was cheaper than the frame wall with its lath inside and boxing and siding outside. The house contains nearly 200 square feet more floor space than the Colonial bungalow described in a recent issue of NATIONAL BUILDER, yet this one cost a little less than the other. The interior finish is slightly better in this house, too.


Bonding the Corner

The plan gives a very commodious house. The living room, dining room, and the front bed room or den have oak floors and finish, and in the first named there are book cases with divided glass doors. The rest of the house is floored with maple, and finished in soft wood enamelled. In the bed rooms ivory, with mahogany stained white pine doors. The kitchen walls are oil painted in gray and the wood work enamelled the same color. All doors in the house are two panel, the small one above, with square sticking.

A unique feature is the coat closet off the living room, the floor of which is raised eight inches and is a cold air grating. There are gratings to three rooms, from which cold air is drawn to the furnace, yet the floor of no room is cut. There is another cold air shaft from the hall.

Another feature is the breakfast nook, 6 ft. square, off the kitchen, with table and seats of cypress stained brown mahogany and varnished with Valspar.


The sleeping porch is under the main roof

The sleeping porch, for a full size bed and one three-quarter size, is reached by a short flight of stairs from the hall, and is enclosed with screen and canvas curtains. This porch is just over the laundry, the floor of which is dropped to grade level, permitting the sleeping porch to go under the main roof level. The floor joists of the porch are set so their lower edges just come to the top of the kitchen door. The rear laundry room is a great convenience, as it provides a place for the refrigerator just over the drain, and contains shelves and bins, and deliveries of groceries or ice may be made outside the kitchen by way of the grade door which is the only back door.

The basement stairs lead from the laundry, which is enclosed by the tile walls the same as the rest of the house, and the heat from the basement keeps it warm in winter.

The kitchen is very complete with many cases and low cupboards. Beside the folding ironing board there is a shallow glass doored case for spices and small packages. Another small cupboard with glass doors is for the kitchen china used on the breakfast nook table.

The pass closet from the den to the bed room provides a way to the bath for persons using the den as a chamber without passing through living rooms.

The basement is partitioned for coal with shiplap. A furnace and hot water heater are installed. The gas is run to the range location and all electric fixtures are of a quality to fit the job. Every room has either floor or wall receptacles for attaching lamps or electrical appliances, that in the breakfast nook, for the toaster, being at the housewife's left shoulder.

The completed house cost, ready to occupy, \$5700. The selling price, including a lot 41x120, is \$7500, on terms of \$3,000 cash the balance monthly at the rate of \$1.20 per month per \$100, or \$54.00 per month, continued for 144 months, which, in that period pays off the principal and interest of the \$4500 balance. This is our regular building and loan plan, which includes interest at 9%. The house is on a paved street, west front with some young shade trees, and has cement walks and driveway but no garage.

A House With Imitation Thatched Roof--By Charles Alma Byers

THE house illustrated herewith, possessing both an unusually attractive exterior and a well-planned interior, constitutes a most charming and practical home, and has, for the prospective builder, many imitation thatched type. Ordinary wood shingles are, of course, used for it, and it is simply by the manner in which they are laid—with roll edges and with certain irregularities in the lining and spacing of in a rear recessed corner, and the brick-constructed stoop of a side entrance lend improving touches of dark red.

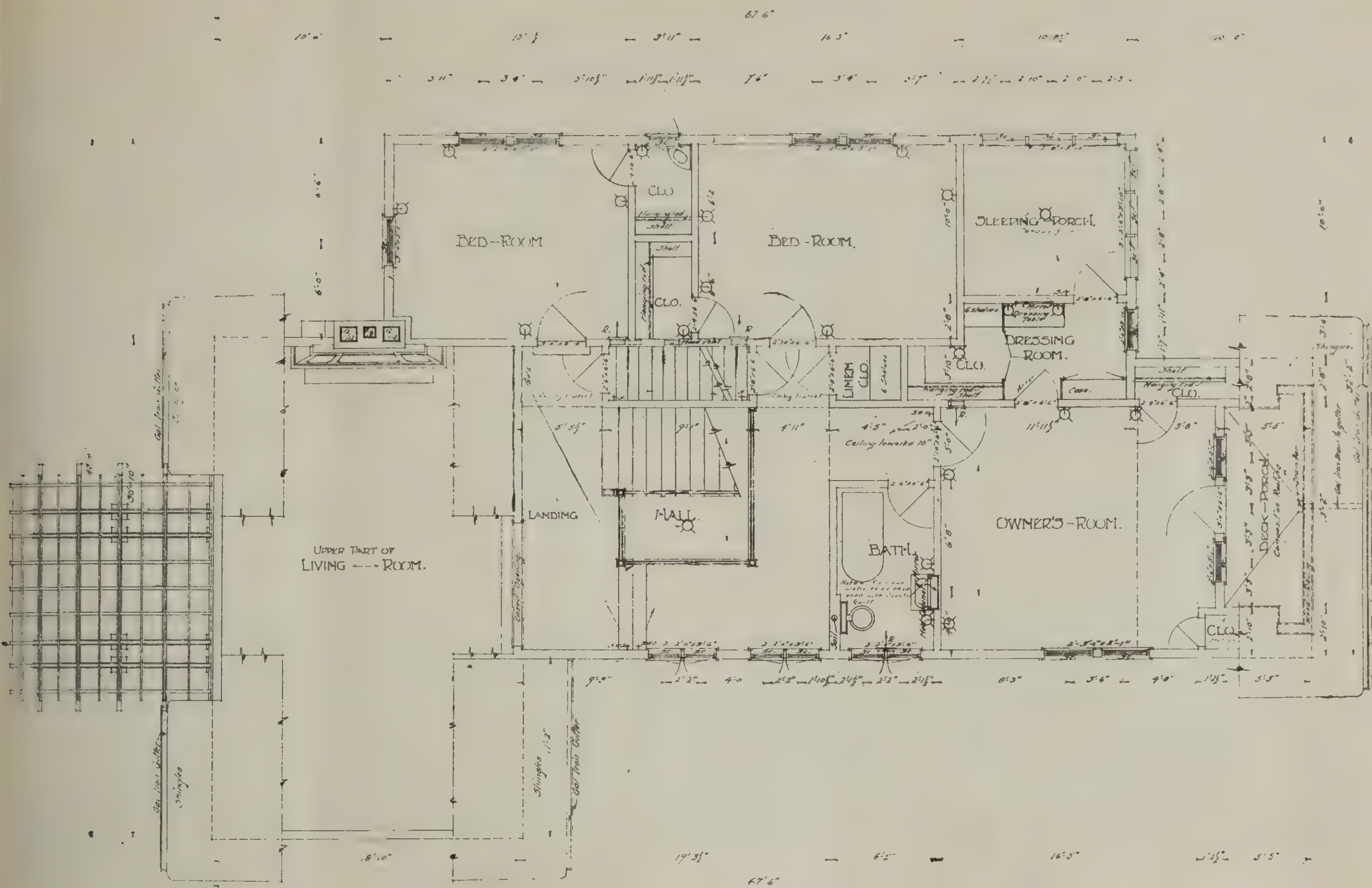
Across the greater part of the front of the house extends a very charming feature

A house with a thatched roof. Arthur Rolland Kelly, Architect, Los Angeles, Calif.

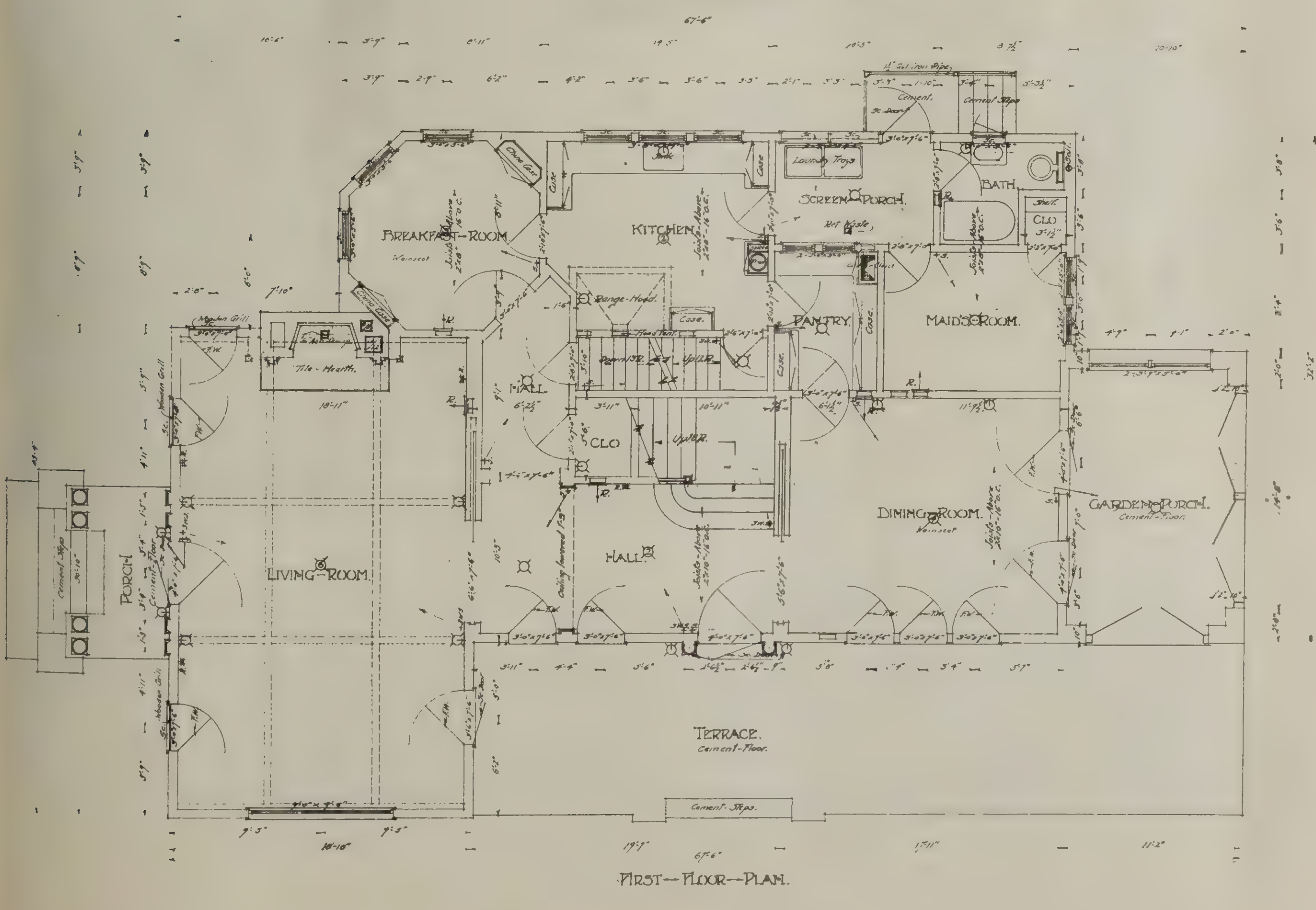
points of quite exceptional interest. It shows an originality of designing, both inside and outside, a breaking away from anything suggestive of the stereotyped, that makes it particularly interesting.

Prominent in giving the house exterior attractiveness and individuality is the roof, which, as will be observed, not only possesses uncommonly graceful lines and is somewhat suggestive of the English style, but is also a good representation of the courses, especially of those near the edges—that produces the thatched effect. The outside walls are also shingled, but the shingles here are naturally laid in the usual even way. Incidentally, the exterior color scheme is exceptionally pleasing, and materially enhances the general appearance. The roof, for instance, is painted a dark straw shade, the walls are done in light gray, and the trimming is of pure white, while the massive brick chimney, situated

in the way of a cement-floored terrace, off of which leads the main front entrance, and from which there are also three separate groups of French windows that give access, respectively, to the entrance hall, the dining room and a sun room, or so-called garden porch, while there is still a single French window opening into the living room. The front entrance, it will be observed, is characterized by a very simply but neatly designed doorway of modified



SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

Colonial style, and the side entrance, previously referred to as possessing the brick stoop, which opens into the living room direct, is of similarly simple design—each provided at either side with a bracketed electric light fixture of lantern-like shape. Incidentally, at each side of this side doorway to the living room and in the rear end of this room are still other single French windows, which, at the bottom, are equipped with wooden grills, painted black. Small bay trees and dwarfed arbor vitae in gray and dark red pots are liberally used about the front terrace and side entrance, comprising a very effective method of decoration. And last but not least, there is also charm added to the exterior, as well as appreciable natural light to the interior, by the numerous French windows mentioned and by the several windows of other styles—particularly by the large one in a front gable.

The arrangement of the interior, both floors, is shown by the accompanying floor plans. Especially deserving of notice, on the first floor, is not only the convenience of the connections, but also the character of some of the divisions, as well as the location of closets and built-in features. Sliding doors, for instance, are indicated separating both the living room and dining room from the hall, and, with its rear extension, this hall contains the main staircase and a closet for wraps and gives direct access to the basement stairway and to a small breakfast room, besides to the two front rooms. A pass pantry, with built-in cupboards and a cooler closet, connects the dining room with the kitchen, and accessible from the rear entry porch adjoining the latter are both the maid's room and a bath room. The breakfast room, accessible from both the hall and the kitchen, is uniquely octagon-shaped, with windows in three of its angles and a built-in china closet in each of two other walls. The especially charming feature of this floor, however, is the sun room, or garden porch, reached either by French windows from the dining room or by similar doors from the terrace and the garden.

On the second floor are three bed rooms and a bath room directly connected with the landing hall, a sleeping porch accessible from the owner's bed room through a small dressing room, and a small balcony, over the sun room, reached also from the owner's room, besides a great deal of closet room. It should also be noted that built-in shelves are featured in the hall linen closet and in each of the sleeping room closets; that in the small dressing room there are two separate shelf and drawer cabinets and a built-in dressing table, and in the bath room a wall medicine case with a mirror door.

The interior is finished and decorated in a particularly attractive and pleasing manner. Cedar woodwork is used in the hall and two main rooms on the lower floor, finished in light gray, together with a limited use of mahogany trim, and elsewhere the woodwork is of pine, finished in either old ivory or white. The walls of the hall, living room, dining room and breakfast room on the first floor and of the three sleeping rooms on the second floor are papered; in the kitchen and bath rooms they are finished with a tile wainscot, to a height of about five feet six inches, and in the other divisions they are tinted. Hardwood floors prevail in the living room, dining room, breakfast room, three bed rooms and the first floor and second floor halls; tile flooring in the two bathrooms; cement flooring in the sun room, and pine elsewhere. The living room fireplace has tile, of dull blues and bluffs, used for the facing, finished with a wood mantel of Colonial design, and a tiled hearth of dark brown.

The house has a large basement, walled and floored with concrete, and is equipped with a good furnace. It is located in Culver City, California, a suburb of Los Angeles, and was designed by Arthur Rolland Kelly, architect, of the latter city.

Flagstones for the Suburban Garden Walk

By Felix J. Koch

ONCE ON A TIME, when neatly cut and trimmed stone for steps was considerably more expensive and difficult to secure than it is today, and when cement for sidewalks had not yet become the fashion, owners of suburban and country places employed the native flagstones, almost as these shelves of rock were found.

A flagged walk

Other times brought other fashions, and today the flagstone has been relegated to oblivion except on farms far removed from town.

Recently, however, a well-to-do suburbanite of Cincinnati reached the conclusion that rustic flagstone—shelves of rock, almost as one might take them from the brooks beyond town—would prove admirable material for the garden path, leading from the cement sidewalk at the roadside to the front door of the house.

The stone has been put into position accordingly. Broad tables of the gray-white rock form the stair treads, each such step supported by a rude bit of masonry of equally rough cut and rough set slabs of stone below.

The path, as it ascends the knoll of lawn, is given several gentle, but delightful turns, much as some English garden path might be assumed to do.

Rambler and other bush roses, so intermingled as to provide blossoms from early spring until the end of fall, flank this trail; branches reaching out into it, blossoms falling almost onto it, as Nature will.

New Orleans Starts House Building

A REPRESENTATIVE of NATIONAL BUILDER investigating the housing situation in New Orleans finds that the deficiency of homes is great, but not so great as in most Northern cities. Local builders estimate the lack as around 4000, mostly needed by the laboring classes. The city is now credited with a population of 400,000. The situation would be much worse than it is were it not for the fact that more house building has been going on right along than in other big cities, due to the abundance of lumber and a lower wage scale.

The New Orleans Association of Commerce has, however, been vigorously at work to get more houses built. It secured the services of a consulting engineer, J. W. Billingsley, and placed the matter largely in his hands. He called a number of business men into conference and organized the New Orleans Housing Syndicate, which has begun operations and has already completed 30 houses. It is expected that the operations will be enlarged to include the erection of over 1200 houses, all of the individual bungalow type.

By obtaining a tract of unoccupied ground penetrated by a car line they were enabled to create lots within 20 minutes' ride of






New Orleans is building approximately 1200 of these bungalow type houses. Note that no cellars are provided for, due to the water table being close to the surface of the soil

Exterior and interior views of bungalow type houses being erected in New Orleans

the center of the city and at such a low price per lot that they were able to place each house on a lot and a half, thus doing away with any possible congestion. Each bungalow is thus on a piece of ground having a frontage of 45 feet and a depth of 110 to 120 feet, thus providing space for driveway and garden. Mr. Billingsley believes that one of the great faults of small house building in cities is that they are generally placed on 25-ft. lots, bringing the houses too close together for artistic effect or for the comfort and happiness of the residents. This can only be avoided by the use of more ground, and an owner cannot easily sell off half a lot, especially when part of it is on both sides of his house.

To make it unnecessary for the residents to order food by telephone, which the housing syndicate regards as wasteful, the project includes a meat market-grocery store placed in the heart of the development.

Many of these houses are to be of the four-room bungalow type built on the bungalow apartment plan. This greatly lessens the cost of construction. In addition, five- and six-room bungalows are being constructed.

It will be noticed, by referring to the illustrations, that all of these houses rest on brick or stone piers, which is a common practice in the South, especially in New Orleans, where the permanent water-table in the soil is always not far below the surface. One of the great problems with cellars in New Orleans is keeping out the water; and many people solve it by not having cellars.

It will also be noticed that more window space is provided than is the case in Northern cities. This is for the purpose of giving the large amount of ventilation required in this climate.

The labor cost of constructing these houses was reduced about 20 per cent by erecting a small electric-driven sawmill to do much of the cutting of lumber generally done by hand.

These homes are sold for around $5000 each. The Reliance Homestead Association of New Orleans loans up to 70 per cent of the selling price on a first mortgage; the buyer is supposed to have at least $250 for initial payment, and the New Orleans Housing Syndicate supplies the balance on a second mortgage, which is regarded as safe financing, as they have the "moral risk" largely under their own control, being able to say to whom they will sell.

Jackson, Miss.

J. B. Lusk, secretary of the Board of Trade of Jackson, Miss., in conversation with a representative of National Builder, said: "Building is starting in the residential districts, and a good many houses are being projected. At the end of the war in 1918 we were short about 1000 houses, but I think we are short now only about 500; that is, figuring a living apartment as a house. The apartment idea is coming in strong here—each house having two to four apartments. The two-apartment house has one apartment below and one above, and the four-apartment house has two apartments below and two above. The two-apartment houses are costing about $8000 each and the four-apartment houses run from $16,000 to $18,000, making each apartment cost around $4000."

Memphis Situation

The National Builder is assured by members of the Memphis Chamber of Commerce that, while Memphis needs many more dwellings than she now has, and rents are too high, the housing situation there is not a disturbing factor, as yet, though it may become so on account of the new manufacturing plants coming to Memphis. Last year 141 new companies located at Memphis or decided to locate there, with more coming. This may bring on an acute housing situation. But the business men of Memphis reply that they have 32 hardwood sawmills located in the city and 46 other ones in the nearby territory and operated by Memphis capital, which will facilitate the building of homes.

Bricklaying

By William Carver, Architect, and Andrew Pentland, Mason Contractor

The Efficient Bricklayers—The Importance of Scaffolding—Familiarity with the Various Bonds Essential—The Economy of Brick

THE antiquity of brick and its economy and efficiency as a building material is declared in Genesis xi, when the earth was of one language and one speech and the sons of men desiring to reach to the heavens and to make a city and a tower and a name for themselves in the valley of Shinar, chose brick as the most suitable material and said "Go to, let us make brick and burn them thoroughly."

It is therefore fitting and proper that out of the chaos of inefficiency that has afflicted the building industry the bricklayer is the first to emerge with the credit of all his old-time efficiency.

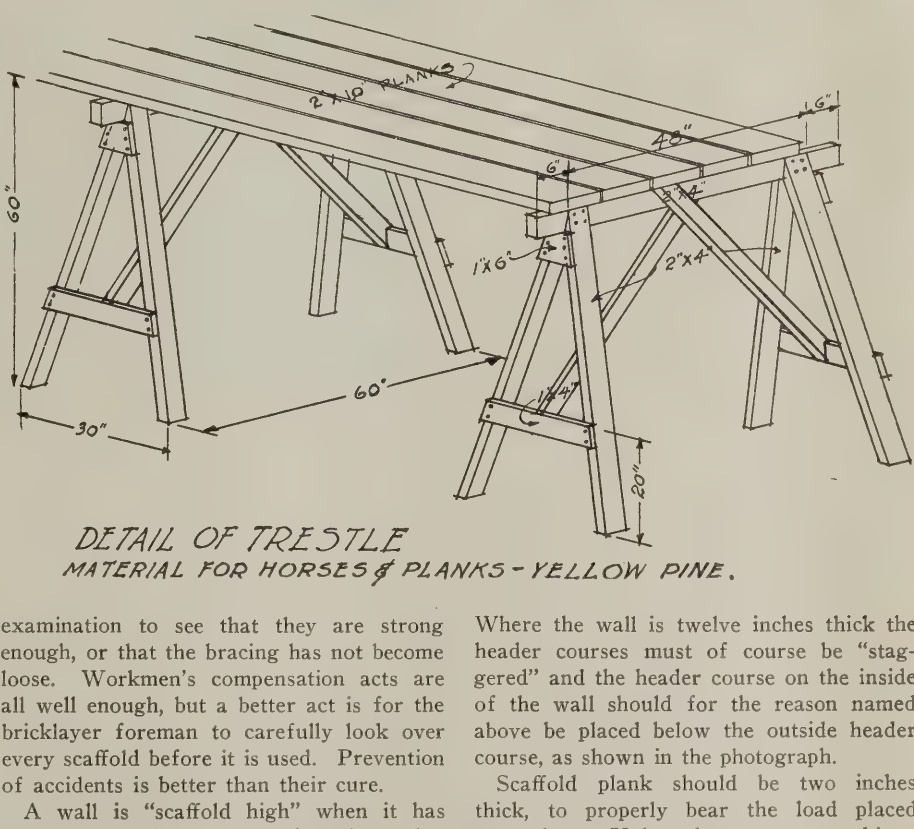
He is one of the most efficient mechanics on the buildings of today. The bricklayer foreman's slogan is "keep the wall moving," and every man in the gang must, from the nature of the work, do his full quota. Persistent rumors have been current that this is not the case, that bricklayers have been "laying down on the job" and restricting production. It is only fair to bricklayers to state that wherever an attempt has been made to trace these rumors and nail them down to specific instances they have proved to be without foundation. Mr. D. Knickerbacker Boyd, a prominent architect of Philadelphia, has interested hmself in this matter and states positively that bricklayers in his city are doing just as good a day's work as before the war. The Common Brick Manufacturers' Association also made an investigation recently among reliable contractors in 43 cities and the figures given show that bricklayers are laying an average of 1200 bricks per day throughout the country, including facing and backing. The Mason Contractors' Association recently went on record and declared that brick masons are laying as many brick per day as before the war.

The Importance of Scaffolding

Every bricklayer's apprentice should be fully informed on the subject of scaffolding. Only too often are even experienced bricklayers incapable of building or of superintending the building of any other scaffold than a common horse scaffold. The bricklayers' scaffold is required to support considerable loads and the apprentice may soon learn to know a poorly or dangerously constructed scaffold at a glance. On buildings with very high stories, and on power house and factory work, the scaffold may be called on to support the regular supply of brick and mortar and the weight of the workmen twenty feet or more in the air. Carpenters, when building such scaffolds, sometimes forget that a bricklayer's scaffold must be stronger than one for their own work.

Except in special cases such as those just mentioned a scaffold on horses or trestles will take care of any ordinary job. Walls of considerable height may also be built with scaffolds upon trestle supports by the simple device of leaving the lower scaffold undisturbed and placing another row of trestles on top. When this is done the trestles should be given an extra careful examination to see that they are strong enough, or that the bracing has not become loose. Workmen's compensation acts are all well enough, but a better act is for the bricklayer foreman to carefully look over every scaffold before it is used. Prevention of accidents is better than their cure.

A wall is "scaffold high" when it has reached the height of four feet six to five feet. At this point the bricklayer finds it no longer possible to "strike" or otherwise treat the joints on the front of the wall. In fact, when the wall is scaffold high it is almost impossible for any but a very tall man to reach over and finish the joints. At this point therefore it is customary to build a "foot scaffold." This is constructed of small piles of brick or any support that comes handy placed near the wall to support a plank twelve or fifteen inches above the regular scaffold. The foot scaffold is always used with a wall eight inches thick. For walls twelve inches thick and over it is used only where the header course further described does not happen to come at a convenient height. For walls twelve inches or more in thickness, a brick may be left out here and there in the course immediately above the header course, about a foot or eighteen inches above the level of the scaffold. When the wall is scaffold high these holes then provide toe holds so that the bricklayer can raise himself up and point the face of the wall with greater ease.



DETAIL OF TRESTLE
MATERIAL FOR HORSES & PLANKS - YELLOW PINE.

Where the wall is twelve inches thick the header courses must of course be "staggered" and the header course on the inside of the wall should for the reason named above be placed below the outside header course, as shown in the photograph.

Scaffold plank should be two inches thick, to properly bear the load placed upon them. Unless the owner or architect objects, the thrifty builder will use floor joints for this purpose, being careful not to use any joists so employed for first floor joints where the basement ceiling is not to be plastered, for such joists will have a "second-hand" appearance. The basement wall of an ordinary house is however generally constructed without any scaffold whatever, the lower part being built with the mason standing in the excavation and the upper part with the mason standing on the bank.

In the floors above the basement the scaffold plank are simply swung up into place as soon as joist level is reached. For the top story and the gable walls, where the joists above are of light dimensions, the second floor joists of the next house to be built may be used as scaffold plank. Hemlock joists or planking should never be used for scaffolding, as this wood is very treacherous when so used.

The trestle here shown is the simplest type in general use. To overcome the objection that these trestles are bulky when loaded on a wagon or stacked on the job, another type is sometimes made, hinged at the top and spread the proper distance apart at the bottom and held in position by iron hooks and eyes of suitable length. Such trestles can be packed almost flat. It is important, when placing the trestles that they be kept three or four inches from the wall. Any scaffold will sway somewhat when a hod of bricks is thrown upon it, and trestles placed right against the wall might push it a little out of line.

Bonds Are the A B C of Bricklaying

One of the basic things with which a bricklayer must become thoroughly familiar is the bond in which his work is laid. The apprentice should make a thorough study of the bond so that he can not only "carry on" but *start* the wall and be absolutely sure that he is not making a mistake. Far too many bricklayers find it necessary to call the foreman over when starting a piece of work and have him explain to them just how it should be done. This should not be necessary, and the contractor should check up his apprentices once in a while and make them demonstrate to him just how they would start a piece of work. The bonds are the A, B, C of the bricklayer's art.

The strength and serviceability of any brick wall depends upon the brick, the mortar, the manner in which the joints are filled, and the bond. The bond is secured by placing the brick so that they overlap each other in every course. Fred T. Hodgson says that a brick is bonded when this overlapping equals or more than equals one quarter of the length of the brick. The overlap of the stretchers ensures the longitudinal strength of the wall, while the headers bond the wall transversely.

Some bonds can be laid more rapidly than others, and in a wall in which appearance is not a factor, or rather in which cost is the prime factor, common bond is invariably employed as it is the cheapest. It is fortunate, in this regard, that a wall in common bond is also the strongest wall. The latter statement is, by the way, made subject to correction; as the U. S. Bureau of Standards at the present time is making a series of tests which should shed some light on the subject, but many construction engineers now hold that a wall in which the greatest majority of brick are stretchers is stronger than a wall containing an excess of headers. Formerly the reverse was held to be the case, and English bond, in which every other course is a full course of headers, was thought to be the strongest.

In a wall laid in common bond most of the brick are stretchers, and it is easier and quicker for a bricklayer to place a stretcher than a header. It comes more easily to his hand, and can be manipulated a little quicker while being placed.

Common bond is probably the first of the bonds with which the apprentice will become familiar, for the reason that almost all backing is in this bond. He should take pains with it and pay attention to its appearance, for afterward he will have occasion to lay hundreds of thousands of brick in which this bond is used on the outside. He should make the vertical joints plumb over each other and try to make them centre on the brick above and below; for although, as Hodgson says, a brick is well bonded when one quarter of its length overlaps, a wall so built would not be suitable for exposed work.

To one who superficially notes the vast variety of the bonds and the patternwork used in brickwork it might seem that the number of bonds is endless, but there are only a few basic bonds, each with an infinite number of variations that give full play to the inventive genius of the designer.

The main types may be classed as follows: Running or American bond, English bond and Flemish bond. A more detailed account of these bonds will be discussed in the next issue.

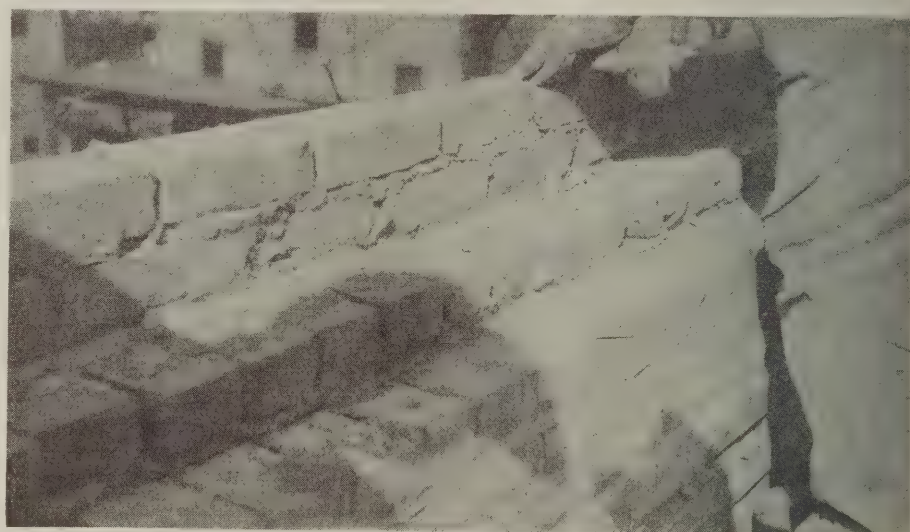
Answers to Question in the February Issue

Quite frequently discussions among contractors arise as to whether a flue eight inches square is as efficient as a flue eight inches by twelve—a great many contractors holding that inasmuch as the square flue is theoretically most nearly correct the additional four inches in one direction only makes no appreciable increase in the flue's efficiency. One of the authors has come across instances where eight by eight flues have been built upon this theory where a larger capacity was really necessary and has resulted in an unsatisfactory heating system and a disgusted owner.

The most efficient flue of all is the round flue, for smoke and hot gases travel upward with a spiral motion, and the flue with square corners undoubtedly causes eddies and reduced efficiency.

Similarly the least efficient flue is that with a shallow rectangular shape.

Quite apart from theory, however, one of the authors can state that as a result of actual experience (which he had to pay for) the eight by twelve flue is actually more efficient than the eight by eight size; having built a flue of the latter size which on account of its unsatisfactory performance had to be torn down and replaced with a twelve by eight flue, the latter proving entirely satisfactory.



Showing how the header course on the inside of a wall is placed below the outside header course

Questions

Every contractor and builder should be familiar with brick and brick construction. If you desire any information on brickwork the authors will do their best to answer your questions.

(1) In addition to the reasons given in this article, why is it more expensive to lay a header than a stretcher?

(2) Can hydrated lime be mixed and used in brick mortar immediately?

(3) What is the minimum slope for a brick window sill?

(4) How far apart should trestles be placed?

(5) What is a jack arch?

(6) What ingredients should be used for mortar to form rough cut joints ¾ to 1 inch wide?

(7) In estimating a brick basement, how

many brick will a bricklayer lay in a day, assuming the mortar to be cement-lime mortar and the wall to be built 12 inches thick?

(8) Would there be any difference in bricklayer's time if this wall were laid in straight cement mortar, and why?

Ordinance for Construction of Chimneys Proposed by the National Board of Fire Underwriters

FOR the purpose of reducing the large annual loss from fire due to defective chimneys, the National Board of Fire Underwriters has proposed a model ordinance for the construction of chimneys which is suitable for use in cities and towns of any size.

Defective chimneys is one of the greatest single known causes of fire, hence, aside from the huge property loss from this cause—amounting to fifteen to twenty million dollars—there is the serious potential conflagration hazard which every such fire creates.

As the danger is one that can be easily and cheaply corrected, all such fires are classed in fire statistics as "strictly preventable." It is self-evident that the enactment of a reasonable, practical ordinance to remove this unnecessary but nevertheless very prevalent danger would be an act of ordinary prudence.

This proposed ordinance has been widely distributed and its purpose has been universally accepted as proper and commendable. Certain features of the proposed ordinance have proved of especial interest to members of the Society and elicited their discussion.

In view of the public interest involved in such an ordinance, the National Board of Fire Underwriters has invited the co-operation of various engineering organizations in studying the proposed ordinance and seeks their assistance and approval. A number of organizations, including the American Institute of Architects, have already expressed their approval. Accordingly, there are here presented for the inspection of the members, excerpts from the proposed ordinance in its latest revised form, it being impossible to present the entire ordinance due to lack of space in this issue. The ordinance will be presented at the chimney session at the annual meeting where it is hoped that it will receive full and complete discussion. For the convenience of members who attend the annual meeting, complete copies of the ordinance will be distributed for inspection.

AN ORDINANCE

Providing Minimum Requirements for Proper and Safe Construction of Chimneys, Flues and Fireplaces in the .... of........

Chimneys for high pressure boilers, furnaces used in manufacture, and other heating appliances, where high temperatures are maintained, are not included in this Ordinance.

Section I—Chimney Construction.

1. The walls of chimneys used for stoves, ranges, fireplaces, warm air heating furnaces, low pressure steam and hot-water heating boilers, or other heating appliances, whether the fuel used be wood, coal, oil or gas, shall be built of brick, concrete, stone or hollow tile of such thickness and construction is hereafter specified. All chimneys, irrespective of which materials the walls are built, shall be lined with fireclay flue lining or with fire brick. The lining shall be made for the purpose and adapted to withstand high temperatures and the resultant gases from burning fuel.

2. Solid brick or concrete chimney walls shall be not less than 4 in. thick exclusive of flue linings. A standard size brick laid flatwise shall be deemed to fulfill this requirement for brick. (See Appendix I.)

3. Concrete chimneys cast in place shall be reinforced vertically and horizontally to avoid cracks liable to occur from temperature stresses or unequal settlement of foundations. The metal shall be thoroughly embedded in the concrete. Concrete blocks shall be similarly reinforced.

4. Stone chimneys shall be at least 4 in. thicker than required for corresponding brick or reinforced concrete chimneys. Rubble stone chimney walls shall be not less than 12 in. thick.

5. Hollow tile shall not be used for the walls of isolated or independent chimneys, but it may be used for chimneys built in connection with exterior hollow tile walls of buildings not exceeding three stories in height, in which case the chimney walls shall be not less than 8 in. thick. The outer 8 in. of a building wall may serve as the outside wall of the chimney, but the remaining chimney walls shall be constructed of two layers of 4-in. tile set with broken joints; or they may be built of 4 in. of solid brickwork. In either case, the side walls of the chimney shall be securely bonded into the wall of the chimney. No chimney shall be corbeled from a hollow tile wall.

10. Fire clay flue linings shall be of standard commercial thickness, but not less than ¾-in., and without collars. The flue sections shall be set in mortar of quality above specified and shall have the joints struck smooth on the inside. The masonry shall be built around each section of lining as it is placed, and all spaces between masonry and linings shall be thoroughly filled with mortar. Flue linings shall start at least 4 in. below the bottom of the smoke pipe intakes of flues, or from the throats of fireplaces and shall be carried up continuously the entire heights of the flues, and at least 4 in. above chimney top to allow for a 2-in. wash, and a 2-in. protection of lining. The wash or splay shall be formed of a rich cement mortar or of tile or iron coping made for the purpose. To improve the draft the wash surface should be concave wherever practical.

12. Not more than 2 flues shall be permitted in the same chimney space, and the joints of any two adjoining sets of flue linings shall be offset at least 7 in. When there are more than 2 flues in a chimney, each third flue shall be separated from the others by a smoke tight withe or division wall of brick or concrete at least 3⅞ in. (standard brick size) thick and bonded into the sidewalls. Each flue intended for a heating furnace or boiler connection, or for a fireplace, shall be separated from other flues by such a withe. In hollow tile chimneys, the withe may be of tile. See Appendix II.

14. Chimneys shall be built at least 4 feet above flat roofs, and 3 ft. above the ridges of peak roofs, and shall be properly capped with stone, terra cotta, cast iron, concrete, or other approved material.

17. When coal, wood or oil is used for fuel for minimum area inside of chimney flue lining for warm-air furnaces, low pressure steam or hot water heating boilers, and fireplaces shall be not less than 75 sq. in., for stoves and ranges 49 sq. in., and for small gas stoves or heaters 10 sq. in. For recommended areas see Appendix IV.

18. Smoke pipe intakes to flues shall always enter the chimney through the side and shall be made of fire clay or metal thimbles securely set in the chimney wall with mortar or be cast in concrete. Such openings shall be at least 18 in. below wooden lath and plaster or other combustible ceilings, or open joists. The intake pipe shall not project into the flue. See detail sketch, Plate I.

19. All flues leading from cellars or basements shall have proper metal cleanout doors below the smoke intakes.

20. After a chimney has been completed, all flues shall be thoroughly cleaned and left smooth on the inside.

21. All flues to which heating furnaces or boilers are connected shall be subjected to a smoke test before acceptance, but the test shall not be made until the mortar has thoroughly hardened. The method of test is to build a smudge fire at bottom of the flue and while the smoke is flowing freely from the flue close it tightly at the top. Escape of smoke into other flues or through the chimney walls indicates openings that shall be made tight before the chimney is

accepted. The test shall be made by the contractor in the presence of the Building Inspector or other official having jurisdiction, and of the owner or his representative.

APPENDIX

IV. Area and Heights of Chimneys.

To secure the most satisfactory draft conditions, the area and height of a chimney should be proportional to the number and size of heating appliances attached to it. A poor draft is a great annoyance, and is difficult to remedy after a chimney is built.

A round flue will give a better draft than a square or other rectangular shape having the same cross-sectional area. Round flues are recommended where it is practical to obtain them, but when round flues are placed inside rectangular chimney walls, care must be exercised to insure complete filling of the corner spaces.

The following table gives the approximate area and height of chimneys recommended by heating engineers as suitable for heating equipment of different kinds and varying sizes when coal or coke is the fuel used.

CHIMNEY FLUE SIZES AND HEIGHTS RECOMMENDED FOR FURNACES AND LOW PRESSURE STEAM AND HOT-WATER BOILERS

Areal dimensions given are inside measurements of the masonry walls of the chimney.

Hot Air Furnace Capacity in Leader Pipe Sq. in.	Boiler Hot Water Rating sq. ft.	Capacity Steam (Direct) Rating sq. ft.	Number of heaters attached to each flue: 1		2		3		4	
			Dimensions in.	Hgt. ft.	Dimensions in.	Hgt. ft.	Dimensions in.	Hgt. ft.	Dimensions in.	Hgt. ft.
To 450	To 700	To 450	8x12	35						
800	900	600	8x12	35						
1000	1100	700	8x12	40						
	1500	1000	12x12	35						
	2500	1500	12x12	40	12x16	45	16x20	50	20x20	55
	4000	2500	12x16	40	16x20	50	20x24	55	24x24	60
	5800	3600	16x16	45	20x24	55	24x28	60	28x28	65
	7300	4500	16x20	50	24x24	60	28x32	65	30x30	70
	8700	5400	20x20	55	24x28	65	30x30	70	30x36	80
	10000	6400	20x24	60	28x28	70	30x32	80	30x36	90
	12000	7400	24x24	65	30x30	75	32x32	85	36x36	90
	14000	8400	24x28	65	32x32	75	30x36	85	36x42	100
	15000	9400	28x28	70	30x36	80	36x36	90	42x42	100
	17000	10400	28x32	70	30x36	80	36x42	90	42x48	100
	19000	11400	30x30	70	36x36	80	42x42	90	48x48	100

Where round tile is used in place of rectangular tile, the nearest corresponding area shall be used.

Changes in Quality of Building Brick

John J. Bishop, manager of the Memphis Brick Supply Co., of Memphis, Tenn., has had an experience of 20 years in the manufacture of brick, and is regarded as one of the best informed men in the business. Recently, talking to a writer for NATIONAL BUILDER, he explained why the prices for common and face bricks have undergone such wide variations in use and relative value as have been noticed during the past 10 years. He said:

"At this time (January, 1921) common brick have gone off one-third from their highest price here and are selling around $16 delivered on the job. At this time also face brick are selling at $45 for a high quality, and a hydraulic face brick of a certain make is selling at $55. This is an enormous difference, but it is due to certain changes that have come about in the making of bricks.

"In the old days, houses used to be built of common brick, both for the backing and facing. You can't do that now, for common brick are not good enough to use for facing. We used to make a sand mold brick and a dry pressed brick, and burn them in a common brick kiln. Those brick were good enough, so we could use them for all purposes. For the facing, we simply selected the best brick. Now for common brick we make a stiff mud brick and no sand mold or dry pressed brick, and the stiff mud brick are not made well enough to be used in facing.

"The effect of this is to cheapen the price of common brick. In the old days they had to be careful in the making of every brick, especially to have it of right size. But common brick are now not of uniform size, which alone makes them impossible for facing. The attempt is made to simply have them average up about right.

Coal Cost of Brick

"One thing that is undergoing great change is the coal cost of making bricks. In a continuous kiln it requires only 400 pounds of coal to burn a thousand brick. In an updraft kiln, it requires 1500 pounds of coal and in a down-draft kiln it takes 2000 pounds of coal to burn 1000 brick. A continuous kiln is made by putting perhaps 20 kilns together in a line and having the same heat pass through all of them. Then why do not all the brick manufacturers use continuous kilns? Because it costs too much money to build continuous kilns, which can be used only in making common brick. But in some localities the brick manufacturers will have to come to it or go out of business on account of the cost of coal in the other kind of kiln.

"Coal is now $4.25 a ton here, more than double what it used to be, and, as a result, we are building a continuous kiln of 60,000 daily capacity. The Standard Brick Co. has one of 20,000 capacity.

"But for burning face brick we still have to use down-draft kilns, as we have not yet learned how to burn them in continuous draft kilns, which means that we have to use five times the amount of coal for burning face brick as we do common brick.

"It seems to me that we are on the eve of one big development in the line of making common brick, as it is affected by the continuous kiln: In any locality where there are several manufacturers of common brick, if one is big enough to put in a continuous kiln and the others are not, the company that has the continuous kiln will put the other ones out of business; as the difference in coal cost will more than equal the profit on common brick.

"This should mean a cheaper brick to the builders."

Give Warning on Cement Frauds

Contractors and builders are warned by the Wisconsin Industrial Commission to beware of fraudulent substitution of natural cement for Portland cement, many instances of which have recently come to the notice of the Commission. Samples of concrete collected by the Commission and tested by the University Testing Laboratory have shown that material labeled and sold as Portland cement was mixed with lime and other cheap filler to make bulk.

The state building code requires that only approved Portland cement shall be used in making concrete in all buildings, except private residences and farm buildings.

The Commission suggests that if suspicious looking or acting cement is received it should be sent to some reliable testing laboratory, such as the Engineering Testing Laboratory, College of Engineering, Madison, Wis.

Getting a Loan by Moving Pictures

Hiram S. Cody, manager of the real estate loan department of the Chicago Trust Company, took Glen Ellyn, Ill., to New York, exhibited its residences and business activities to Mr. Walter Stabler of the Metropolitan Life Insurance Company and secured his O.K. on a loan of $160,000 to build twenty-five houses in that Chicago suburb.

Mr. Cody had taken a moving picture machine and operator to Glenn Ellyn and spent an afternoon in photographing the leading features of the town, and then departed for New York. It is said that it took only a few minutes of the demonstration to convince Mr. Stabler that Glen Ellyn was a good town to make a loan in. Mr. Cody will take moving pictures of the twenty-five houses every few weeks during construction and now under way, and send the films to the Metropolitan Insurance Company for inspection.

An Attractive Patio Residence

By John Anson Ford

The cost of this patio residence erected at Redlands, Cal., is estimated at $6,700 to $7,200

THE "patio dwellings" shown in the accompanying illustrations are the work of Lawrence B. Valk, Stimson Block, Los Angeles, one of the veteran architects of southern California, who has evolved this special type of residence. While designed originally for the warm climate that prevails on the southern Pacific Coast, these residences afford practical suggestions to builders and architects in sections considerably colder. This has been demonstrated by the fact that in Washington, D. C. precisely the same idea—a central patio, with a glass roof that can be opened in warm weather—has been embodied in the Pan-American Building. Owing to the size of the glass roof over the patio of this public building, electric motors are used in opening and closing the especially designed skylight.

The plan, with photographs, shown here is one of a series for houses ranging in cost from $6,500 to $15,000. Each is constructed with tile walls and white stucco, hardwood floors, white enamel and mahogany trimming. The patio, being inside the dwelling, is in effect the living-room. The size of this room varies in the plans of this series from 22 by 22 to 24 by 24. In a few instances even larger patios have been pro-

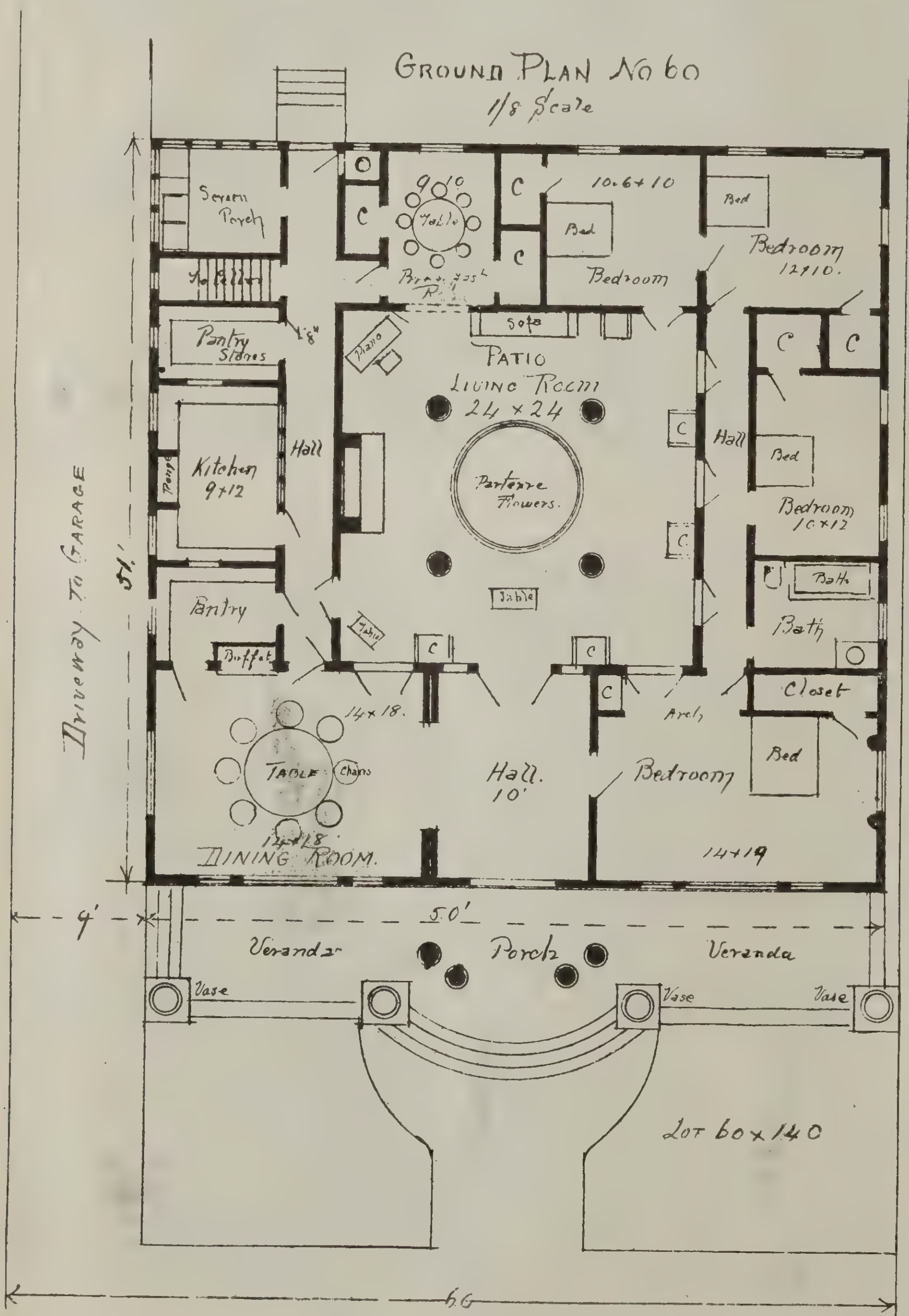
The patio. The roller dimly seen above the opening is provided for an awning.

vided. All of the rooms have 12-ft. ceilings. Most of the structures have been one story, although in a few cases two stories have been used, with very pleasing balconies opening onto the patio.

As indicated in the plan and photographs the ceiling of the living-room patio is supported by four to eight pillars of rich or plain design. The skylights above the area which they enclose measure 10 by 12, 12 by 14, and 14 by 14. They are provided with sliding sash and with ropes, inconspicuously placed, it is easy to open and shut the skylights. To shield the room from the direct rays of very hot sun an awning is placed about three feet above the glass, giving an opportunity for a pleasing touch of color. In California the skylight remains open about nine months of the year. In the Pan-American Union Building in Washigton the roof over the patio is opened six to seven months in the year except in the case of long, cold rains or cool nights.

The appeal which this type of house has to the prospective owner is the fact that it affords the occupants a maximum of outdoor living, but with the shelter of four walls to protect against chill winds. All of the main rooms open on the patio so that there is ample opportunity for good circulation of air. The photographs show the pleasing use of plants and bric-a-brac in the enclosure.

The plan shown is suited to a 60-ft. lot with a 9-ft. driveway at one side. Some of these patio dwellings are built with basements and others without basements.



Plan of a patio residence

The Properties of Cal

By S. W. Stratton, Director, United States Bureau of Standards

CAL is a material obtained by pulverizing the dried or undried product resulting from a mixture of either quicklime or hydrated lime, calcium chloride, and water. It is a dry white powder, which may be handled in much the same way as hydrated lime, and with the same general keeping qualities. Upon exposure to the air, dried cal gradually takes up moisture and carbon dioxide and becomes somewhat damp. However, tests indicate that long exposure does not affect its action as an accelerator of the hardening of portland cement mixtures.

The setting of normal portland cement mixtures may be hastened by cal to an extent which is very desirable in concrete construction requiring a finished surface. The finishing operation may proceed with much less delay after the concrete has been placed, which should result in cutting down overtime labor. This hastening of the set is not objectionable in any type of construction providing the concrete is placed soon after it is gauged with water. It is believed that cal increases the workability of portland cement mixtures. However, no attempt was made to measure the extent of this effect because, up to this time, no satisfactory test has been developed for measuring the workability of portland cement mixtures.

Unsound cements may be greatly benefited or made sound by an addition of cal. This effect was produced in neat pats subjected to the steam test and in mortar test pieces stored in air.

Limited tests indicate that quick setting cements, either fresh or having become quick setting on aging, may be made normal by the addition of cal as used in cement mixtures.

There was no indication that the amount of efflorescence appearing on the surface of cement mixtures exposed to the weather is increased by the use of cal.

The series of tests on the effect of cal on steel reinforcing bars, which were embedded in a thin layer of cal cement mortar and exposed to the weather for eight months without showing any sign of corrosion, while favorable, is too limited to give assurance that corrosion will not occur under these conditions. Caution should therefore be exercised in the use of cal in concrete containing steel reinforcement when the concrete is to be freely exposed to the weather or excessive dampness. It is believed that no bad effect will be produced in ordinary building construction.

Undried cal mixed with portland cement causes greater deterioration in the quality of the cement during storage than that which ordinarily takes place. Therefore cal should be added to the concrete materials during the mixing operation, preferably before the water is added.

All portland cement mixtures treated with cal attained greater strength at the two and seven days' period than the corresponding untreated mixtures. The percentage increase in the strength of mortar at the two-day period obtained by an addition of 5 per cent cal to cement ranged from 40 to 140. The strength of the treated mortar at two days was equal to the strength of the untreated mortar at 3½ to eight days. These calculations are made from the results of tests in which the test pieces were stored in water, damp sand, or damp closet.

Treated mortars stored in the laboratory air attained strengths at two days greater than that of the untreated at 28 days. This was due to the rapid drying out of the small test pieces and the comparatively slow rate of gain in strength after the two-day period. However, this indicates that cal is especially advantageous in cement mixtures which are necessarily subjected to any drying out action.

The increase in strength produced by 5 per cent cal in concrete mixtures at the two-day period ranged from 52 to 80 per cent, and the strength of the treated concrete at the two-day period was equal to that of the untreated at from 3.2 to 4.4 days. This represents a saving of from 37 to 55 per cent of time in operations which are dependent upon the early time strength of concrete. The effect of the air storage in the concrete tests was lessened in degree owing to the high relative humidity which existed throughout the storage period.

The general effect of cal on portland cement mixtures is the same as might be expected from the use of equivalent amounts of hydrated lime and calcium chloride.

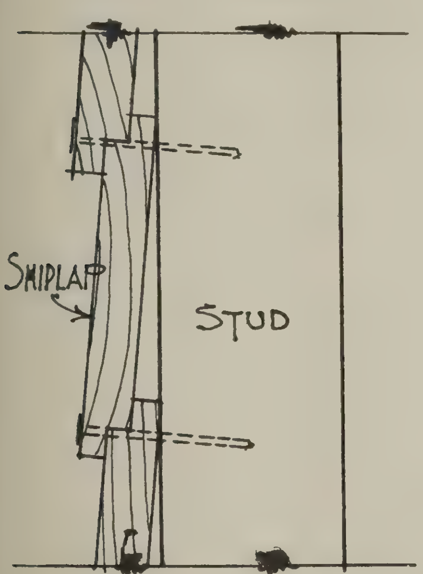
The three-year test by the Bureau of Standards on concrete gauged with a solution of calcium chloride are sufficient grounds for believing that the addition of cal will not injuriously affect the ultimate strength and integrity of portland cement concrete.

Cutting Cost Without Sacrificing Quality

By Arthur F. McCarty

IN the construction of three bungalows at about the high point of the lumber market the writer used two methods of cutting down the cost, which, in his opinion, did not in the least involve any loss of strength or weather-proofness.

Two of these bungalows were to have the exterior walls shingled. Instead of boxing, 1x4 common was used, these strips being nailed with two 8d nails at each stud, and placed 5 inches on center. As the 1x4's ran a little scant this left spaces of nearly 2 inches between the strips. The start at the bottom was made so that the center of each strip of 1x4 would come at the exact point of nailing the shingle courses, which were laid 5 inches to the weather. Over this crib-like wall we placed a cheap 2-ply roofing, costing $1.00 per square, applied like building paper with liberal laps and well nailed. The walls were thus rendered wind and weather proof before the shingles went on. The frame of the building had been braced at the corners, and the result is a building essentially as strong as if boxing had been used and a warmer house than we get with the ordinary red rosin paper over boxing. The savings amounted to just one per cent of the total cost of the finished building.

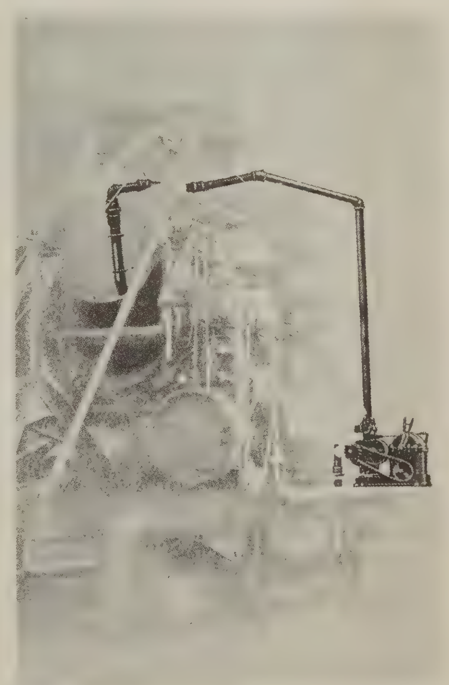


The third bungalow was treated in a different manner. The roofing mentioned was placed directly on the studs, which had been braced at the corners and openings, being carefully lapped and well tacked. The siding was then put on, but the siding was depended on for strength and we used ⅞-inch lumber for siding—clear fir ship lap, which cost the same as No. 2 boxing boards. This ship lap is 10 inches wide, and a double lap was made as shown in the accompanying sketch.

The result was a wide-siding effect suitable to the house, which is Colonial in details. It is but one story. It has passed through the period of high winds in Kansas, under close observation, and is as staunch as any frame house and as wind-tight. The saving amounted to nearly the cost of one entire covering of lumber, or about two per cent of the total cost of the finished building.

Automatic Meter-Pump for Concrete Mixers

A new automatic meter-pump has been designed by an engineer connected with the Austin Machinery Corp., which measures the amount of water discharged into concrete mixers and paving machines. Construction and operation are very simple. The device consists of a pump, a valve, a timer, and a few pipes and fittings. The amount of water required is regulated by the adjustment of a pin. The pump is driven from the mixer shaft and works continuously, lifting water approximately 12 feet from dead water to pump, or taking it from the hydrant. The two-way valve is opened and closed by means of a cam on the timer controlled by the starting lever. When the valve is open, the water is discharged into the mixer; when closed, the water circulates through a return loop in the pipe. The operator opens the valve by throwing the starting lever over to the timing pin, and when the exact amount of water required has been discharged, the valve closes automatically. There is a range of about 250 per cent between minimum and maximum discharge. The total weight is not over 200 pounds. The quality of the concrete turned out by the use of this automatic water control has proved so dense as to be practically waterproof and consequently of the greatest strength.



It automatically measures the water for the mix

Concrete Block and Tile Construction

This Is the Second Article of a Progressive Series Begun in the February Issue—Questions in Regard to Concrete Block and Tile Construction Will Be Answered by Mail and Also in This Department

ALL CONCRETE should be mixed by machine in a batch mixer of approved type. The ingredients of the concrete should be mixed to the required consistency and the mixing continued at least one and one-half (1½) minutes after all materials are in the mixer, before any part of the batch is discharged.

Where sand-cement mortar is used, a shovel-type mixer preferably should be employed and the batch mixed dry for at least one-half minute in addition to one and one-half minutes specified preceding.

The mixer should be completely emptied before receiving materials for the succeeding batch. The volume of the mixed material used per batch should not exceed the manufacturer's rated capacity of the mixer in cubic feet of mixed materials. If possible, the mixer should be equipped with suitable charging hopper, water storage, and measuring device, which can be locked.

HARDENING (CURING) BY STEAM

The products may be removed to steam chambers immediately, provided that the difference in temperature between concrete and steam chamber atmosphere does not exceed 35 degrees, and provided that temperature in steam chamber is not raised above one hundred twenty-five (125) degrees until products have remained therein not less than six hours.

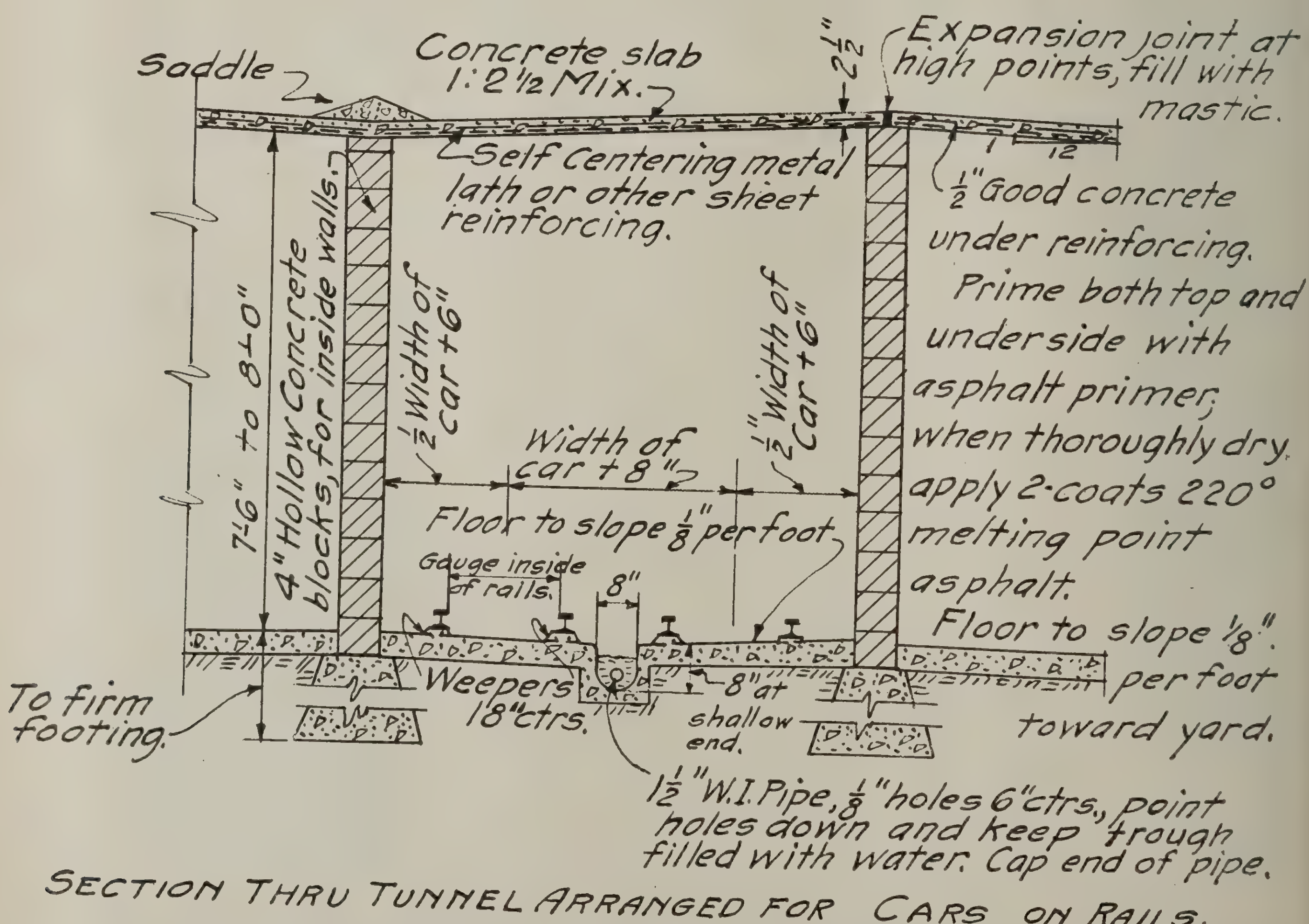
After six hours' curing, the temperature may be raised, but the atmosphere should at all times be saturated with water vapor by introducing steam through perforated pipe, laid perforations down in a trough of water in the floor of the curing chamber. At no time should the temperature in steam curing chambers fall below 100 degrees while block are contained therein.

When the outside temperature is never below 50 degrees Fahrenheit, products should be steam-cured as described above for not less than 24 hours, after which they may be removed from the curing chamber and piled in the yard. They should be sprinkled not less than two times daily for four days. They may be used after having been stored in the yard not less than 14 days.

When the temperature of the outside atmosphere falls below 50 degrees Fahrenheit, products should be steam-cured for not less than 48 hours, after which they may be stored. They need not receive any further treatment, but should remain in the yard for not less than 14 days.

CURING BY SPRINKLING

When it is found impracticable to introduce water vapor into the curing chamber, block should be stored in a chamber where the temperature is not lower than 50 nor more than 100 degrees Fahrenheit and protected from draughts of air and



Cross-section of a typical steam-curing chamber for concrete block and tile. The chamber should be well insulated and have a low roof to conserve heat; the chamber should be saturated with moist steam at all times from all exposure which will tend to cause evaporation of moisture from the concrete until they have been sufficiently hardened so that the application of water will not injure the surface. Block should then be kept constantly wet on the surface by sprinkling with water for not less than 10 days, when the outside temperature does not fall below 50 degrees. If the temperature of the outside atmosphere is below 50 degrees, the product should be sprinkled for not less than 10 days and the temperature in the curing chamber should be maintained at not less than 60 degrees. After removal from the curing chamber, the products should be stored in the yard for not less than 14 days.

HANDLING

Concrete block should be handled with care. When transported and subjected to rough handling, they should be so packed as to afford proper protection against breakage and chipping.

HAND VERSUS MACHINE TAMPING

To secure thorough and uniform tamping of products, substantial machine tampers are recommended. Tamping of concrete is simply a matter of power applied. Authorities have found on investigation that the best laborer cannot exert more than one-fifth horsepower continuously. In order to be liberal however, figure on the highest possible labor output, say one-fifth horsepower. Labor at 50 cents per hour equals $2.50 per horsepower hour for hand tamping.

Electric current or other mechanical power seldom costs more than 10 cents per horsepower hour. Figuring 50 per cent loss in friction, etc. (a very high figure), the cost may be 20 cents per horsepower hour for mechanical tamping. It is obvious that such mechanical equipment will quickly pay for itself and earn a substantial profit on the investment.

The claim that a man must be employed to operate the tamper does not affect the case as the increased output is unquestionably greater than could be obtained by putting on an additional laborer for hand tamping.

NUMBER OF BLOCK PER SACK OF CEMENT

Concrete block equal in all other respects will have equal strength regardless of make of machine on which they are made. Roughly, the number of blocks obtainable per sack of cement from any machine $= \frac{400}{\text{weight}}$ for 1:3 mix cement and sand, or $\frac{685}{\text{weight}}$ for 1:2½:4 mix, using cement, sand and coarse aggregate.

(See first paragraph of this article Mixtures.)

Coke Breeze for Concrete Blocks

A storehouse built of concrete in which coke breeze was used instead of gravel is illustrated in *Iron Age*, with the statement that while the cost of coal has been mounting steadily during the past years, the use of coke breeze as fuel has become correspondingly more general so that the majority of coke oven plants are now equipped to burn their breeze outputs either under boilers or elsewhere. There are still some plants, however, where, due to local conditions, as for example, lack of a market for surplus gas, the disposal of breeze is a troublesome question.

An entirely new use for coke breeze, that is for making concrete blocks, is shown in a storehouse built recently at Ohio River lock and dam No. 29, East Ashland, Ky., using these breeze blocks. The breeze was obtained from the adjoining Semet-Solvay coke oven plant, operated by the Kentucky Solvay Coke Co., and was ordinary fine breeze passed through a ¾-in. screen. The blocks were made by mixing coke breeze and cement in proportions of two ordinary wheelbarrows of breeze to one sack of cement. The breeze contains just about the proper mixture of large and small particles to take the place of any first-class fine gravel. The floor was also made from a mixture of breeze and cement, using two wheelbarrows of breeze to 1½ sacks of cement.

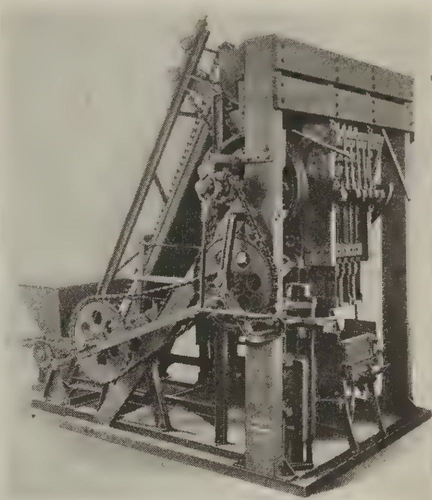
The blocks present a very neat appearance in contrast with the white mortar used in building. The blocks are described as exceedingly hard, and are expected to withstand weathering considerably better than the usual cement blocks. The floor also turned out very well and, it is expected, will outwear an ordinary cement floor.

In those plants where the disposal of breeze is a problem, the new concrete block may open up a new market, particularly if the local price of gravel happens to be high. The brief experience in building this storehouse has indicated no difficulties, and none is expected.

Converting a Hand Machine to an Automatic Block Machine

Announcement is made by the Ideal Concrete Machinery Company that they have completed and will shortly place on the market an automatic block producing machine which can be built up from the hand machines of the company's manufacture. The equipment consists of the block machine, power tamper, scraper and finisher and core actuator, conveyor and feeder, and the new automatic cam attachment.

The old equipment required 23 manual and pedal operations for the production of a block. These operations are now reduced to one single motion by means of the new automatic cam attachment—simply pulling the starting lever. The machine then automatically feeds in the material and produces a block and stops. The block is removed, another pallet placed in the machine and the lever pulled, and so on.



An automatic block machine that makes a concrete block every 12 seconds

This improvement permits those who have the hand equipments manufactured by the company to apply them to building up the automatic machine described—nothing need be discarded.

National Builders' Supply Association Convention

The annual convention of the National Builders' Supply Association is being held at the Hotel Sherman, Chicago, at the time of going to press—Feb. 21. About 300 delegates are in attendance. Regarding the price situation A. E. Bradshaw, of Indianapolis, president of the association, said: "In the first place there will be a long and dubious road to travel before pre-war prices will ever be seen again, so far as builders' material is concerned. In the second place the great road-building programs throughout the United States are diverting concrete, cement, tile and lime from house and apartment building construction.

"Until conditions are materially altered," asserted Mr. Bradshaw, "we cannot have any further reduction in building materials. There is no use in the dealers fooling themselves in expecting a recession of prices. Prices in cement, lime, plaster and clay products, such as tile, sewer pipe and brick are now very much below the peak of last year. Many of these prices are now as low as can be expected. Cement at the mill base is only 20 cents a barrel higher than before the war. Lime is also way down.

"There are so many things that enter into the costs of these products I have named that manufacturers and dealers cannot pull prices lower."

A Modern Sales Pavilion

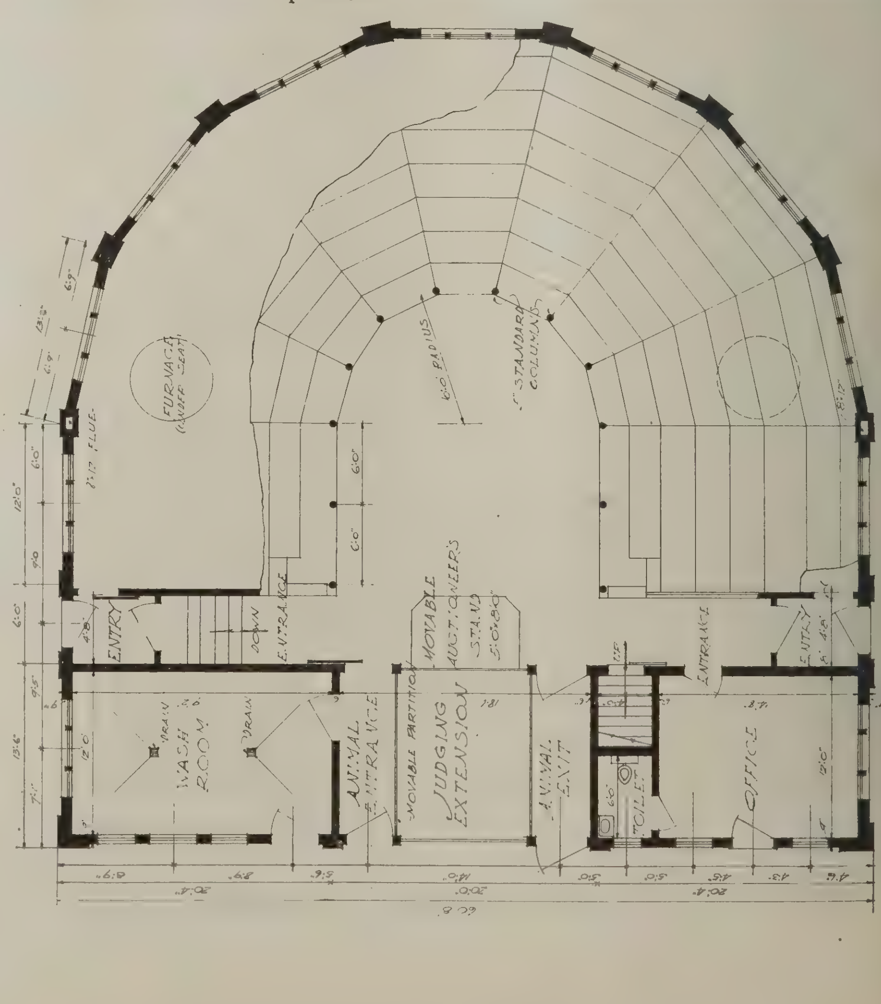
By A. A. Burger

THE community around Cedar Falls, Iowa, is but typical of many communities in many states. Here the pure bred live stock business has been growing so fast that the breeders saw the need for a modern, thoroughly equipped pavilion in which they might hold their sales—a building which would be convenient, not only as regards barns and equipment, but convenient to the live stock men and easily accessible to the buyers. More than that, they had in mind that a good live stock pavilion would draw on the best breeders in all of the territory surrounding and in that way would not only help the farmers to dispose of their animals but would also give those who wanted to buy, a chance to select from the very best. Although the building has been but recently completed, it is not too early to say that it has been a mighty factor in boosting the pure bred live stock industry. The live stock men who have had a chance to use it, the auctioneers who have held sales in it, and the breeders who have made consignments say it is one of the best buildings of its kind built at the present time.

Blue prints of the building are on file at the Department of Agriculture Engineering at the State College at Ames. Many committees from different places have come to look over the building and are already following the plans in most of their essential details. They find, even when the barns are built in connection with the building, that the arrangement which was used is ideal and if a less expensive building is desired without the office, wash room or sleeping rooms, these can be omitted without changing the rest of the building.

The main part of the pavilion is built of brick. The second story is of wood. It

Front view of sales pavilion



Rear view of sales pavilion, showing three chimneys and two outside doors to lunchroom underneath the seats

has never been suspicioned by those who have looked at the exterior that the brick used is discarded paving brick which was used on the streets of Cedar Falls and which the city donated to the farmers. The building is 80 feet wide across the front, and is 58 feet deep. Looking at the building from the south front which faces the barns we see at the right the entrance to the office which is equipped with a heating stove to be used when it is not necessary to heat the rest of the building with the furnace. The office is also equipped with a lavatory and two toilet rooms. The left door in front, and to which the swinging gates form a driveway from the barns, is a wash room. At the center the folding doors open into a room which is generally used for small calves. It is a very convenient place for the little fellows when the dams are washed and brought in from the wash room. In the second story are five sleeping rooms for the herdsmen or those who may be fitting the cattle. Three of the center rooms are plastered and finished complete. The two outside rooms and the third story, which consists of one room, will be used for the club boys during the fair. These unfinished rooms will accommodate about fifty cots.

Wash Room

Perhaps the thing that appeals most to the stockmen is the wash room. This will accommodate ten or twelve head of cattle at one time. The walls are finished with a smooth coat of cement to the top of the hose connections and with plaster above.

The floor is cement and slopes to the center where a large drain takes care of the water. About four and one-half feet from the floor is a very substantial tie rail made of iron pipe. The wash room is a great place, not only to wash but to tame wild cattle. It is so constructed that it is almost impossible for cattle to be hurt in any way. During sales the wash room is used for an assembly room where the animals are prepared for the sales ring, being taken directly from this room through the driveway into the ring. There are ten separate hose connections. This room is heated from the furnace by an electric fan, which makes it possible to heat it to any temperature in a very short time.

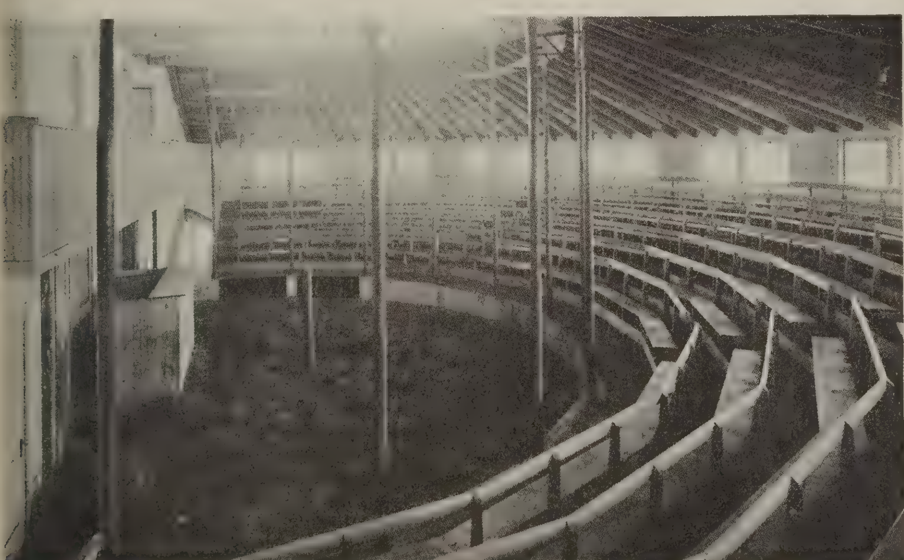
Sales Ring

The sales ring is the important part of the building. The accompanying picture of the interior (it does not show the pipe railing sales ring which has been recently installed) was taken in ordinary daylight and shows the remarkable and even distribution of the light. The windows are all hung on hinges and may be opened so that the room can be thoroughly ventilated without the slightest draft. The seats are built with back rests and plenty of seat space. They are very comfortable. The room will accommodate conveniently about 600 people.

Side view of sales pavilion, showing barns and gate chutes from barn to pavilion. First door to left is entrance to lunchroom underneath the seats; center door entrance to furnace room; door to right entrance to amphitheater

The animals enter the ring to the left of the auctioneers' stand and they are taken out at the right of the stand through hinged doors (hinges are preferable to noisy trucks) which close immediately behind them, thus preventing any disturbance from noise and keeping from view everything except the individuals which are in the ring. In that way the attention is kept entirely on the animal being sold. There is not the slightest echo in the building and the auctioneer, without effort can be heard from every seat. The view from the back seats is as good as from the front seats and the auctioneer can see every person in the room. Perhaps a distinct feature of the building is its separation from the barns, thus absolutely eliminating all noises and confusion.

In selling hogs an elevated platform is used in the ring. This is 18 inches high and is so constructed that it can be easily put in place and quickly removed. The same platform can be used for dairy cattle and it can be raised to any desired height. The auctioneers' stand, about 4½ feet high, is built so that it can be raised with the



Amphitheater in day time, showing remarkable distribution of light. Note door to animal entrance and exit; also two doors forming entrance and exit to calf pen or judging extension. The entire block of doors behind auctioneer's stand is removable

Washroom, showing tie rail 4½ feet above tie rope. Entrance doors five feet wide, hung on tracks. Warm air duct in right hand corner

platform. A woven wire ring is used for hogs, but for cattle this has been found to obstruct the view, so an iron pipe railing with three bars of circular pipe fastened to steel posts has been installed. These posts are raised and lowered in a cement collar so the railing can be set at any desired height.

An important feature of any pavilion is the heating system. The builders realized that they must have something that would be warm in the winter time in the coldest kind of weather so they considered steam, hot water and hot air, and they came to the conclusion that where inexperienced men might at times have to take care of the building that something convenient and fool-proof would be necessary, so they installed a pipeless furnace with cold air shafts. This makes it possible to heat the building to any desired temperature in a very short time. Even the upstairs sleeping rooms can be heated through the doors or windows from the inside. Since the furnace is of the pipeless type, no cold air shafts were put into the wash room and it was necessary to force the hot air into this room by means of an electric fan.

Barns

The barns face the pavilion on the south. The first two, used for cattle, are 240 feet long, equipped with hay racks, feed boxes, water and electric lights and will accommodate about 300 animals. They are connected with swinging gates to the pavilion. The third barn is generally used for horses. The barns are owned by the Fair Association but are turned over for the use of the breeders and the Pavilion Association without any charges

At the time of construction the building cost, without the barns, $12,000. The stockholders decided to make the rates very liberal so that any stock man could afford to hold his sales in the pavilion. Therefore they make a mininmum sale rate of $60 for any sale. The rate on cattle is $2.00 and on hogs $1.50 per head or per single lot. Sow and pigs, unweaned, are considered as one lot. The pavilion was completed last fall, but since that time 18 sales have been held and nearly one-half million dollars worth of stock has been sold through the ring.

In beginning the farmers set about as in organizing any other co-operative concern, securing the signatures of those wanting stock. The shares are largely held by the stockmen and were fixed at $50.00 each. They run from one to five or six shares for each person, but largely one to each person. Every shareholder has one vote in the corporation regardless of the number of shares. What these men have done any other locality can do and can do it just as well. They will find that a good sales pavilion will not only be a credit to the locality, providing it has the proper hotel accommodations and rail facilities, but they will also find that it will furnish a better outlet for their live stock and will be a great inducement in getting new breeders started. In this locality nothing has been done which has given the pure bred live stock business a greater impetus.

What Standardized Lumber Sizes Mean

The need of standard sizes for all the different lumber products has been felt for some time, due to the exceedingly numerous and constantly changing sizes, and the action of prominent lumbermen in promoting standardization presages another progressive step in the lumber industry. The United States Forest Products Industrial Research Laboratory at Madison, Wisconsin, has been co-operating during the past year with the National Lumber Manufacturers' Association in working out an equitable basis for standardizing softwood lumber sizes. Some of the benefits to be derived from the standardization of sizes are as follows:

1. It makes possible a common language for all. The consumer can substitute one species for another with assurance of getting material of the same size. Similarly, if a contractor starts to build several houses and orders his millwork, sash, doors, etc., based on certain lumber sizes as to stock around which the casing fits, the kind of wood can be varied as he desires.

2. Architects and purchasers can order more rapidly with one set of sizes,—looking for sizes scattered throughout different grading rule books is eliminated.

3. Material of standard sizes is more saleable and by increasing the consumer's good will creates and adds value to the products.

4. Building design is simplified, since fewer sizes can be used.

5. Uniformity in construction results, regardless of the grading rules under which the material is purchased. Manufacturers now can not standardize millwork, etc., because it is dependent upon the sizes of the lumber used in building.

6. Re-manufacture of larger sizes to match smaller sizes will be reduced and greater utilization with less labor and expense result. The architect frequently designs a building in accordance with the minimum sizes of lumber which may be furnished rather than on a species that can be procured in larger sizes.

7. Standardization of sizes eliminates local legislation on lumber sizes which confuse manufacture and distribution. Such legislation has been already suggested.

8. Standardization makes for fewer sizes and hence greater efficiency, ease and accuracy in lumber grading.

9. It equalizes competition between manufacturers, because present differences in overrun and freight charges are important factors in determining price.

10. It makes possible uniform practice and sizes in resawing.

11. It makes possible a fewer number of drying schedules in the kiln drying of lumber. At present the actual thicknesses of lumber of the same and different kinds cut under the rules of different associations and often varies several per cent.

Important Notice

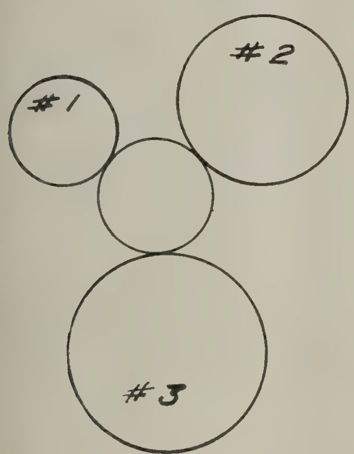
Postcard inquiries addressed to National Builder of interest to the writers only cannot be answered. If it is not worth while for inquirers to write a letter and enclose a self-addressed stamped envelope their inquiry is not worth attention. National Builder is desirous at all times of serving subscribers who use common sense.

Questions, Answers, Kinks and Discussions

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

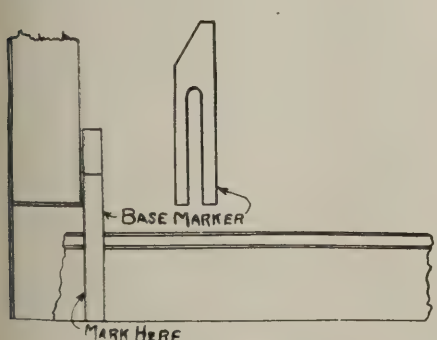
A Problem for Solution

F. Motherspaugh, Sherwood, Ohio, writes us: "I have a problem in which I wish information. I wish to know if there is any way, either by geometry or the steel square, to show the center of the fourth wheel in the drawing below, Nos. 1-2-3 being stationary centers."



A Base Marker

A base marker such as the one shown in the accompanying sketch is of considerable value in laying out the length to which a baseboard is to be cut.



Its operation is simple and consists in setting up the baseboard in the position it is to occupy. Then the base marker is slipped over the baseboard and set close against the plinth. The cutting line is then marked on the baseboard, using the edge of the marker as a guide.

The marker should be made of walnut or white pine to avoid warping.

Concrete Forms Used as Storage Sheds

Much material is wasted on the job by careless storage. A few moments spent in covering materials that are to be stored in the open will often result in a considerable saving in money and time in the long run.

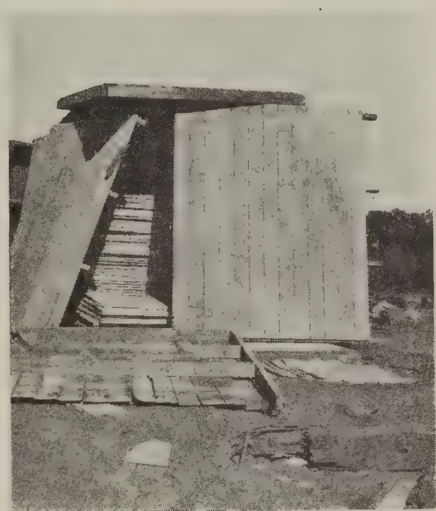


Fig. 1

The accompanying photographs show how ordinary wooden unit forms may be used in protecting materials, thus creating a use for the forms when they are not being employed in concrete work.

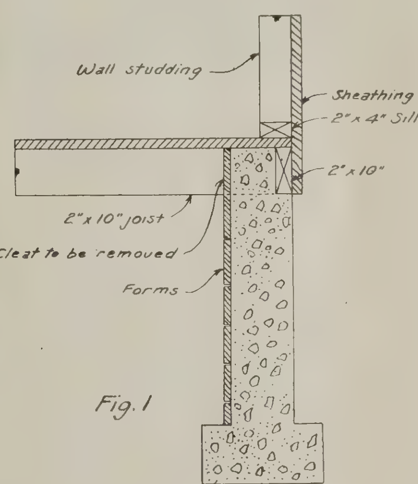
In figure 1 a shelter is formed for wall board. There is a floor made of a couple of forms laid on the ground; the walls are of forms stood up loosely and the whole is covered with units placed on top.

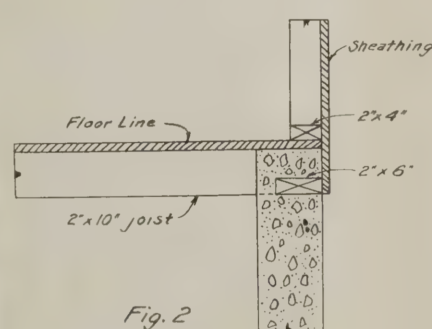
Fig. 2

Figure 2 shows a temporary shelter for cement. It is even more simple than the one in figure 1, and consists of a form laid on the ground for a floor and covered with a couple of forms placed tent fashion and lightly nailed together at the top.

Sill Construction

Olaf Lindberg, of 200 North La Crosse Avenue, Chicago, writes: "Am sending you frame; in No. 2 it is lying on top of the frame even, with concrete filled in between.





I think the construction is strong and substantial, but I have been hearing some argument about it. Some claim that the end of the sill in the concrete will decay before the other part. Would like to hear what some other builder thinks about it."

Raising the rafters with a pulley

Nailing the rafters in place

Interior view showing pulley arrangement

Ready for the roof

Barn Trusses

The accompanying pictures illustrate a good time- and labor-saving method of framing a large barn. This building is 40 by 60 feet, and 16 feet to the eaves. The rafters were bolted together with half-inch bolts and then raised into position by a rope and pulley contrivance, the rope passing through the pulley located some distance outside the barn, and through a heavy ring attached to the middle rafter or bent of the barn inside, the other end of the rope being securely knotted to the rafter 650 of the half-inch bolts were used. For the roofing, 30,000 shingles were required. The barn is of splendid construction and very durable. Another excellent feature is the concrete ground floor with a 14-foot driveway extending through the entire interior.

The barn was erected some 18 months ago on the farm of Sheriff S. L. Miller, in Brown County, Ohio, near Georgetown; it was contracted and built by Mr. Miller himself, at the approximate cost of $2,900. A. Yockey had charge of all the carpenter work.—*M. G. Shockey.*

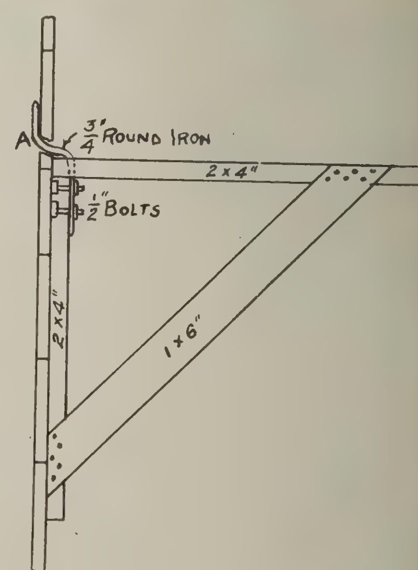
THE slogan "1921 Will Reward Fighters" simply means that there are plenty of people with money to spend who will build if shown. Be a fighter and show them!

Staging and Roofing Brackets

Referring to the drawing of the staging bracket shown on page 72 of the January issue, S. F. Black, building contractor, New London, Ohio, writes: "Owing to my poor writing an explanation is in order. The bed piece of the roofing bracket should be ¼x1-in. buggy tire and the rest 3/16x⅞. Any blacksmith can make the hook, and the rest is punch and rivet. The 'loose' pins in the side bracket should read 'glued' pins, and the brace put in solid as they are not folding brackets. The hinge is to add strength to the bracket and a washer for the screw. The lookout should be about four feet or more. In sheathing up I do not take out the bolts, but only slack them enough to get the brackets. After sheathing up I start siding at the bracket and side up to the cornice, and then drop down to the first bolts below and work up again, and when I get to the ground there is no broken lumber or nail holes in the work. I've used them 35 years and never had a break nor a fall yet. No patent."

A Scaffold Bracket

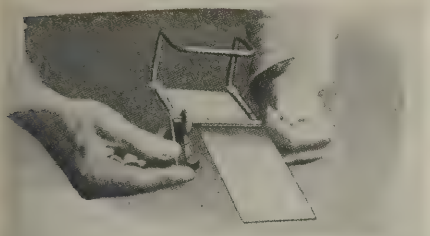
F. G. Rockwood, contractor and builder, Waukesha, Wis., writes: "I send you a sketch of a scaffold bracket which is easy

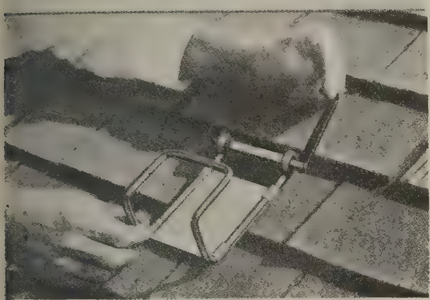


to make and if made of sound stuff is absolutely safe. No nails are needed to put them up. Simply bore a ⅞-in. hole through the sheathing and slip the iron through by tipping the bracket up."

A Patent Roof Bracket

John Ahl, a builder of Madison, Wis., has placed on the market the roofing bracket here illustrated. A metal strip is inserted in the bracket and clamped by an eccentric lever. The free end of the metal strip is nailed to the roof and the timbers laid in the brackets. The bracket is removed by





releasing the lever, which frees the bracket from the metal strip, after which the strip can be bent over and inserted under the shingle for future use if needed.

A Noisy Metal Roof

In a recent issue of a trade journal we read a wail for help from a workman in the Southwest. From his statements it

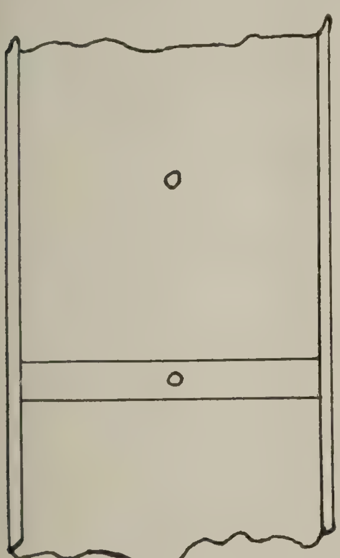


Fig. 1

would appear that he was one of the "hurry up" workers who care less for the quality of the work than for the finishing up the job in the least possible time and "getting by" with it. Claiming to be a sheet metal worker he certainly should know the principle of metal contraction and expansion, the relative merits of spacing, and espe-

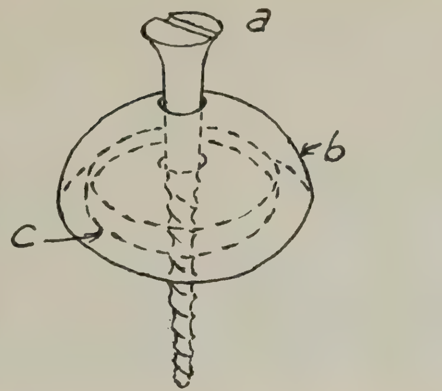


Fig. 2
a - Wood Screw
b - Metal Cap
c - Washer

cially should he know the absolute necessity for close, careful cleating in the character of roof he placed for covering an opera house. Yet instead of uniting his sheets in the usual way for making the strips of tin for a standing seam roof he formed his connecting edges on the twenty-eight inch sides of the sheets, making the distances between the standing seams eight inches more than they should have been. The result was an annoying vibration in a slight wind and a deafening clatter in a high one. No wonder that they have to stop the exercises in the opera house during a storm, as he states they do.

Some two decades and more ago, when painted iron and steel roofings were at the peak of their popularity, they were laid as a covering on buildings of every description, and as they were made in 28-inch width sheets entirely there were constantly coming to the attention of the manufacturers complaints of the noise and rattle these roofs made. We eventually solved the problem by making a fastener as shown in the centre of Fig. 1.

Part of the rattle is caused by cleating the standing seam with anchors too far apart. Cleats should not space over 18 to 20 inches. Careless work in nailing the cleats too far back from the seam should be avoided.

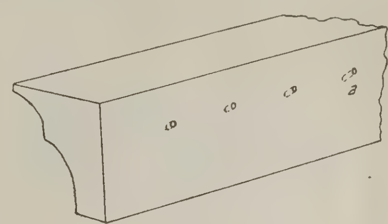
Tin sheets for a standing seam roof should never be edged the 28-inch way. It makes too great a distance between the standing seam (25¼ inches), which results in an unbearable vibration, the warping and buckling of the roof, and its quick destruction. The 20-inch edges are the ones to seam together, making 17¼ inches between the standing seams, which will give excellent service and satisfaction if properly laid.

To stop most of the vibration resulting from laying a metal roof with too much space between the standing seams, a cap such as shown in Fig. 2, may be used. A heavy washer of leather or rubber may be used next to the roof, over which a metal cap should spread, of such a depth as will allow its bottom edges to touch the roof metal when forced down by a heavy wood screw. This screw passes through cap and washer and roof, into the wood sheeting below. The cap bottom and screw head may be soldered then, if the roof is of galvânized iron or tin. Where it is painted iron or steel, these places may be protected with a good roof cement.

At times it may be found necessary to place a fastener in the body of the sheet, between the seam fasteners. Avoid this when possible, for every hole made in the body of a metal roof, even a nail head exposed, is an additional hazard.—*L. S. Bonbrake.*

Stone and Concrete Flashing

Occasionally a wide coping or other places are encountered where a metal covering or flash is required and no material, copper or tin, is found wide enough. This necessitates the material being used lengthwise and a provision must be made for securing the side seams. This may be done by drill-



For Stone and Concrete Flashing

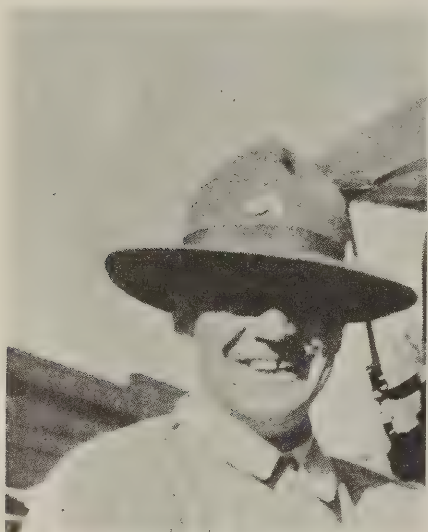
ing or making wedge holes with a chisel where needed. These holes may be run full of liquid solder, to which cleats may be soldered for holding the sheet material. The sides, or rather the end of the flash, may be fastened by drilling holes with a slight downward slant (see *a*, Fig. 1), into which wooden plugs are made to fill or wedge. Several notches may be cut into the back end of these plugs. Run a little hot lead into the holes and drive the plug into it immediately. Then it will be ready to receive the nail which can be driven through the metal and into the plug to secure the end of the flash. Of course, measurements are taken for the proper location of these holes, which may be as close together as desired. Where a wooden strip is used over the edge of the metal, however, the plugs need not be so numerous.—*L. S. Bonbrake.*

Bayless-Built Barns

Floyd Bayless, of Northboro, Iowa, is one of the younger type of progressive builders who "seen their duty and done it."

After his release from the service he

cast around for a way to continue to serve his country and at the same time make an independent living. Barn building may seem a rather prosaic method of accom-



Floyd Bayless, Barn Builder

plishing this result, but Mr. Bayliss says that there are deeper things in barn building than appear on the surface, and none of us can deny that anything that increases efficiency or productiveness on our farms is a service to the nation.

Conducting Water Over a High Comb

Sometimes the artisan fails to visualize his complete work in the making, and when the job is finished finds himself confronted with an awkward or unseemly result. The illustration (Fig. 1) shows a not infrequent result of such a failure—an extension has been built up against the side of a building, and the comb is so high that it will scarcely finish up under the eave of the main building. If the owner wants all the water from the main roof conducted to the left, say, for cistern purposes, a problem is encountered.

The situation could be handled very nicely with an ordinary roof gutter, but in this instance that was not satisfactory to the owner. The eave-trough could have been hung the full length of the eave if the comb of the lower building had been cut down to accommodate it, but this would have made an ugly piece of work inviting leakage and affording a catch-all for leaves and rubbish which would have eventually resulted in a rusted-out metal trough. So the following plan was used:

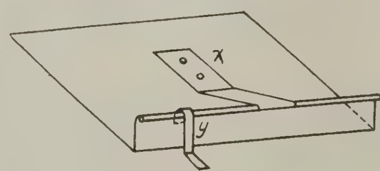


Fig. 2

An eave-trough of suitable size—5 in. for the ordinary-sized building—was hung in the usual manner, extending as near to the comb as its end-piece would allow. Then a square-cornered flash (Fig. 2)—a flash made from eave-trough having its back half turned down flat, as shown in Fig. 3, can be used, also—was inserted under the first row of shingles above the eave course, the length being given a slight pitch toward the hanging trough and extending some inches over the end of the trough to insure

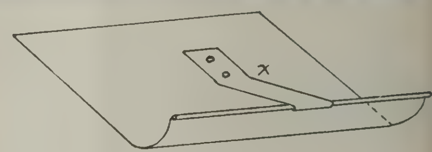


Fig. 3

all the water's running into it and not being blown back in case of a high wind. A second flash may be inserted under the third row of shingles if necessary, reaching to the gable and emptying into the first flash which in turn empties into the hanging trough beyond the comb.

As a precaution against these flashes being bent or broken under the weight of snow and ice, roof strips, as shown at *x*, *x*, Fig. 2 and 3, should engage the front bead of the flashing and be nailed back upon the roof. A cleat may be used at the bottom end of the clash to hold that corner down solid and smooth (see y, Fig. 2). The roof flashing front should be no higher than is absolutely necessary to carry the water, say 2½ to 3 inches; then it will not show at all from the ground.—*L. S. Bonbrake.*

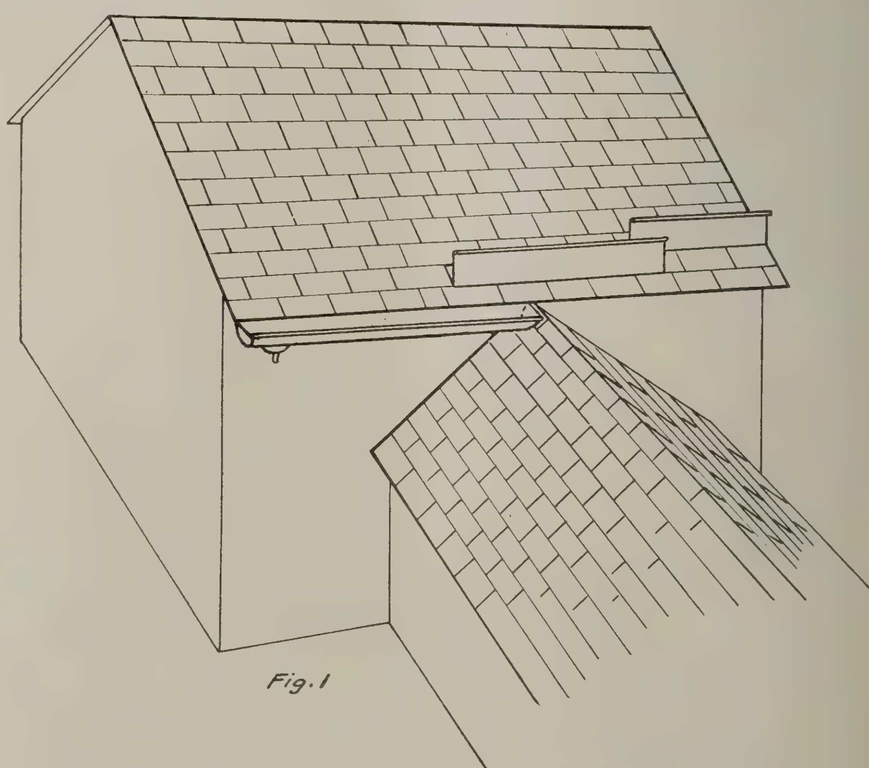
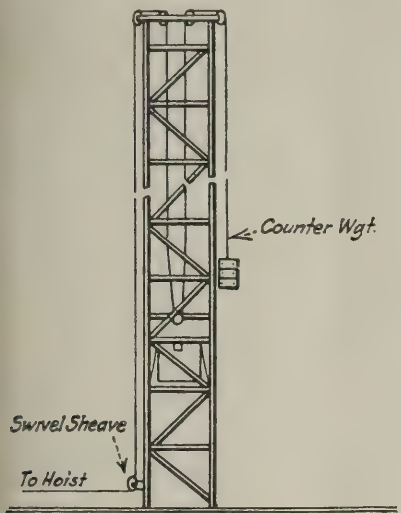


Fig. 1

This construction can be avoided

Helping the Hoisting Engine

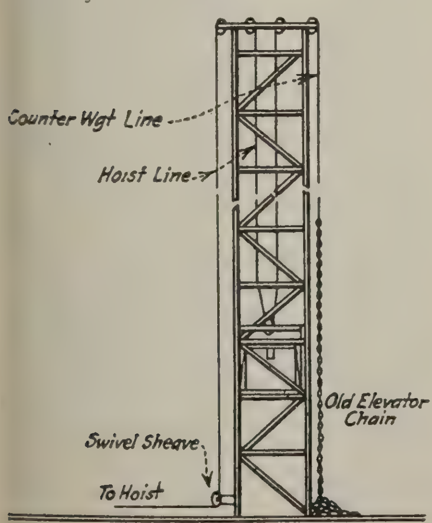
On construction work, the hoisting engine often lacks adequate power for properly hoisting the concrete bucket. The usual method of overcoming this lack of power is to rig the hoist line with a double whip, which naturally slows up the speed of the bucket, and a contrivance that will



give relief without the usual slowing up is of interest to any job.

A scheme that has worked satisfactorily is to place a counterweight on the bucket. The regular hoisting line is attached to the bucket and led over the sheaves on the cat-head of the tower and down to the hoisting engine in the usual manner.

A second line is fastened to the bucket and led to the cat-head and down one side of the tower, where it will be out of the way. To this line is fastened a counterweight box. The length of line should be just sufficient to clear the ground at the base of the tower when the bucket is raised to the highest point of travel. This weight should not be great, as too much weight will slow down the bucket on its return trip and is not necessary. By experimenting, just the right amount of counterweight can easily be ascertained.



It is well to fasten the counterweight box by means of guides or by letting it follow a wire line by means of a snatch block, in order to prevent twisting.

The scheme may be improved greatly by supplementing the box with a heavy chain in the same manner as used on elevators. This chain may be purchased as scrap from some junk dealer and the time saved on the job will more than pay for its cost.—J. H. Williams, in *Successful Methods.*

Hoists

One advantage of the type of hoist shown in the photograph is the comparative ease with which it may be moved from one portion of a job to another. They are rigged with block and tackle in connection with a windlass, and are operated by means of cranks. Such a hoist may be operated by one or two men, and is capable of handling exceptionally heavy weights.

The hoist illustrated is provided with rollers at the bottom so that it may be easily moved along the building much as the roller ladders used in stores are operated. This makes it possible to raise the stone work to the exact position where it is to be set without additional handling. Practically all of the stonework of this building has been placed by means of the hoist.

The Unions and the Open Shop

In many cities of the South the contest over the union labor issue is as acute as in many Northern cities. Recently a representative of National Builder traveling in the South has heard expressions regarding it from contractors in several different states. Nearly everywhere the open shop, where union men and non-union men work together, appears to be a failure in solving the question. It only changes the battlefield from the closed shop to the open shop. A contractor from Knoxville, Tenn., said to the writer: "I'm supposed to be running an open shop, but there is not a non-union man in it. I hire non-union men as well as union men, but in some way the union men get rid of them. They simply quit without telling why." Another Knoxville contractor commented: "I am running a straight non-union shop, which I regard as the only solution of the question." In New Orleans, in a hotel, a mechanic was telling how the open shop is captured. "It is this way: the foreman is in with the union. The company employs a non-union man and puts him to work. After a day or so a union man asks him privately if he has a card. The man says he has not and is not going to join the union. If he does not get a union card, on Saturday the foreman tells him that his work is not satisfactory and he lets him go." A building contractor in New Orleans said to the writer: "I started my last job under open shop conditions, and hired both union and non-union men. In a few days I found the union men were trying to unionize the job, and I fired them all and did not employ any more union men." Contractors in other cities declare that in many of the so-called open shops the only men who can work in them are those having union cards and that they are union shops in spite of the companies that are trying to run open shops.

A hoist mounted on rollers

Slate, Tile and Sheet-Metal Roofs

By John Y. Dunlop

A ROOF with straight sides on the plan and elevation can be covered with either slates, tiles, shingles, or sheet metal, but a domical roof, which is curved in both plan and elevation, can be covered satisfactorily only with a material that can be made to fit the canvas closely.

Thus it will be understood that slates should not be used for a dome shaped roof because no matter how carefully they are laid or how small the material is, the tail of the slate always cocks up. Tiles can be used for a dome shaped roof because they can be specially manufactured to fit the curves. Sheet metal, however, is the ideal material for this class of work.

In an ogee roof it is quite easy to slate the hollow part, but in slating the convex part of the roof, the slater finds the same difficulty mentioned above, as here again the tail of the slate often leaves a clear half inch of space between it and the course below. Which means that the first gale is sure to catch the tail of the slates and strip a few off.

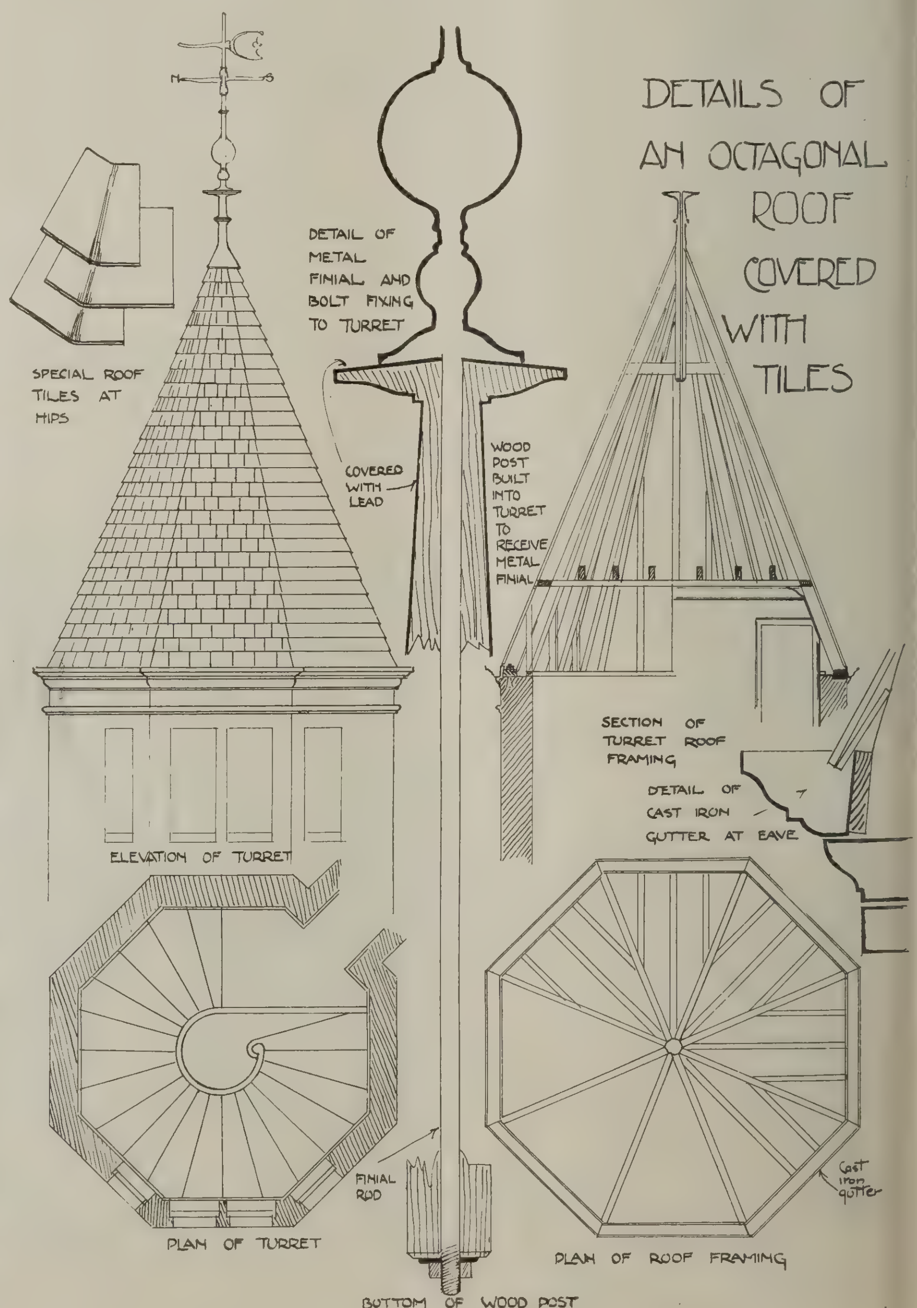
Turrets are seldom used nowadays on ordinary work, but they are shown in connection with this article because they offer a convenient means of illustrating th points to be brought out in the followin discussion.

The square turret of Figure 1 is covere with slates laid in plain and ornamenta courses. The eaves gutter is of cast iro and the hips are covered with a sheet meta hip roll which extends from top to bottom

Over the upper ends of the hip roll is a lead apron, while the base plate of the finia forms a watertight joint on top of the apro piece. The hip rolls are laid on the roo before the slates are set in position. Th edges are under the slates and extend o

Fig. 1—A slate roof with metal hip rolls and finial

Fig. 2—Octagonal roof covered with tiles in which special hip tiles are used at the angles



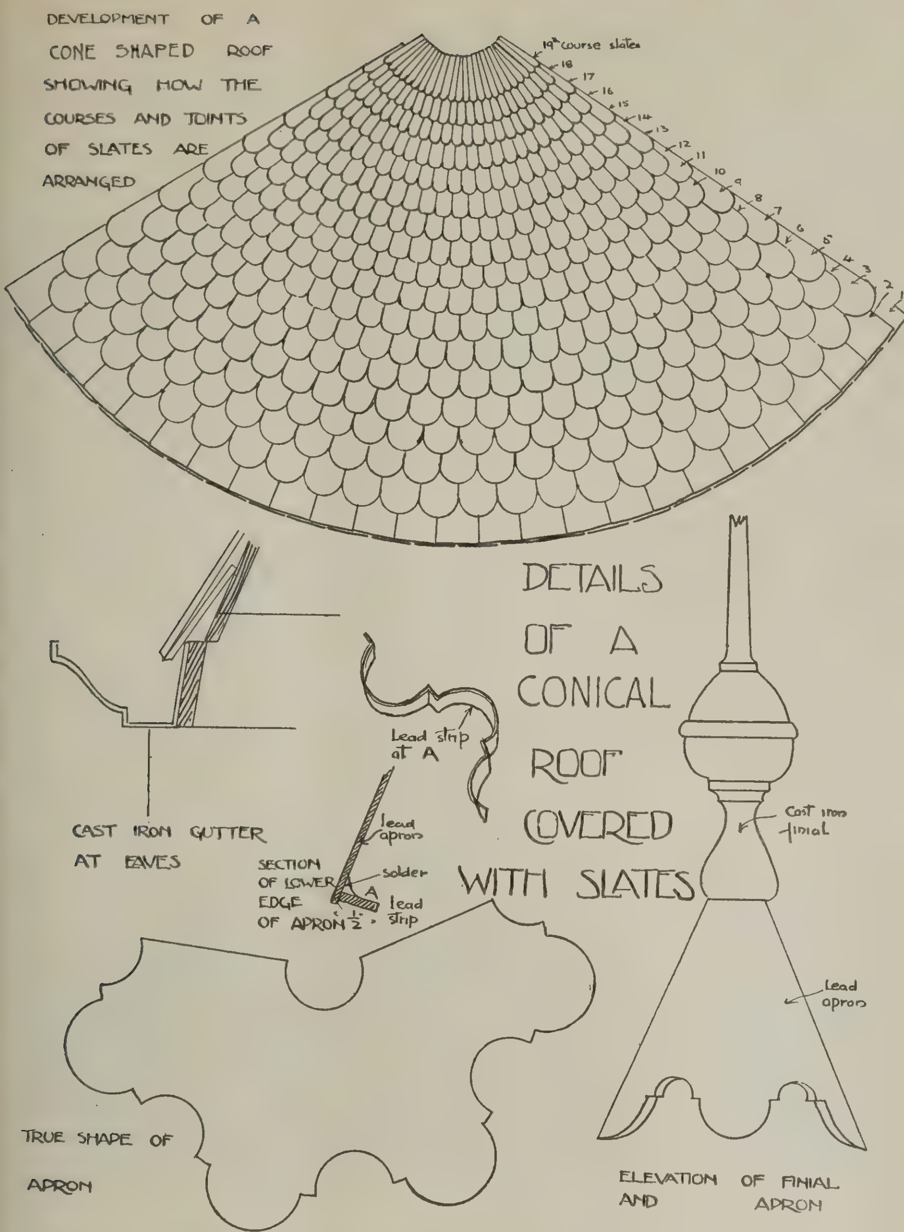


Fig. 3—Note that the slates are reduced in breadth as they approach the finial

the flat of the roof for a distance of 2 inches. The edge is then turned over toward the hip roll to form a bead, and the end of each course of slates is cut to lie close up against the upstand of the hip.

A line drawing is shown of the tile covered octagonal roof of Figure 2. It is quite usual in this class of work to bolt the wallplate onto the wall so that when the rafters are fixed at the bottom end and also to the post at the top, the whole of the framing is well secured. The finial post is bored throughout its length to receive the finial rod which is secured with the usual nut and washer at the bottom end.

In building a roof of this type the hip rafters shauld be beveled on the top edge to conform to the angle of the intersecting sides. This allows the roof boarding and tile battens to be cut close at the corners and makes a more workmanlike job.

Of course a great amount of this work is done without boarding, the tile battens being nailed directly onto the edge of the rafters.

The battens are spaced according to the size of the tile and the required lap, thus:

$$\frac{\text{Length of tiles—lap}}{2} = \text{distance of battens from center to center.}$$

In this example special tiles are used at the hips, a sketch of which is shown in the line drawing. In a roof such as this the tiles should be made to suit the pitch of the roof and must also agree with the angle of the corners or hips of the roof.

A detail of the eaves course is shown with the two lower courses projecting over the cast iron gutter. The first course of tiles must be shorter than the ordinary tile by the amount of gauge to which the ordinary tile courses are laid.

The lead apron, which is a large piece of lead cut on a conical principle and either soldered down the back or made good with a welt joint, is made to lap the top course of tiles. The wood finial is covered in the same way.

Figure 3 shows examples of slate covered circular or cone shaped roofs in which the courses are ornamented by cutting the tail of each slate to a curved pattern. Details of these roofs are shown in one of the drawings.

In laying slates on a roof of this shape the courses are arranged in much the same way as on a straight roof and each slate breaks joints over the joints below. The joints in alternate courses are thus arranged one above the other, and to carry this out, the slates are reduced in breadth one course after the other until at the topmost course they are mere strips. In other words each course is laid with the same number of slates. The advantage of this arrangement is that each of the narrow slates on the upper courses lies closer to its neighbor than would be the case if all of the courses contained slates of equal size.

The first course of slates at the eaves are left square on the tail so that it is only

Fig. 4—A conical roof covered with slates laid in ornamental and plain courses

after the short course and the ordinary course have been set in position that the ornamented courses begin. A sketch of the development of the various courses is shown so that a fair idea may be obtained of how the slates in each course are reduced in size as the work goes up.

The shape of the piece of lead to make the lead apron is also set off in the line drawing. Very often in work of this kind a one-half inch strip of lead is laid along the lower edge of the apron piece to give it a bolder appearance. Otherwise at the height of a two-story building, the edge would appear as thin as paper and would not harmonize with the thick edges of the tiles or slates. This strip of lead, bent to the shape of the edge of the apron piece, is shown in the drawing at "A" and so is a section of lower edge of the apron with the strip in position.

Another point in which the work of slating a circle roof differs from a straight roof is that the slater uses a chalk line in setting off the tail of each course of slates on straight work, but in circle work good workmen are inclined to use a trainer for this purpose. That is, they take a piece of lead and cut it so that it will turn on a pin fixed in the hole for the finial rod. To this piece of lead they fix a rod which hangs down the slope of the roof. On the rod they mark off the tail end of each course so that by turning the rod round the turret they can mark the exact gauge of the courses.

Figure 4 shows another method of giving variety to a roof by means of ornamental slates. In this example six courses of plain slates and six ornamental courses are used alternately. The construction of this roof is similar to that of Figure 3.

Metal roofing is the logical material to use for domes or for ogee roofs such as the one shown in Figure 5. Details of this roof are shown on one of the drawings.

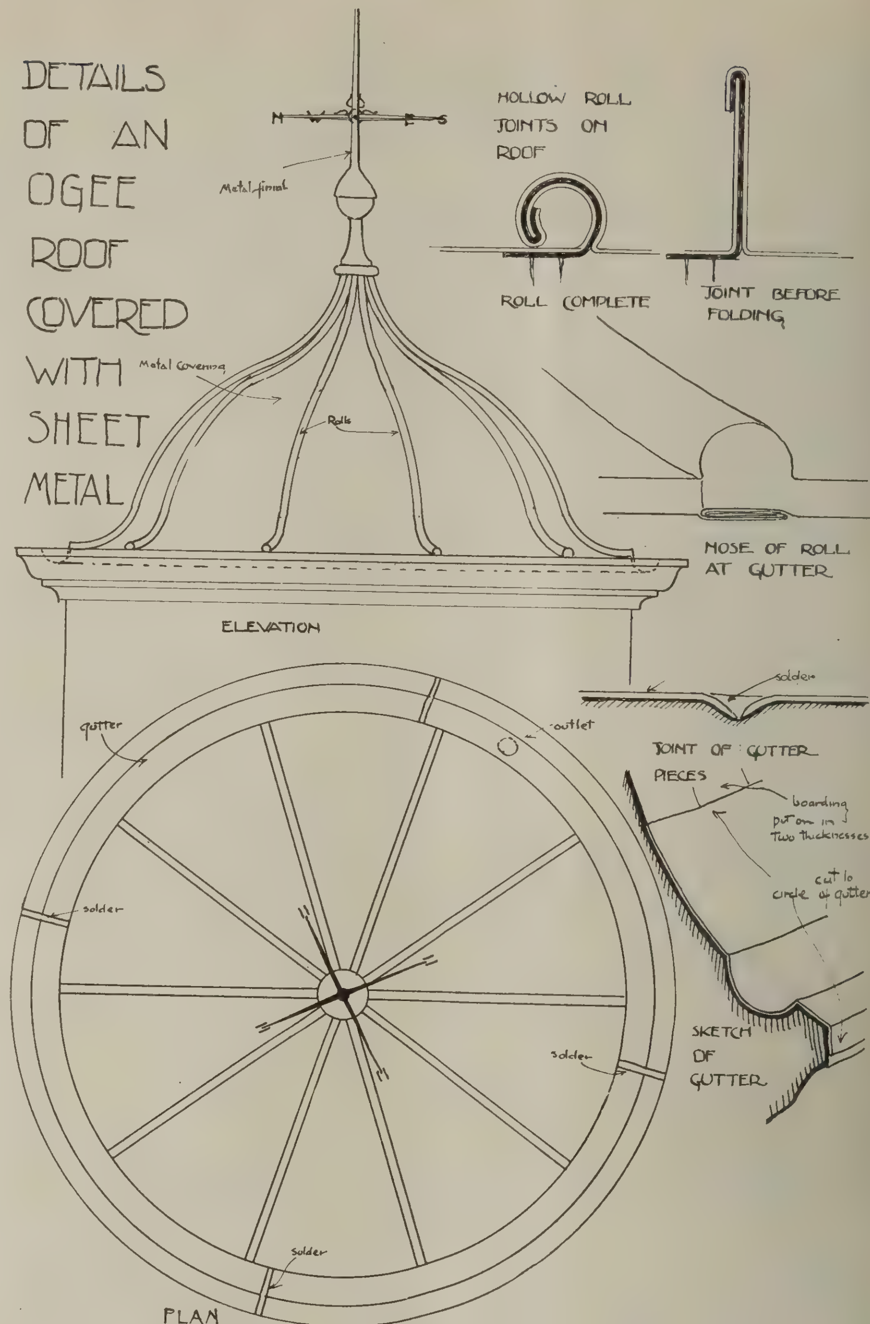


Fig. 5—An ogee roof covered with sheet metal

The boarding of such roofs should be made of thin stuff that may be easily bent to conform to the curved surfaces. Experience has taught me that the best way to lay those boards is up and down the roof from the apex to the eaves which means that the shape of the boards must be developed in a full size drawing and each board carefully cut and fitted by means of this pattern or template.

The moulded eaves course may be of wood in which case it would be framed up to the side of the roof and the semi-circular gutter wrought out on the top. A sketch of the gutter and lead piece is shown and in the plan the gutter is shown laid in four pieces with soldered joints.

In covering the curved parts of the roof two methods can be adopted. The first is to use wood rolls of 2-inch diameter made to run from the eaves to the apex. These rolls should be placed at no greater distance than 3 feet from center to center at the widest point. The sheets of metal are then cut to the shape between the rolls with sufficient allowance for the joints.

One edge is dressed over the roll and nailed while the other edge is dressed into a vertical position against the side of the next roll. The same operation would be followed with the next sheet, and then the vertical part of the first sheet is dressed tight over the nailed edge of the second sheet and so on until the roof is completed. This arrangement allows the necessary freedom for the metal to expand and contract, but very often the cost of having wood rolls set up have caused the roofers to adopt seam rolls (hollow rolls) which are formed as shown in the drawing by dressing up the edges of the sheets of metals to be united. In this method, metal cleats are nailed at intervals to the boarding alongside of the joint. The edges of the adjacent sheets are then set up and both turned over. The two edges are then dressed together and finally bent over into the form of a roll.

At the gutter end of the roll the part which projects is flatted and turned over together with the edges of the roof sheets which lap over the gutter piece.

At the apex the rolls are cut flush with the top of the finial post and dressed in to receive the base or apron of the finial.

Concrete Block Houses at Jeannette, Pa.

THE two attractive small houses shown in the accompanying illustrations are specimens of the design and construction prevailing at the Pennsylvania Rubber Company's Paruco Park subdivision, located near its extensive works at Jeannette, Pa. The architect and town planner was George H. Schwan of Pittsburgh.

A primary object of the company in undertaking the Paruco Park project was to provide attractive permanent homes as an inducement for high class skilled mechanics to remain with the company. Concrete block construction with exterior treatment of stucco was selected. The blocks which are of the picabbs tile-block type, have triple air spaces, as shown in the illustration showing the specimen wall panel. All block used in these houses were manufactured and cured in a portable plant on the site, a by-product blast furnace slab available in the vicinity of Jeannette being used as aggregate.

All of the houses are of the small five and six room types and have proved very popular with the occupants, all of whom have purchased their homes, with the option of paying for them on a liberal payment plan extended over a long period of years if desired. The floor plans have the advantage of being compact and convenient. Plenty of light is provided. Architecturally, the houses are to be admired both for general appearance and good handling of details, with plenty of variety and absence of duplication.

Owing to the particular type of triple air space tile block used, furring and lathing were entirely dispensed with, the plaster being placed directly on the inside surface of the block. The floors are of usual wood joist construction. These buildings were finished complete in every detail, with modern plumbing of high quality, electric lights and warm air furnaces.

Fig. 1—Five-room concrete house, Paruco Park project of the Pennsylvania Rubber Co., George H. Schwan, Architect

Fig. 3—Six-room concrete and frame residence, Paruco Park project, also designed by Mr. Schwan

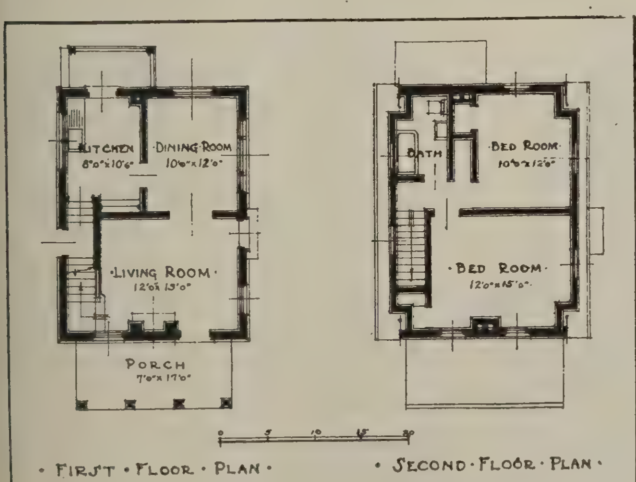


Fig. 2—Floor plan of the five-room Paruco Park dwelling shown in Fig. 1, a most compact and convenient arrangement. The rooms are of ample size and provided with plenty of sunlight

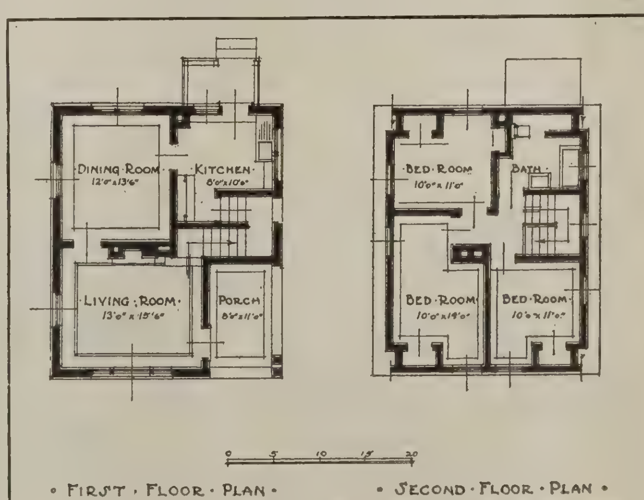


Fig. 4—Floor plan of the concrete and frame dwelling shown in Fig. 3. The rooms on the main floor are a little larger than in the preceding plan, and an additional bedroom is provided

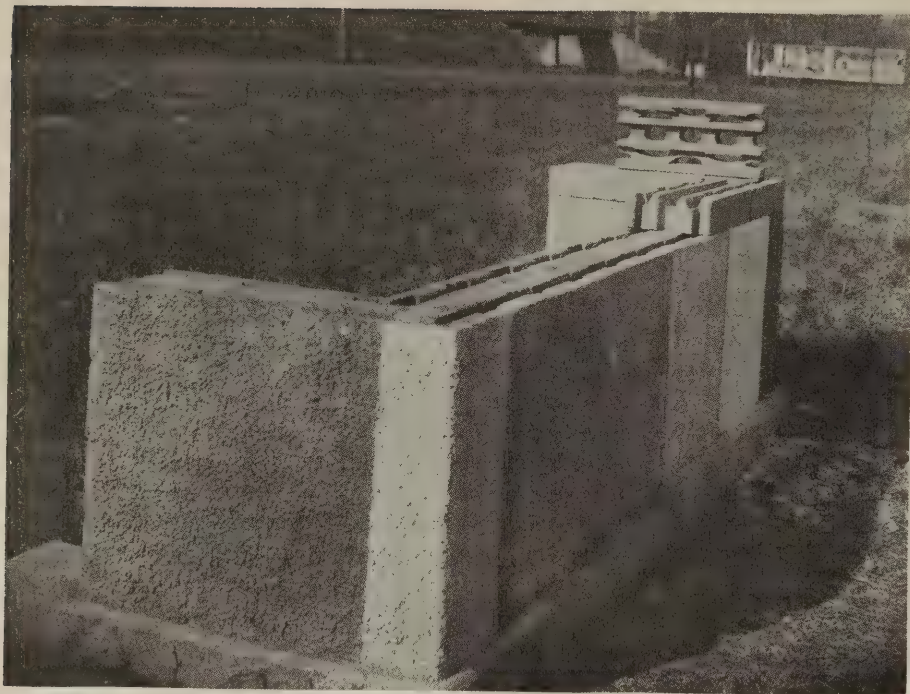


Fig. 5—Sample of concrete block and stucco wall (picabbs type) built at Paruco Park to illustrate wall construction of houses described in the accompanying article. A number of different stucco colors and treatments are shown. A sample tile block unit is shown face up, on top of the wall

Rules for Bevels Wanted

W. H. Irwin, Knoxville, Tenn., writes us: "As a subscriber to your magazine, and knowing that there are several millwrights reading your magazine, I will ask you to give as many rules as is convenient for getting the bevel for diamond spouts or for getting the cuts for what is commonly called diamond dog leg spouts." Can you get in on this?

National Association of Builders' Exchanges

The annual convention of the National Association of Builders' Exchanges was held in Savannah, Ga., February 14-16. Memphis was chosen for the next convention. The officers elected for the ensuing year are: Chas. Wm. Bernhardt, of Atlanta, president; G. C. Mills, of Webster City, Iowa, first vice-president; John V. Beeckman, of Boston, Mass., second vice-president; J. D. Stoddard, of Detroit, treasurer; I. H. Scates, of Baltimore, secretary.

Small House Competition

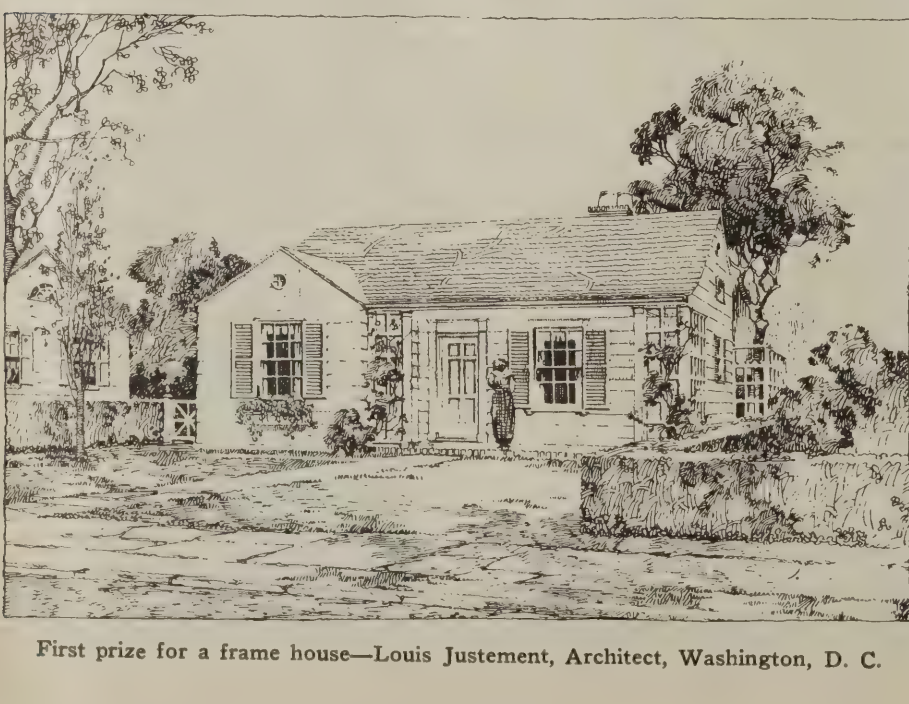
THE small house competition in conjunction with the first "Own Your Home" exposition to be held in Chicago, March 26 to April 2, and the third exposition of a similar character to be held in New York, April 16 to 30, was closed on February 7, according to Henry K. Holzman, president of the Illinois Chapter of the American Institute of Architects.

Three four-room house designs, two of which were submitted by Louis Justement, Washington, D. C., and the third by Edgar and Verna Salomonsky, New York City, were selected by the Jury of Awards as first prize-winners. The winning designs are in frame, brick, and back plastered metal lath and stucco. The first prize was $500.

Eighteen hundred small house designs were passed upon during the two-day sessions of the jurors at the Art Institute in Chicago, and the announcement of winners was made February 9. Fifty of the best designs for which $15,000 in prizes were awarded, will first be exhibited at the Chicago "Own Your Home" Exposition.

The designs also will be displayed during the third annual "Own Your Home" Exposition in New York. Real Estate Boards, including those in Philadelphia and New Haven, also will exhibit them. In both Chicago and New York, department stores have been granted permission to construct winning designs, for exhibit purposes.

Designs were submitted for four, five and six-room houses. The cost of construction of any of the first prize win-



First prize for a frame house—Louis Justement, Architect, Washington, D. C.

ning houses, according to Mr. Holzman, will run from $6,000 to $6,800. This estimate does not include the cost of the building lot. The cost of construction of other designs given prizes and honorable mention in the five-room class, will not in any instance, exceed $10,000.

Charles N. Hammond, the Chicago architect on the jury, termed the house designs the best he ever had seen submitted in a prize contest. "We are delighted with the results," he said. "The prize winners are remarkable both for their architectural attractiveness and for the splendid arrangement of their rooms."

"Realizing that the majority of small houses are not designed by the most competent architects, and that small plans are not usually profitable work for established architects," according to Mr. Holzman, "the 'small house competition' was hit upon as the method of enlisting the nation's best architectural skill and minds in designing plans for economically constructed, beautiful small homes."

The designs which won prizes and honorable mention, as well as a number of designs set aside by jurors as especially meritorious, will be incorporated in book form. Detailed working drawings and complete specifications also will be available so that prospective home builders may obtain them at a cost not to exceed $25.

The members of the Jury of Award were: Architects—C. H. Hammond, Chicago; Edwin H. Howitt, Minneapolis, Minn.; E. J. Russell, St. Louis, Mo.; Hal F. Heintz, Atland & Dwight, New York; James Baum. Builders—E. W. Lane, H. G. Zander, and Bartholomew O'Toole, all of Chicago.

The complete list of prize winners and those architects receiving honorary mention follows:

Frame — 1st Prize — Louis Justement, Washington, D. C.; 2nd prize: J. Ivan Dise and E. J. Maier, Detroit, Mich.; 3rd prize: Edmund J. Jacques, Detroit, Mich.; 4th prize: Walter F. Bagner and Carl A. Rahse, Milwaukee, Wis.

Brick — 1st Prize — Edgar and Verna Salomonsky, New York; 2nd prize: John Barnard, Boston, Mass.; 3rd prize: Henry F. Stanton and Chas. Crombie, Detroit, Mich.; 4th prize: Ainelie N. Ballantyne, New York.

Stucco — 1st Prize — Louis Justement, Washington, D. C.; 2nd prize: Amedo Loome, Detroit, Mich.; 3rd prize: Montgomery & Nibecker, Los Angeles, Cal.; 4th prize: Theo. Vischer and Jas. Burley, New York.

Frame—Mention—John Floyd Yowell, New York; Hal Hyde Harbach, Buffalo, N. Y.; Jas. A. Parke, Washington, D. C.; Robbins Louis Conn, New York.

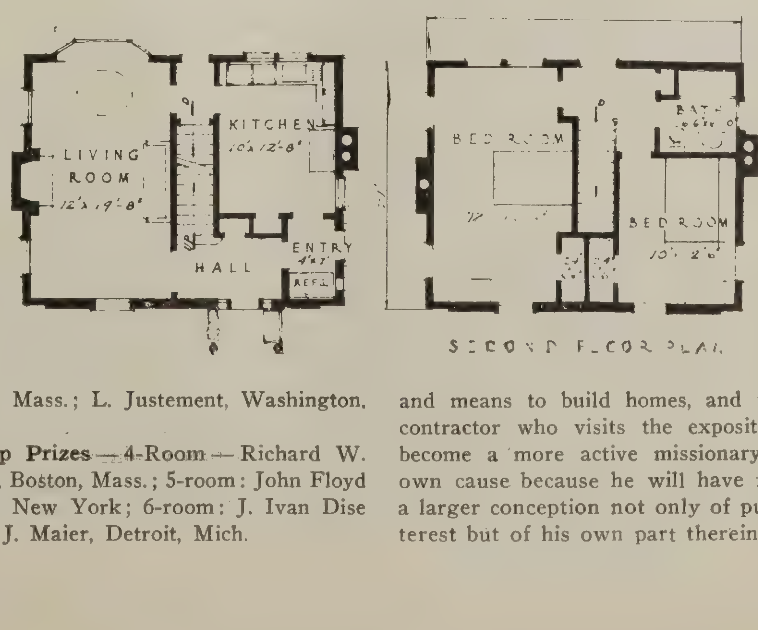
Brick — Mention — Johnson & Ford, Jamestown, N. Y.; Chauncey Hudson, New York; Richard W. Powers, Boston, Mass.; Isador Richmond, Beechmond, Mass.

Stucco — Mention—Alfred Cookman Case, New York; Edgar and Verna Salomonsky, New York; Richard W. Powers, Boston, Mass.; L. Justement, Washington, D. C.

Group Prizes — 4-Room — Richard W. Powers, Boston, Mass.; 5-room: John Floyd Yowell, New York; 6-room: J. Ivan Dise and E. J. Maier, Detroit, Mich.

The 1,800 designs and plans will be on exhibition at the Own Your Home Exposition at the Coliseum, Chicago. It is fully anticipated that the effect of the exposition will quicken the public mind to find ways and means to build homes, and that the contractor who visits the exposition will become a more active missionary in his own cause because he will have received a larger conception not only of public interest but of his own part therein.

First prize for a brick house—Edgar and Verna Salomonsky, Architects, New York City



Improved Multiple Unit Laying House

By Harold E. Wettyen, County Agricultural Agent, Passaic Co., N. J.

TO the builder whose trade includes farm and suburban work, the question of the outbuildings is a matter to be carefully considered.

The average man spends a considerable amount of time in conference with his architect and builder when it comes to the planning and construction of his home. His barn or garage are also usually well planned and all details worked out before the work is started.

However, when it comes to the poultry building or buildings, how often have you been instructed to build a "chicken coop"? As a builder you are interested in building should be considered in order to have your customer get a good start in the business, anyway.

As in all other buildings we must consider first the fundamental requirements and then build accordingly so that we can give each point due consideration.

1. Light.
2. Moisture.
3. Ventilation.
4. Temperature.

Light. To get the best light and direct sunlight is an essential. We have found in Passaic County, New Jersey, the shed roof type house the best as the sun in this type thrive on moisture, so the coop should be placed in a dry location and should be raised a few inches above the level of the ground.

We have found cement floors and foundations, well underlaid with stone and ashes, the best type of floor for our use. The good layer of stone and ashes below the floor helps keep the floor dry and makes it rat and vermin proof. The floor is carried up to the small foundation so that surface water cannot run in. Such a floor covered with a good layer of dry straw is clean, dry and warm at all seasons of the year.

Fig. 1

Fig. 2

a "good, tight building with plenty of light" and usually that is about all that is considered. An attempt is sometimes made to have the "chicken coop" fit in with the other outbuildings and to try to be of the same type as the main buildings on the place.

To the average man such a coop is entirely satisfactory as far as the construction of it goes, but the results he will obtain from the poultry which are due in a large degree to the housing may be far from satisfactory. The result is usually that the birds become unprofitable and the "chicken coop" goes out of use and a profitable hobby or side line is discontinued.

The fate of most of the suburban or farm poultry flocks is in the hands of the builders. As builders may we consider the points in poultry house construction that house has easy access to all parts of the floor and helps keep the temperature up and the moisture down and thus keeps disease down to a minimum. To get this light most evenly distributed at all times of the season we have found that the coop must face the south.

Cut No. 1 shows a Passaic County poultry house constructed after plans furnished by the New Jersey State Agricultural College, and shows clearly how much the light factor is considered. You will note the windows to each side and the large open spaces in the center which are provided with cloth screens which may be dropped in bad weather. We have found that if we keep the front of the house all closed up, as in Cut No. 2, it gets too hot for the birds and makes ventilation more difficult.

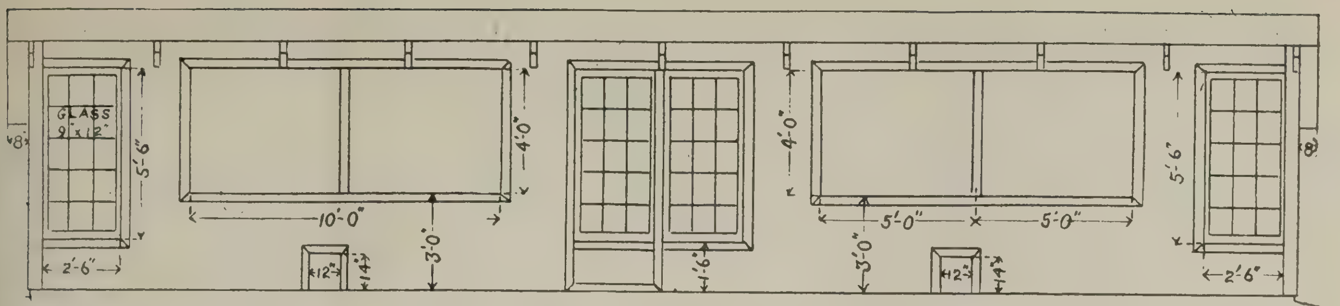
Moisture. All disease germs seem to

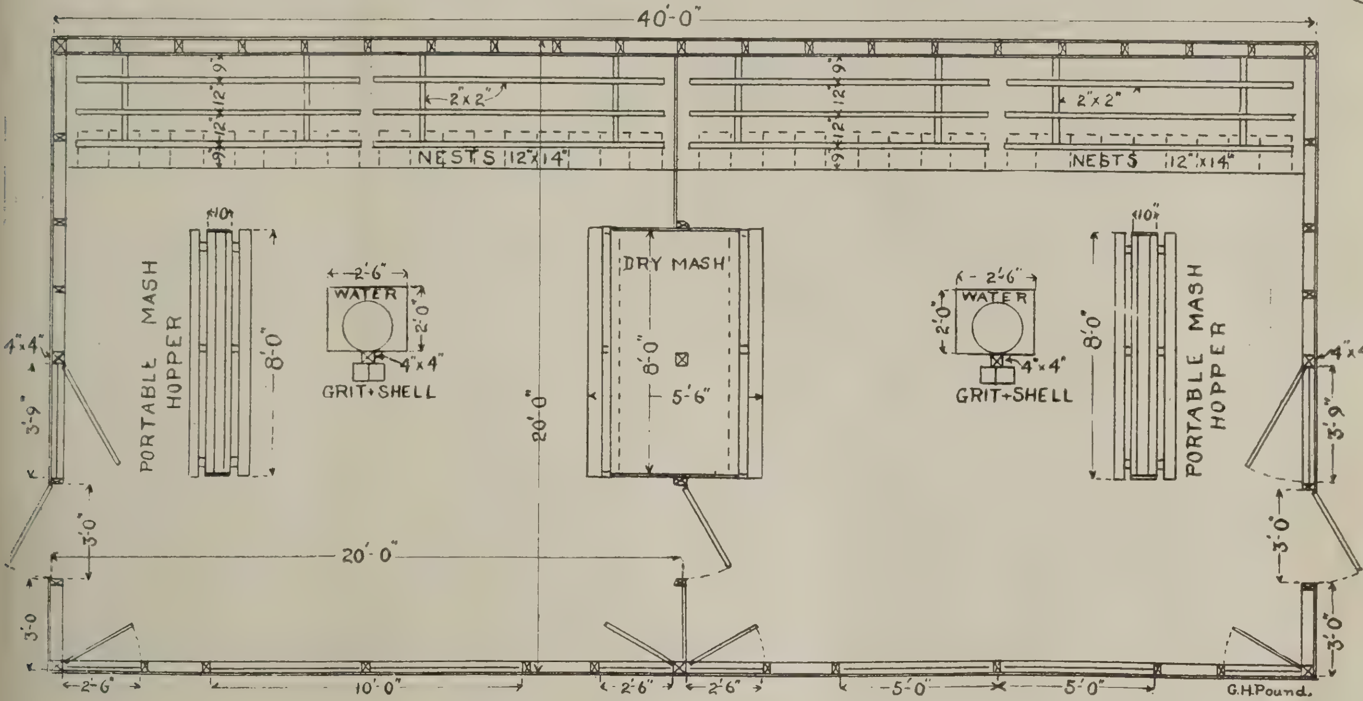
Ventilation. Contrary to the general belief, ventilation is an essential in good poultry house construction. Ventilation is obtained through the open spaces in front of the house and the ventilator in the back. This helps keep the moisture down and the air fresh at all times, insuring the health of the birds.

Temperature. Temperature is not such an important factor as we sometimes think it is. It does not seem to trouble us in our latitude at all as long as the preceding three factors are all right. Low temperature, with dry air, has little effect on the birds if properly fed and free from drafts.

There is no need for an air-tight house as long as you keep your ventilator and moisture factors in mind. We have found, however, that the house can be made more comfortable by lining the back or north end

Front View





Front Plan

of the poultry house with paper and good light boards.

In especially cold days the curtains in the front of the house can be lowered. This will keep the temperature up without disturbing the ventilating or lighting scheme.

Equipment. The equipment of the house is also an important factor, and the plan, as shown in Cut. No. 3, will show the location and plan of construction. A few points that should be considered in building this equipment are worth a few moments' study.

First, be sure to build a dropping board and build it of grooved and tongued lumber so that it can be easily cleaned.

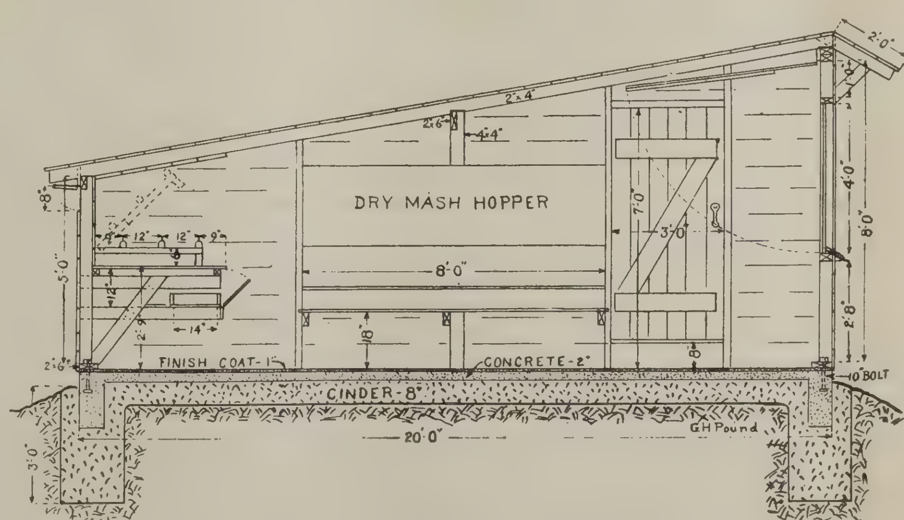
Have all perches removable so they can be easily cleaned.

If your customer is keeping leghorns or any of the light breeds of poultry the height of the dropping boards and perches is of no importance.

However, with the layer and heavier breeds that cannot fly so easily, they find it hard to get to high perches and nests and also injure themselves in jumping down to the hard floor. Either lower the perches or provide a runway for the birds to and from perches and nests.

Allow from three to four square feet of floor space for each bird.

By considering these points and factors that mean so much toward the success or failure of the poultry man, you build a good house, at a reasonable cost, and one that will give service and satisfaction, and, if coupled with good management on the part of the poultryman, will in time mean more poultry house construction contracts.



Cross Section

The plans shown are taken from the Hints to Poultrymen Bulletin of the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

Reinforced Concrete Footings

By C. H. Marquess, C. E.

THE following tables of re-inforced concrete footing are the first part of a series covering earth bearing values from 1,000 pounds per square foot to 8,000 pounds per square foot, inclusive. It is believed that they represent conservative practice, but no effort has been made toward ultra-refinement in design. The idea of the compiler is to produce a practical, safe, and easily understood table of spread footings, of a design which can be built safely and economically.

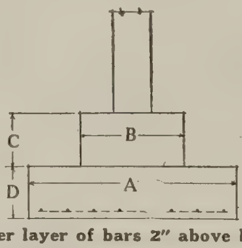
The following unit stresses are used, as a maximum:

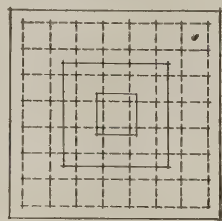
Tension on steel .... 16,000 lb. per sq. in.
Extreme fibre compression on concrete .... 850 lb. per sq. in.
Punching shear on concrete ...... 120 lb. per sq. in.

For the convenience of our readers we

Table No. 1

1000 lbs.
per sq. ft. allowable pressure on soil.



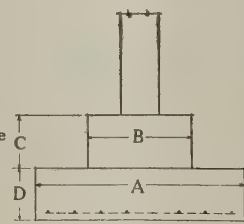


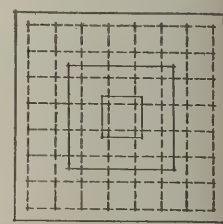
NOTE: Lower layer of bars 2″ above bottom of footing.

Footing Load in Pounds	A	B	C	D	Bars, Each Way	Steel, Lbs. per Footing	Concrete Yds. per Footing
9,000	3′–0″	1′–6″	12″	12″	5–⅜″□	13.2	.416
10,300	3′–3″	1′–6″	12″	12″	5–⅜″□	14.4	.476
12,200	3′–6″	1′–8″	12″	12″	5–⅜″□	15.6	.538
14,000	3′–9″	1′–8″	12″	12″	5–⅜″□	16.8	.61
16,000	4′–0″	2′–0″	12″	12″	5–⅜″□	18.0	.74
18,000	4′–3″	2′–0″	12″	12″	5–⅜″□	19.2	.82
20,000	4′–6″	2′–3″	12″	12″	6–⅜″□	24.5	.94
22,500	4′–9″	2′–3″	12″	12″	6–⅜″□	25.8	1.1
25,000	5′–0″	2′–6″	12″	12″	6–⅜″□	27.4	1.16
27,500	5′–3″	2′–6″	12″	14″	6–⅜″□	28.8	1.42
30,000	5′–6″	2′–9″	12″	14″	7–⅜″□	35.5	1.59
33,000	5′–9″	2′–9″	12″	14″	7–⅜″□	37.0	1.7
36,000	6′–0″	3′–0″	12″	15″	7–⅜″□	38.6	2.0
39,000	6′–3″	3′–0″	14″	15″	7–⅜″□	40.0	2.2
42,000	6′–6″	3′–3″	14″	15″	8–⅜″□	48.0	2.6
45,500	6′–9″	3′–3″	14″	15″	8–⅜″□	50.0	2.74
49,000	7′–0″	3′–6″	14″	16″	8–⅜″□	52.0	2.95
52,500	7′–3″	3′–6″	14″	16″	8–⅜″□	54.0	3.13
56,000	7′–6″	3′–9″	14″	16″	9–⅜″□	63.0	3.30
60,000	7′–9″	3′–9″	14″	16″	9–⅜″□	65.0	3.5
64,000	8′–0″	4′–0″	15″	18″	9–½″□	118.0	4.3
68,000	8′–3″	4′–0″	15″	18″	9–½″□	122.0	4.53
72,000	8′–6″	4′–3″	15″	18″	9–½″□	126.0	4.83
76,500	8′–9″	4′–3″	15″	18″	10–½″□	144.0	5.18
81,000	9′–0″	4′–6″	16″	20″	10–½″□	149.0	6.0
85,200	9′–3″	4′–6″	16″	20″	10–½″□	153.0	6.26
90,000	9′–6″	4′–9″	16″	20″	11–½″□	173.0	6.66
95,000	9′–9″	4′–9″	16″	20″	11–½″□	177.0	6.97
100,000	10′–0″	5′–0″	18″	22″	11–½″□	183.0	8.46

Table No. 2

2000 lbs.
per sq. ft. allowable pressure on soil.





NOTE: Lower layer of bars 2″ above bottom of footing.

Footing Load in Pounds	A	B	C	D	Bars, Each Way	Steel, Lbs. per Footing	Concrete Yds. per Footing
18,000	3′–0″	1′–6″	12″	12″	5–⅜″□	13.2	.416
20,600	3′–3″	1′–6″	12″	12″	5–⅜″□	14.4	.476
24,400	3′–6″	1′–8″	12″	12″	5–⅜″□	15.6	.538
28,000	3′–9″	1′–8″	12″	12″	5–⅜″□	16.8	.61
32,000	4′–0″	2′–0″	12″	12″	5–⅜″□	18.0	.74
36,000	4′–3″	2′–0″	12″	12″	5–⅜″□	19.2	.82
40,000	4′–6″	2′–3″	12″	12″	6–⅜″□	24.5	.94
45,000	4′–9″	2′–3″	12″	12″	6–⅜″□	25.8	1.1
50,000	5′–0″	2′–6″	12″	12″	6–⅜″□	27.4	1.16
55,000	5′–3″	2′–6″	12″	14″	6–⅜″□	28.8	1.42
60,000	5′–6″	2′–9″	12″	14″	7–⅜″□	35.5	1.59
66,000	5′–9″	2′–9″	12″	14″	7–⅜″□	37.0	1.7
72,000	6′–0″	3′–0″	12″	15″	7–⅜″□	38.6	2.0
78,000	6′–3″	3′–0″	14″	15″	7–⅜″□	40.0	2.2
84,000	6′–6″	3′–3″	14″	15″	8–⅜″□	48.0	2.6
91,000	6′–9″	3′–3″	14″	15″	8–⅜″□	50.0	2.74
98,000	7′–0″	3′–6″	14″	16″	8–⅜″□	52.0	2.95
105,000	7′–3″	3′–6″	14″	16″	8–⅜″□	54.0	3.13
112,000	7′–6″	3′–9″	14″	16″	9–⅜″□	63.0	3.30
120,000	7′–9″	3′–9″	14″	16″	9–⅜″□	65.0	3.5
128,000	8′–0″	4′–0″	15″	18″	9–½″□	118.0	4.3
136,000	8′–3″	4′–0″	15″	18″	9–½″□	122.0	4.53
144,000	8′–6″	4′–3″	15″	18″	9–½″□	126.0	4.83
153,000	8′–9″	4′–3″	15″	18″	10–½″□	144.0	5.18
162,000	9′–0″	4′–6″	16″	20″	10–½″□	149.0	6.0
174,000	9′–3″	4′–6″	16″	20″	10–½″□	153.0	6.26
180,000	9′–6″	4′–9″	16″	20″	11–½″□	173.0	6.66
190,000	9′–9″	4′–9″	16″	20″	11–½″□	177.0	6.97
200,000	10′–0″	5′–0″	18″	22″	11–½″□	183.0	8.46

are re-publishing the following table of soil bearing values, which is commonly accepted as conservative practice:

Coarse and compact,

Allowed pressure per sq. ft.

Hard rock—in deep, wide sheets ....25 tons and over
Hard rock—stratified ....15 to 20 tons
Soft rock .... 5 to 10 tons
Clay, dry .... 4 to 6 tons
Clay, moderately dry............ 3 to 4 tons
Clay, soft—wet .... 1 to 2½ tons
Gravel and sand, mixed, natural bed .... 7 to 9 tons
Coarse sand, compact, natural bed .... 4 to 6 tons
Sand, dry .... 2 to 4 tons
Gumbo, quick-sand, filled ground ....½ to 1 tons

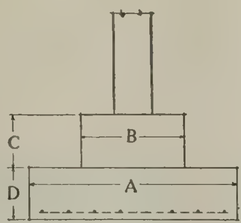
Footings which are to be supported on piles require special calculations, and the designs shown in the following tables cannot be used for this purpose.

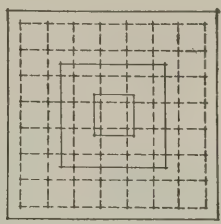
Concrete used in footings should be equivalent to a 1-2-4 mixture; that is, they should have 1 part of cement, 2 parts sand, and 4 parts broken stone.

Table No. 3

3000 lbs.

per sq. ft. allowable pressure on soil.





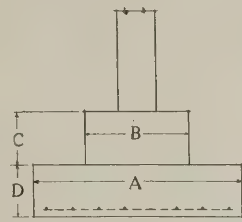
NOTE: Lower layer of bars 2″ above bottom of footing.

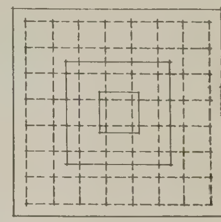
Footing Load in Pounds	A	B	C	D	Bars, Each Way	Steel, Lbs. per Footing	Concrete Yds. per Footing
27,000	3′–0″	1′–6″	12″	12″	6–⅜″□	15.8	.416
30,900	3′–3″	1′–6″	12″	12″	6–⅜″□	17.3	.476
36,600	3′–6″	1′–8″	12″	12″	6–⅜″□	18.8	.538
42,000	3′–9″	1′–8″	12″	12″	6–⅜″□	20.0	.61
48,000	4′–0″	2′–0″	12″	12″	8–⅜″□	28.6	.74
54,000	4′–3″	2′–0″	12″	12″	8–⅜″□	30.7	.82
60,000	4′–6″	2′–3″	12″	12″	9–⅜″□	36.6	.94
67,500	4′–9″	2′–3″	12″	12″	9–⅜″□	39.0	1.10
75,000	5′–0″	2′–6″	12″	12″	10–⅜″□	45.6	1.16
82,500	5′–3″	2′–6″	12″	14″	10–⅜″□	48.0	1.42
90,000	5′–6″	2′–9″	12″	14″	10–⅜″□	51.0	1.59
99,000	5′–9″	2′–9″	12″	14″	10–⅜″□	54.0	1.70
108,000	6′–0″	3′–0″	12″	15″	8–½″□	78.2	2.00
117,000	6′–3″	3′–0″	14″	15″	8–½″□	81.5	2.20
126,000	6′–6″	3′–3″	14″	15″	8–½″□	85.0	2.60
136,500	6′–9″	3′–3″	14″	15″	8–½″□	88.5	2.74
147,000	7′–0″	3′–6″	14″	16″	8–½″□	92.0	2.95
157,500	7′–3″	3′–6″	14″	16″	9–½″□	107.0	3.13
168,000	7′–6″	3′–9″	14″	16″	9–½″□	110.0	3.30
180,000	7′–9″	3′–9″	14″	16″	9–½″□	115.0	3.50
192,000	8′–0″	4′–0″	15″	18″	9–½″□	118.5	4.30
204,000	8′–3″	4′–0″	15″	18″	10–½″□	133.0	4.53
216,000	8′–6″	4′–3″	15″	18″	10–½″□	140.0	4.83
229,500	8′–9″	4′–3″	15″	18″	11–½″□	159.0	5.18
243,000	9′–0″	4′–6″	16″	20″	11–½″□	164.0	6.00
255,600	9′–3″	4′–6″	16″	20″	12–½″□	184.0	6.26
270,000	9′–6″	4′–9″	16″	20″	12–½″□	189.0	6.66
285,000	9′–9″	4′–9″	16″	20″	13–½″□	210.0	6.97
300,000	10′–0″	5′–0″	18″	22″	14–½″□	232.0	8.46

Table No. 4

4000 lbs.

per sq. ft. allowable pressure on soil.





NOTE: Lower layer of bars 2″ above bottom of footing.

Footing Load in Pounds	A	B	C	D	Bars, Each Way	Steel, Lbs. per Footing	Concrete Yds. per Footing
36,000	3′–0″	1′–6″	12″	12″	6–⅜″□	15.8	.416
41,200	3′–3″	1′–6″	12″	12″	6–⅜″□	17.3	.476
48,800	3′–6″	1′–8″	12″	12″	6–⅜″□	18.8	.538
56,000	3′–9″	1′–8″	12″	12″	6–⅜″□	20.0	.61
64,000	4′–0″	2′–0″	12″	12″	8–⅜″□	28.6	.74
72,000	4′–3″	2′–0″	12″	12″	8–⅜″□	30.7	.82
80,000	4′–6″	2′–3″	12″	12″	9–⅜″□	36.6	.94
90,000	4′–9″	2′–3″	12″	12″	9–⅜″□	39.0	1.10
100,000	5′–0″	2′–6″	12″	12″	10–⅜″□	45.6	1.16
110,000	5′–3″	2′–6″	12″	14″	11–⅜″□	53.0	1.42
120,000	5′–6″	2′–9″	12″	14″	11–⅜″□	55.6	1.59
132,000	5′–9″	2′–9″	12″	14″	12–⅜″□	63.7	1.70
144,000	6′–0″	3′–0″	12″	15″	12–⅜″□	66.2	2.00
156,000	6′–3″	3′–0″	14″	15″	12–⅜″□	69.2	2.20
168,000	6′–6″	3′–3″	14″	15″	8–½″□	85.0	2.60
182,000	6′–9″	3′–3″	14″	15″	8–½″□	88.5	2.74
196,000	7′–0″	3′–6″	14″	16″	8–½″□	92.0	2.95
210,000	7′–3″	3′–6″	14″	16″	10–½″□	119.0	3.13
224,000	7′–6″	3′–9″	14″	16″	10–½″□	124.0	3.30
240,000	7′–9″	3′–9″	14″	16″	11–½″□	141.0	3.50
256,000	8′–0″	4′–0″	15″	18″	11–½″□	147.5	4.30
272,000	8′–3″	4′–0″	15″	18″	12–½″□	163.0	4.53
288,000	8′–6″	4′–3″	15″	18″	12–½″□	168.0	4.83
306,000	8′–9″	4′–3″	15″	18″	13–½″□	188.0	5.18
324,000	9′–0″	4′–6″	16″	20″	13–½″□	194.0	6.00
348,000	9′–3″	4′–6″	16″	20″	15–½″□	230.0	6.26
360,000	9′–6″	4′–9″	16″	20″	15–½″□	235.0	6.66
380,000	9′–9″	4′–9″	16″	20″	16–½″□	258.0	6.97
400,000	10′–0″	5′–0″	18″	22″	16–½″□	265.0	8.46

A Shed Roof Poultry House

By F. C. Lewis

A HEN must be kept comfortable and happy if she is expected to yield a maximum production of eggs and young stock. This means a well designed and constructed poultry house. Conditions vary so much that it is not possible to design a poultry house which may be used for all locations without alterations but there are a few well known principles which are essential for poultry house construction. Provisions should be made for the admission of fresh air and sunlight, be free from drafts, be durable, have a low cost and be dry.

LOCATION.—The poultry house should be located if possible on the southern slope of a sandy soiled hill. This insures abundance of sunlight, dryness and protection from the cold north winds. Low places and damp soils should be avoided. The poultry lot should be provided with shade and land for growing green crops and grains. An orchard is a very desirable location.

Construction of the Poultry House

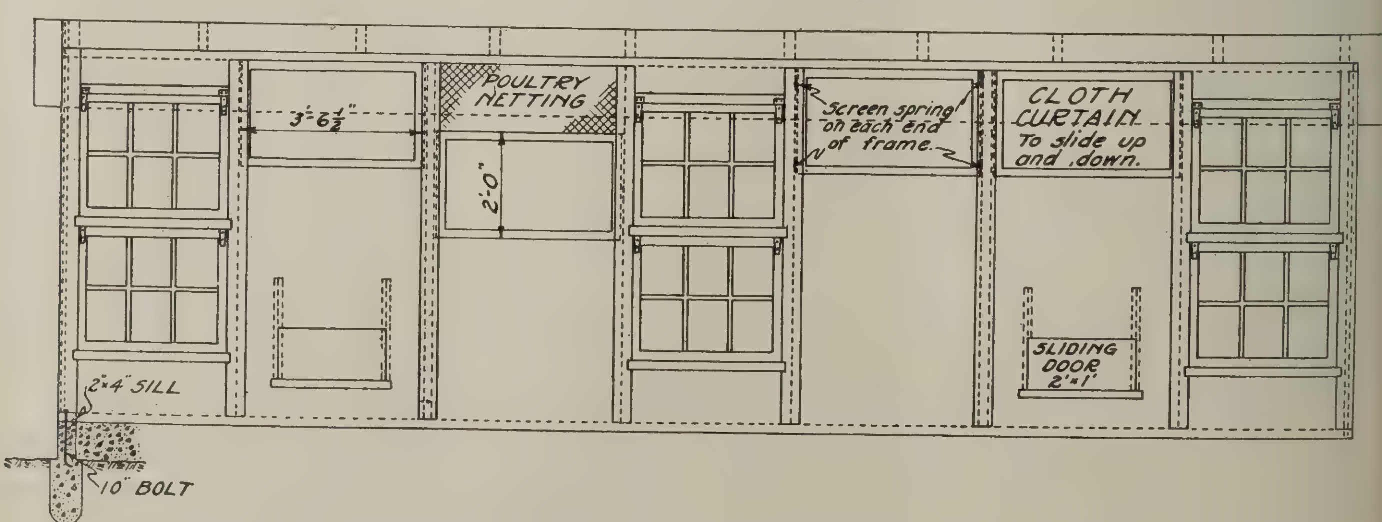
SIZE.—The size of the house depends upon the breed and the size of the flock. Four square feet of floor space will meet average conditions. The smaller the flock the greater should be the number of square feet of floor space provided per bird. Where birds are confined during the greater part of the winter a large floor space should be provided to insure ease of cleaning and freedom of the birds. A twelve-bird house should be about eight by eight feet by eight feet while a one hundred and twenty-five to one hundred and fifty bird house need but sixteen by thirty-two square feet of floor space.

SHAPE.—The more nearly square the house is built the less will be the cost of the side wall construction. Sixteen feet is a convenient depth for a shed roof house. This type of house is cheaper than many of the other shapes of roofs, is easily constructed and is very satisfactory.

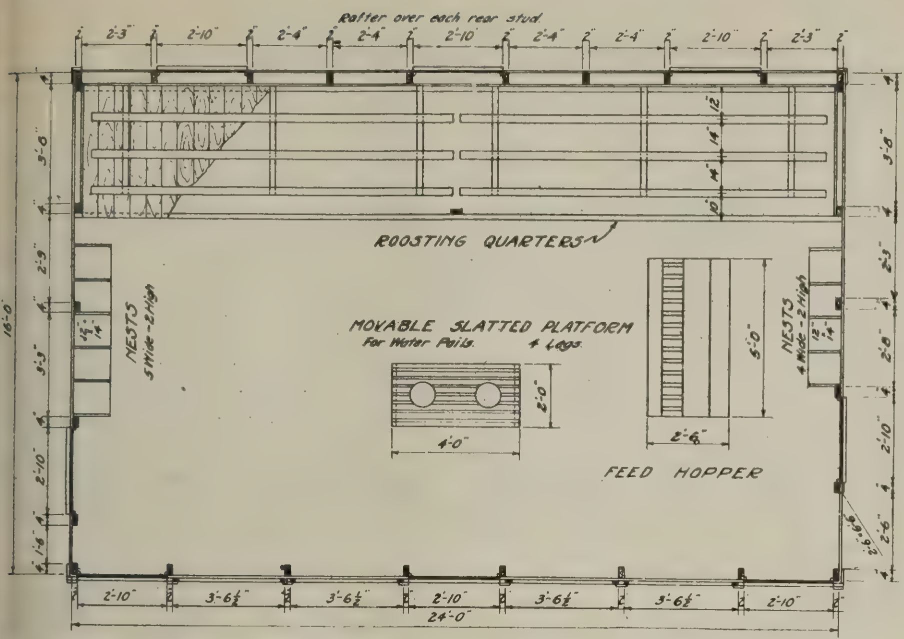
FOUNDATION AND FLOOR.—A well built concrete foundation besides furnishing a solid support for the superstructure keeps out rats, cold air, and moisture, and prevents the heaving of the floor due to moisture and frosts in the soil. A concrete mixture of one part cement to six parts gravel will be found very satisfactory. A foundation six feet wide, two feet deep and extending one foot above ground will be sufficient for the average poultry house. Concrete floors if provided with a gravel or cinder base will be dry, easy to clean, sanitary, durable and economical in construction.

HEIGHT OF WALLS.—The front wall should be just high enough to allow sunlight to cover the floor during part of the day, and to give sufficient pitch to the roof and head room for the attendant in caring for the birds. The back wall need be only high enough to allow space for the roosting quarters. The more waste space in the house the colder it will be, but if too low ventilation will be poor and the house will be warm in summer. The walls should be tightly constructed to eliminate drafts and aid in controlling the inside temperature.

A dry, well-ventilated poultry house



FRONT ELEVATION



GROUND PLAN

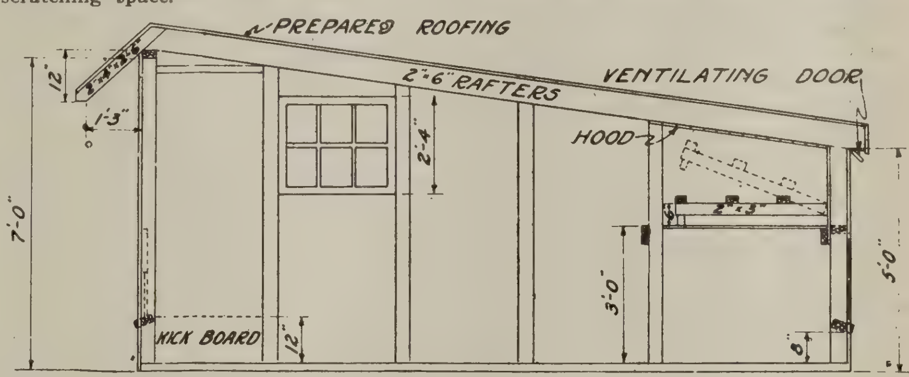
ROOF.—The gable, combination, half-monitor and shed roofs are all commonly used for poultry houses. The shed roof requires a minimum amount of material, is easily constructed, drains all the rain water to the rear and has proven very satisfactory. A good grade of prepared roll flooring laid over shiplap or tongued and grooved material makes a roof which is tight, and if kept well painted will last several years. Prepared roll roofing may be laid on a roof of less pitch than can shingles.

VENTILATION.—Ventilation is very important for poultry houses, as large amounts of water vapor is given off through respiration, and if not properly provided for will condense upon the walls of the building and cause the house to be damp and cold. Ventilation for poultry houses is usually provided for by openings in the front fitted with muslin sashes and by openings in the back wall. In order that the system may be effective the walls and roof must be air tight. In some gable-roofed houses a loft filled with straw is used. The straw absorbs the moisture and tends to keep the house cool in summer and warm in winter. Muslin breaks up the air currents and shuts out cold winds and rain.

WINDOWS.—Glass sashes are necessary to keep out cold and admit sunshine. The windows should be fitted for opening to admit air on warm days and to keep out rain. Muslin sashes should also be fitted for opening and closing as desired. Stock sizes of windows should always be used to cut down expense.

INTERIOR FIXTURES.—The arrangement of the interior is very important, as convenience in arrangement lessens the labor in caring for the birds and also adds to their comfort.

The roosting quarters are usually in the rear of the house about three feet from the floor. The walls and bottom of the rafters at the back may be ceiled, making a tight compartment over the roosts which aids in keeping the birds warm while at roost during cold weather. The perches are made of two by two or two by three inch lumber spaced about 14 inches apart and supported by sleepers which rest on the droppings platform. The droppings platform aids in keeping the floor clean and usable for scratching space.



END FRAMING

The roosts should be from 12 to 14 inches deep and 12 inches wide. The wall nests are most convenient as they are off the floor and easily cleaned. A sloping top prevents the birds from roosting on the nests.

The poultry house shown by the photograph and plans was designed for a general purpose house suitable for the country or town flock. It has a floor area 16 by 24 feet and will accommodate about 100 birds. A concrete foundation extends 20 inches below and eight inches above the surface of the ground, supports the framework. The floor is also of concrete constructed on a sub-base of gravel; it is dry, sanitary, and should be permanent. The framing is of two by four inch material. The studdings for the front wall are seven feet long and for the back wall five feet. The rafters are two by six material spaced two feet apart. Drop siding is used for the walls which are made single except around the roosting quarters where the walls and rafters are ceiled, forming a hood to protect the birds while on the roosts. The roofing consists of shiplap sheathing covered with a good grade of roll roofing. Cornice rafters are spiked to the front ends of the rafters, forming a hood over the front to prevent rain from blowing into the house through the front openings. Light is admitted into the house through three 10 by 12 inch six light sash, double windows in the front wall, one six light sash window in both ends and three in the back wall. The sashes in the front wall are hinged at the top and open outward so that they will drain water away from the house. The windows in the back wall light the space under the roosting quarters. These windows are fitted to slide, and if the house is located in a country where the temperature is below zero during a large part of the winter these windows should have double glass. All the windows and openings are covered with poultry netting. A door for the admittance of the attendant is in one end near the front. One sliding poultry door in the front wall and one in the end wall butted one foot from the floor. The front has three, two by three feet six inch muslin sashes. These sashes are fitted with friction springs which hold the sash at any desired position.

Ventilation doors are fitted under the back cornice and may be opened for cooling the house. A hood over the roosting quarters prevents an air circulation directly upon the birds at roost.

The roosting quarters are at the back and consist of three removable perches extending the full length of the house and a dropping platform three feet off the floor.

Nests are fastened to the walls at both ends about two feet from the floor.

A stand for keeping the liquid feed pails off the floor and keep them from litter is in the center of the floor.

Announcements and Publications

Ralph H. Oliver, architect, formerly at 234 S. La Salle St., Chicago, announces the re-opening of his offices for the general practice of architecture at 115 S. Dearborn St., Chicago; rooms 915-916.

"Hinges" is the name of a handsomely bound catalogue of builders' hardware put out by The Griffin Manufacturing Co., of Erie, Pa. Hinges, bolts, hasps, corner irons, and other kinds of hardware are shown.

Gasoline Shovel—The Austin Machinery Corp. announces the perfecting of a thorough-going, practical gasoline shovel, in the new Austin Model 6-T. An entirely new design and not an adaptation of the steam shovel idea, this machine, it is claimed, has a number of exclusive features which insure increased earning power.

The Austin Machinery Corp. of Louisiana, Inc., announces its incorporation under the laws of the State of Louisiana, as sole distributors for Louisiana, Arkansas, Mississippi, and Tennessee of the products of the Austin Machinery Corp., manufacturers of contractors' equipment. The general offices are at 1020 Maison Blanche Bldg., New Orleans, La.

Advance Waterproof Cement Co., 175 West Jackson Blvd., Chicago, have issued a booklet dealing with the nature and uses of Advance Re-Ground Water-Proof Portland Cement and Advance Hydro Corundum Portland Cement. A table of tests is included, with specifications and a partial list of structures and locations where these products have been successfully used.

How the Ingersoll-Rand Co. Is Solving Its Housing Problem with Concrete is the name of a booklet containing photographs, plans, details and a complete description of the unusual housing project at Phillipsburgh, N. J., in which standardized forms were used and the concrete placed continuously from basement to roof. The booklet is obtainable by writing to the Portland Cement Association, 111 W. Washington St., Chicago.

Tanks and Arc-Welded Products—The Adamson Manufacturing Co., of East Palestine, O., announces the addition of a new department for manufacturing all kinds of storage, pneumatic and pressure tanks, welded pipe, battery casings, evaporators, condensors and a large line of arc-welded products.

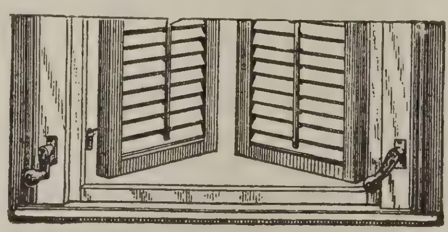
Construction Lime News is the name of the new publication with which the National Lime Association has ushered in the new year. This first number, for January, 1921, is a neat little eight-page booklet containing interesting items on the uses and preparation of lime. A particularly important item in this number is the list given of the publications of the Construction Department of the National Lime Association, the majority of which may be obtained free of charge by writing to the Association at the Mather Building, 918 G St., N. W., Washington, D. C.

Lakewood Engineering Co., of Cleveland, O., announces a new 16-page booklet in two colors illustrating the Lakewood clamshell bucket. The "digging down" feature of this bucket is stressed, and the whole story is told in pictures showing the bucket in use on different types of cranes and operating under various conditions.

G. F. Peds—The entire January, 1921, issue of "General Fireproofing," the official organ of the General Fireproofing Co., of Youngstown, O., is devoted to the discussion and illustration of the use of G. F. Peds, the construction and method of utilizing the several types of Peds being carefully explained, with specifications.

Terra Cotta Defined is the subject of Volume VI of the Brochure Series issued by the National Terra Cotta Society, of 1 Madison Ave., New York City. This well-arranged booklet is made up almost entirely of photographs, carefully chosen and instructive, of buildings, illustrating various methods of utilizing terra cotta as a decorative feature. There are a number of close-ups showing the possibilities of terra cotta as a medium of rendering delicate and intricate bits of architectural detail, and it is this plasticity of the material combined with its permanence which is stressed in the brochure.

Mallory Standard Shutter Worker is the title of a booklet issued by the Mallory Manufacturing Co., of Flemington,



N. J., illustrating and describing a device for operating shutters from inside or outside the window. A special attachment is used for two-fold blinds or casements.

Oak Flooring: How and Where to Use It is the title of one of several booklets to be had of the Oak Flooring Manufacturers' Association, 1014 Ashland Block, Chicago. In this booklet are given grading rules, standard thicknesses and widths, weights and counts, the use of different grades and widths, how to estimate the quantity needed, the proper handling of oak flooring and the laying, scraping and finishing of the floor. "Oak Flooring for Factories and Warehouses" contains testimonials from firms where oak floors have been in use for years. "Modern Oak Floors Good for a Hundred Years" gives pictures of some interesting interiors and buildings where that type of flooring has been used, and is handsomely printed in colors. A folder of "Oak Flooring Newspaper Cuts" offers free to builders the choice of eight different cuts which may be used in newspaper advertising.

The American Cement Machine Co. Inc., sends us a very handsome catalogue of their "Builders' Mixers." These machines are illustrated with clear, large cuts and details, with descriptive text and specifications. A liberal use of silver bronze adds to the attractiveness of the booklet.

Roofing—Bird & Son, Inc., East Walpole, Mass., exhibit a folder in colors showing the possibilities and advantages in the use of the American Ready Roofing, Slate Surfaced, and the Art-Craft Roofing, Shingle design.

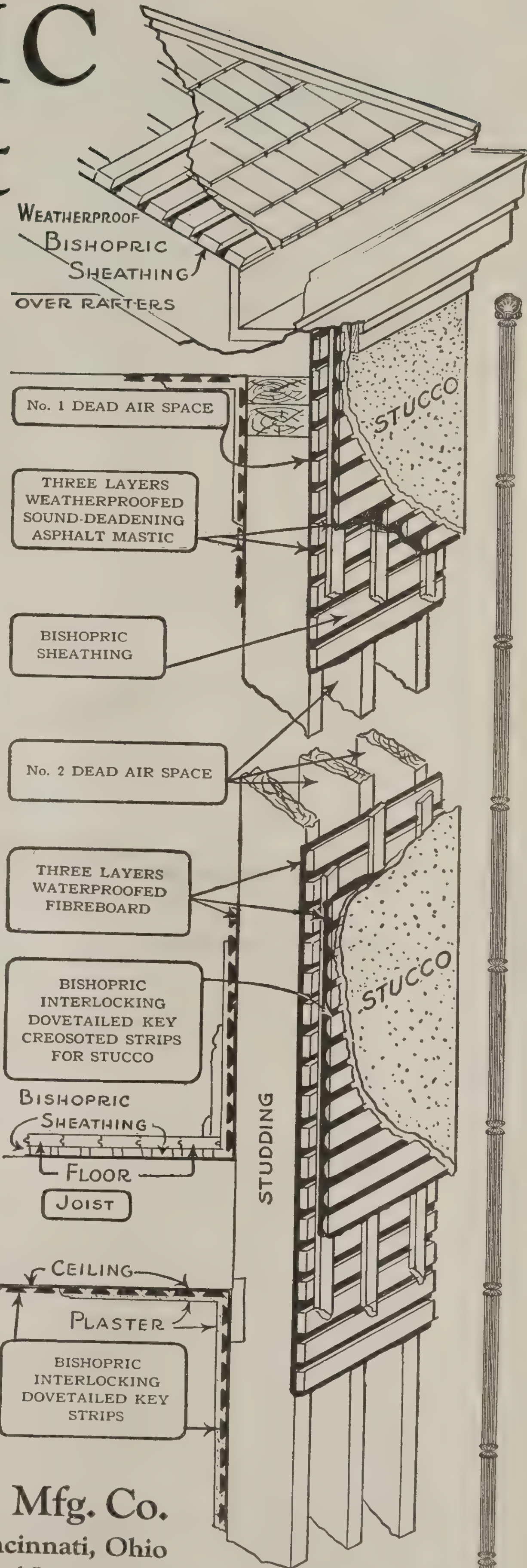
The Standard Manufacturing Co., of Sterling, Ill., illustrate and describe in a couple of well-arranged folders their Floor Hinge No. 240 for use on swinging doors and their "Big 4" Door Hanger to be used on the barn.

Barn Equipment—"No. B 12" is the number of the catalogue in which the Hudson Manufacturing Co., 308-330 Third Ave., North, Minneapolis, Minn., have listed in a very complete and comprehensive way the various types of barn equipment manufactured by that concern.

Portsmouth, N. H., is the scene from which are taken the photographs and descriptive text making up the first number of Volume VII of the White Pine Series of Architectural Monographs issued by the White Pine Bureau, Merchants' Bank Bldg., St. Paul, Minn. The houses illustrated are simple, dignified and imposing, and furnish some interesting entrance details. Electus D. Litchfield has written the text for the book. The program of the Sixth Annual Architectural Competition, which has for its subject this year the planning of a three-teacher rural school with a teachers' cottage adjoining, is given in this number.

Stucco Base Details — The Bishopric Manufacturing Co., 301 Este Ave., Cincinnati, O., has recently issued a 17-page portfolio of working specifications and details for their stucco and plaster bases.

BISHOPRIC Throughout *for the* Stucco House of Supreme Quality



THE stucco house, when built *throughout* of BISHOPRIC, as illustrated in the sketch at the side, provides the utmost, within practicable limits, of strength, insulation, satisfaction and comfort.

A study of the drawing, showing the three layers of asphalt mastic in the walls and the two layers of non-circulating air space and the super-excellent combination of asphalt and non-circulating air space insulation of the floors and ceilings indicates how impossible it is for moisture to penetrate. The elastic asphalt mastic seals itself about the nails and prevents rust and the seepage of moisture. Warmth is kept inside in winter and heat outside in summer by reason of those double walls of air space and those triple walls of sound-deadening, weatherproof asphalt mastic.

While BISHOPRIC was designed first for superiority, actual practice has demonstrated that a BISHOPRIC built house *costs decidedly less* than stucco and frame houses built by other methods. We have prepared a booklet for you, containing facts and figures, and illustrated with photographs of beautiful houses built with BISHOPRIC stucco, plaster and sheathing units. Ask for it.

BISHOPRIC

BISHOPRIC SHEATHING — Strengthening, insulating, sound-deadening, weather-proofing unit; for exterior walls, sub-flooring and sub-roofing.

BISHOPRIC STUCCO BASE— Interlocking dovetailed key, insulating and waterproofing unit; creosote treated and not treated; for exterior. Applied direct to the studding or over BISHOPRIC sheathing.

BISHOPRIC PLASTER BASE— Interlocking dovetailed key, insulating, moisture proofing and sound-deadening unit; for interior plaster walls and ceilings.

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NATIONAL BUILDER

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The Situation

A BRISK controversy has arisen over the question of the actual increase in lumber costs since 1914, and has excited much interest throughout the country. This was provoked by a comparison by Architect F. E. Davidson, president of the Illinois Society of Architects, of the costs of two buildings erected in 1914 and prices quoted for the same construction material today. In this comparison it is claimed that lumber costs have mounted to 150 per cent over 1914 prices. Mr. N. C. Maher, president of the Lumbermen's Association of Chicago, submits figures to show that the increase is only 60 per cent, and offers $1,000 to be paid to any charitable institution, if his figures can be proved erroneous.

This controversy carried on through the daily press seriously shakes public confidence which at this time the building interests badly need to acquire. But in addition to such untoward happenings it is kept at a low ebb by the revelations which resulted in the fining and imprisonment of about forty master plumbers and corporations in New York for violation of the anti-trust laws.

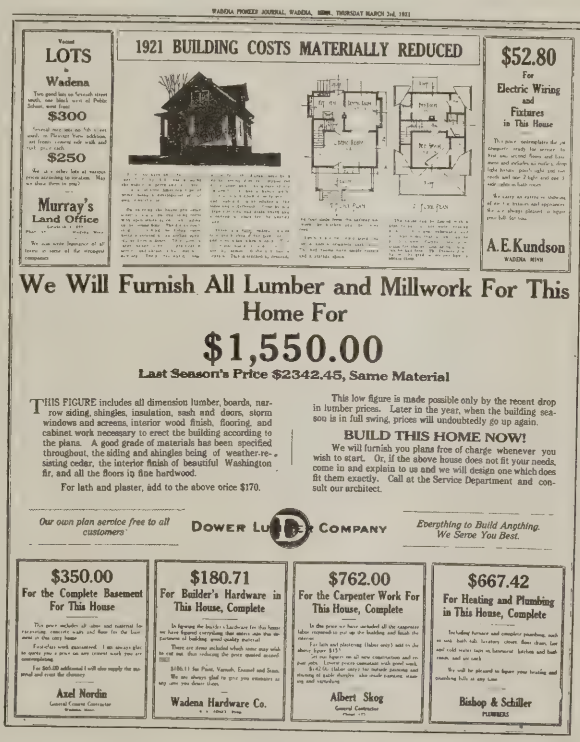
As an offset to these drawbacks, facts and figures are being presented to the public at the various "Own Your Home" exhibits.

Persistent, well-considered advertising, national and local, recognized to be the greatest moving influence upon the public mind, is coming to the relief of the situation. It is represented in the "Own Your Home" expositions in Chicago, New York, St. Louis, Mo., Omaha, Neb., Dallas, Texas, and in any other cities. In minor fashion it is shown in the construction of "model" houses, completely furnished as examples of the ability of local contractors, material men and general supply houses, as well as financial interests to build homes at consistent and attractive prices and terms.

On this page is shown the reproduction of a full page advertisement from the Wadena Pioneer Journal, of Wadena, Minn., showing how in even a comparatively small community the building interests are getting together to organize advertising campaigns of a practical and convincing character.

It cannot be expected under all the circumstances that there will be anything resembling a building boom in the near future though much is expected from a revision of the taxes to make building mortgage loans more attractive and give back to building the financial support that has been siphoned away from it into non-taxable securities.

While the prices of coal have been reduced, transportation rates bear heavily on the weighty and bulky building materials.



A specimen of co-operative advertising reduced from a full-page advertisement in the Wadena (Minn.) Pioneer Journal

Wage reductions are being attempted and resisted, but some contractors are taking the opportunity to make careful selection of good men and seeing to it that the pay is well earned.

Time and the grind of necessity promise to be the potent factors in forcing and shaking all the discordant factors into place.

Another "building trust" inquiry will be launched on March 24 by the Illinois legislature to delve into the conditions in Chicago. Meantime the prices of lumber and building material held at approximately the old levels with nominal demand may not be expected to recede as building activity improves, indications of which are becoming more marked. Price quotations in the Chicago market are:

Yellow Pine: B. & B. 1-in., $95 to $130, depending on thickness; 2 x 4, No. 1, 10- to 16-ft. length, $51 to $53; 2 x 6, $48; 2 x 8, $50; 2 x 10, $53; 2 x 12, $55; 13/16 x 3¼ z & b flat flooring, $85 to $90; 1 x 6, No. 2 common, $48 to $90.

Douglas Fir: 2 4 S, in sizes up to 12 x 12, in length up to 32 ft., $65 to $70; 14 x 14, $68 to $73; 16 x 16, $72 to $75; 18 x 18, $75 to $80.

Hard Maple: Four, ¼ Nos. 1 and 2, $135; select, $120; No. 1 common, $100; No. 2 common, $65; No. 3 common, $32.

Birch: Four ¼ Nos. 1 and 2, $160; select, $133 to $138; No. 1 common, $95 to $100; No. 2 common, $60 to $65; No. 3 common, $40.

Red Gum: Four ¼ Nos. 1 and 2, $150; No. 1 common, $90 to $92; No. 2 common, $45.

Face Brick—Standard, vitrified red, $32.00@34.00; Smooth, Indiana red, $38.00@40.00; Smooth, Ohio red, $38.00@40.00; Smooth, Pennsylvania red, $46.00@48.00; Smooth, buff, $45.00@47.00; Smooth, gray, $47.00@49.00; Rough, buff, $44.00@46.00; Rough, gray, $47.00@49.00; Variegated, rough texture, $34.00@49.00.

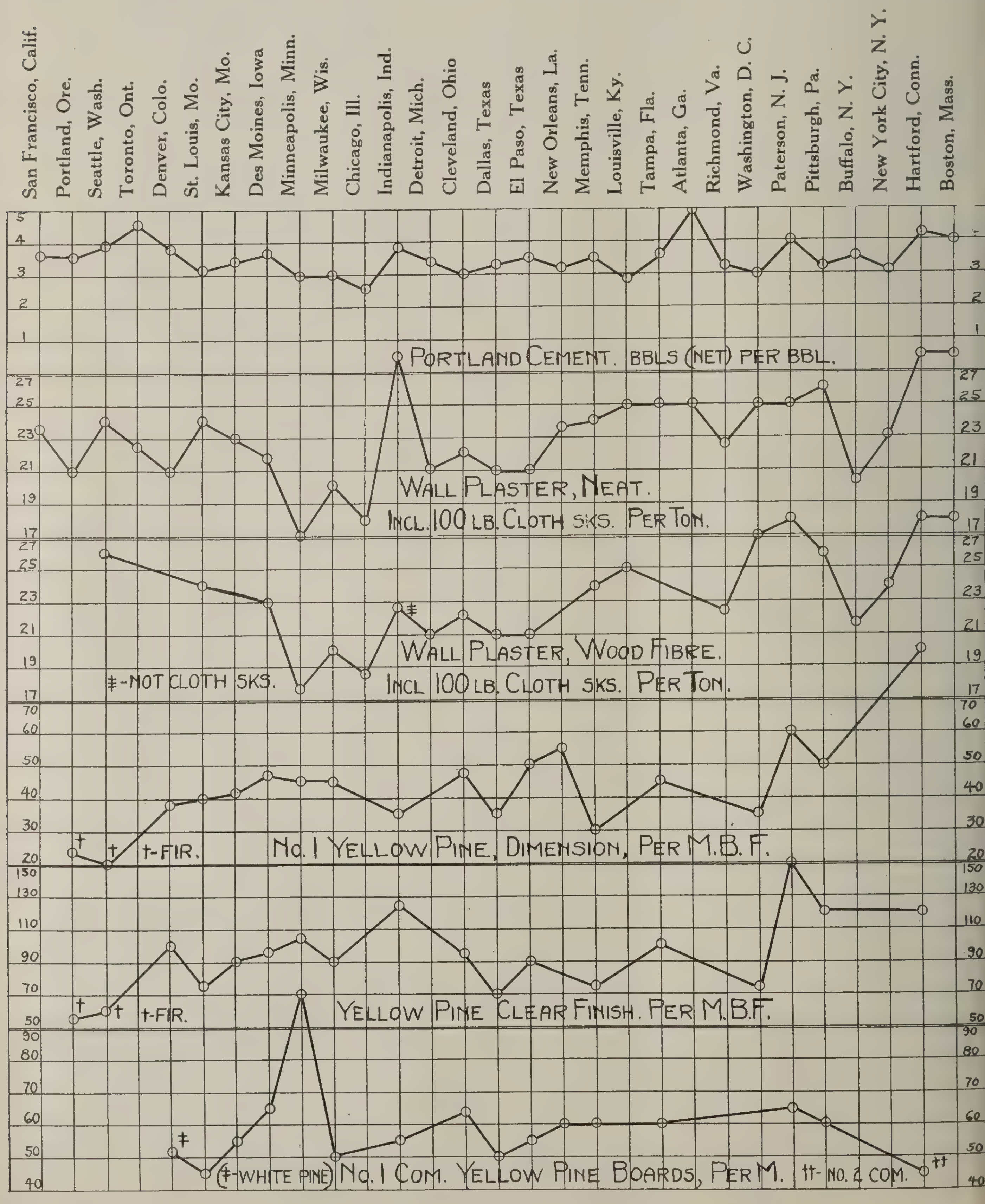
Common brick, $13.00 to $16.00 per M. Portland cement, $2.25 per bbl. Torpedo—Lake and bank sand, $3.50 per yd. Crushed stone, gravel screenings, $3.50 per yd. Hydrated lime, Ohio, paper, $21.00 per ton. Hydrated lime, Ohio, cloth, $29.00 per ton. (Includes sacks at 30c each). Hydrated lime, Wisconsin, paper, $19.00 per ton. Bulk lime, $1.65 per ton.

New York reports of March 19, according to the Dow Service, state that lumber suitable for home building has dropped 60 per cent from the price peak and is now only about 25 per cent above the pre-war delivered prices. The movement in cement has steadily increased from 20,000 barrels a day the first 15 days in January to 42,000 barrels a day for the corresponding period in March.

Building Material Prices

THE following charts represent graphically the current retail prices of building materials based on figures taken from various published sources as of March 15, quoting retail, delivered on the job prices, and their variation according to locality.

Twenty-nine representative cities covering the whole country are quoted from. Prices of material are shown in figures



as dollars at the right and left sides of the pages. A circle opposite any city represents a quotation, and the amount of the quotation is represented by the figure at the sides of the chart.

No circle, or plotted point, means no quotation from that city. For example: Minneapolis, Minn., shows quotations of $3 for lime; none for crushed stone; $20 for brick; $2.25 for washed gravel, and none on building sand, etc.

The quotations in some respects are not complete, reliable reports from points included in the plan not having been received. These will be supplied as the charts are developed from month to month and advances or recessions shown.

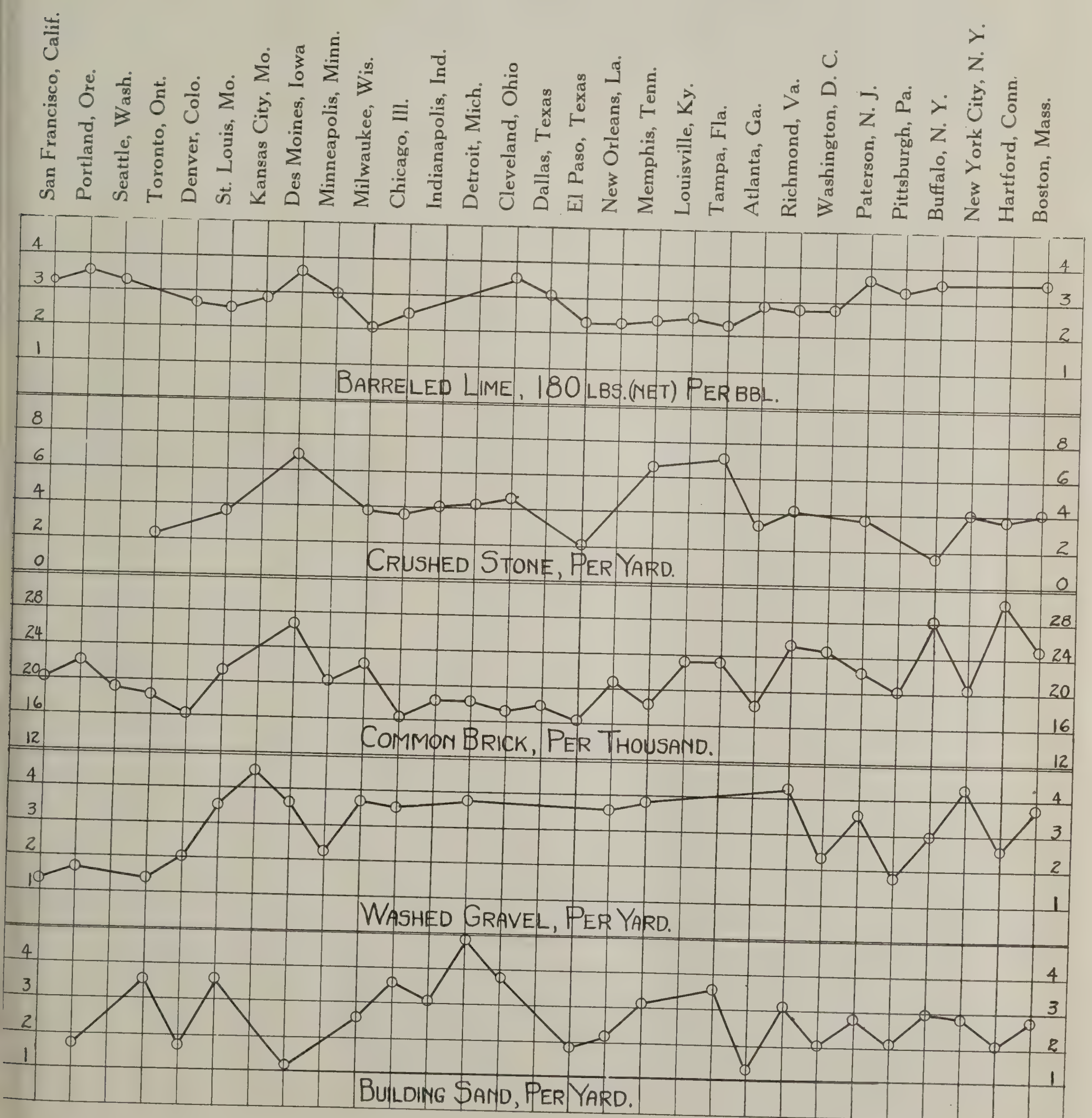
Absolute accuracy is not possible under all the circumstances in the preparation of these charts. Their utility consists in their approximate accuracy in disclosing price tendencies and the relative prices in representative points in various sections of the country.

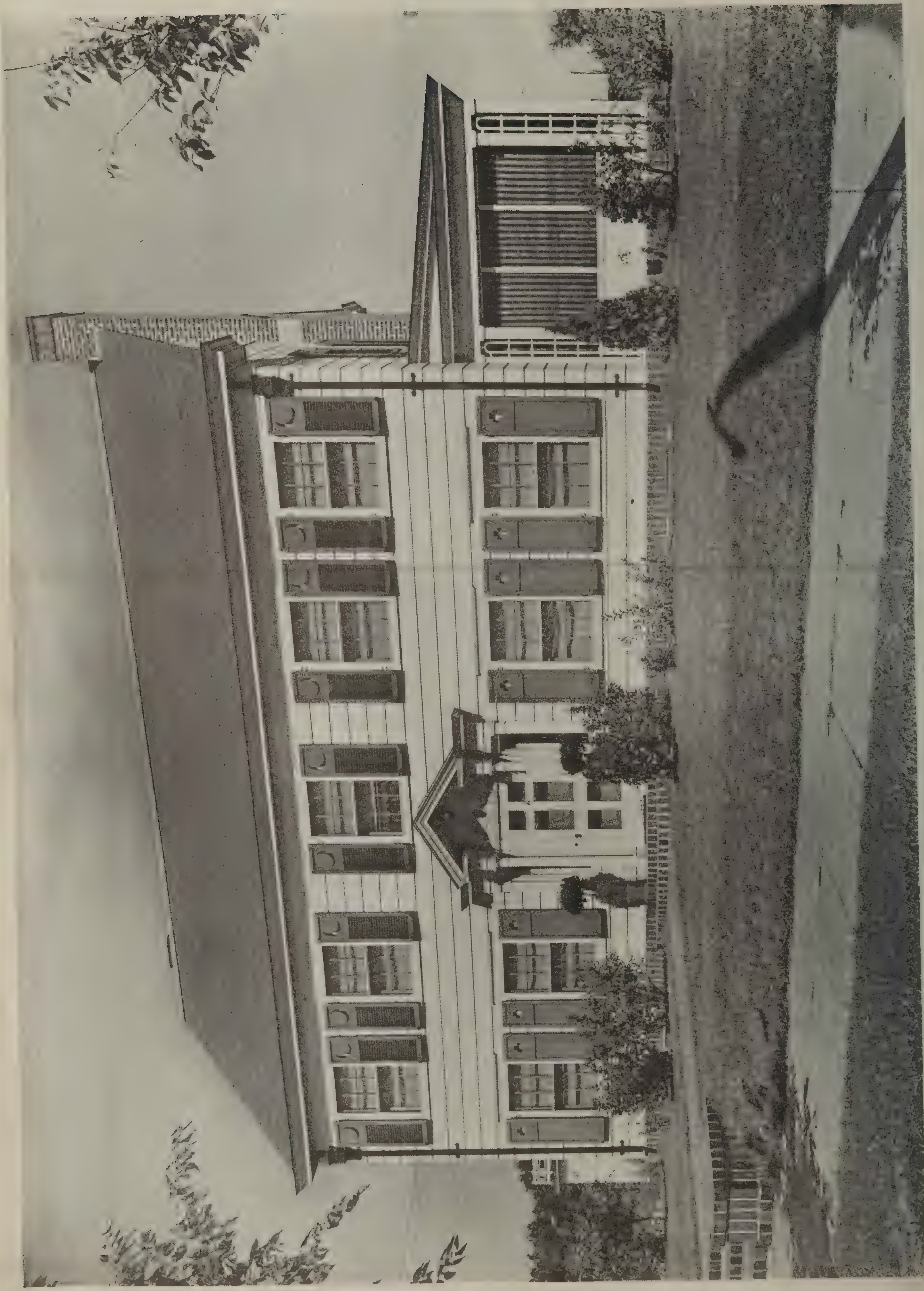
The co-operation of our readers is cordially invited in checking and correcting any inaccuracies in quotations from their localities. While the sources of information are sought from the best authorities—the most reliable is the man who buys.

Brick Reports

The report for February issued by the Common Brick Manufacturers Association on March 11, based on returns from 142 manufacturers representing about 40 per cent of the nation's total brick production, blames high freight rates for stagnating the brick industry, also the war order imposing a super-freight charge of 2 cents per 100 bricks.

The report of the association declares that brick prices cannot go lower and leave the producer a profit and are now at the lowest level.

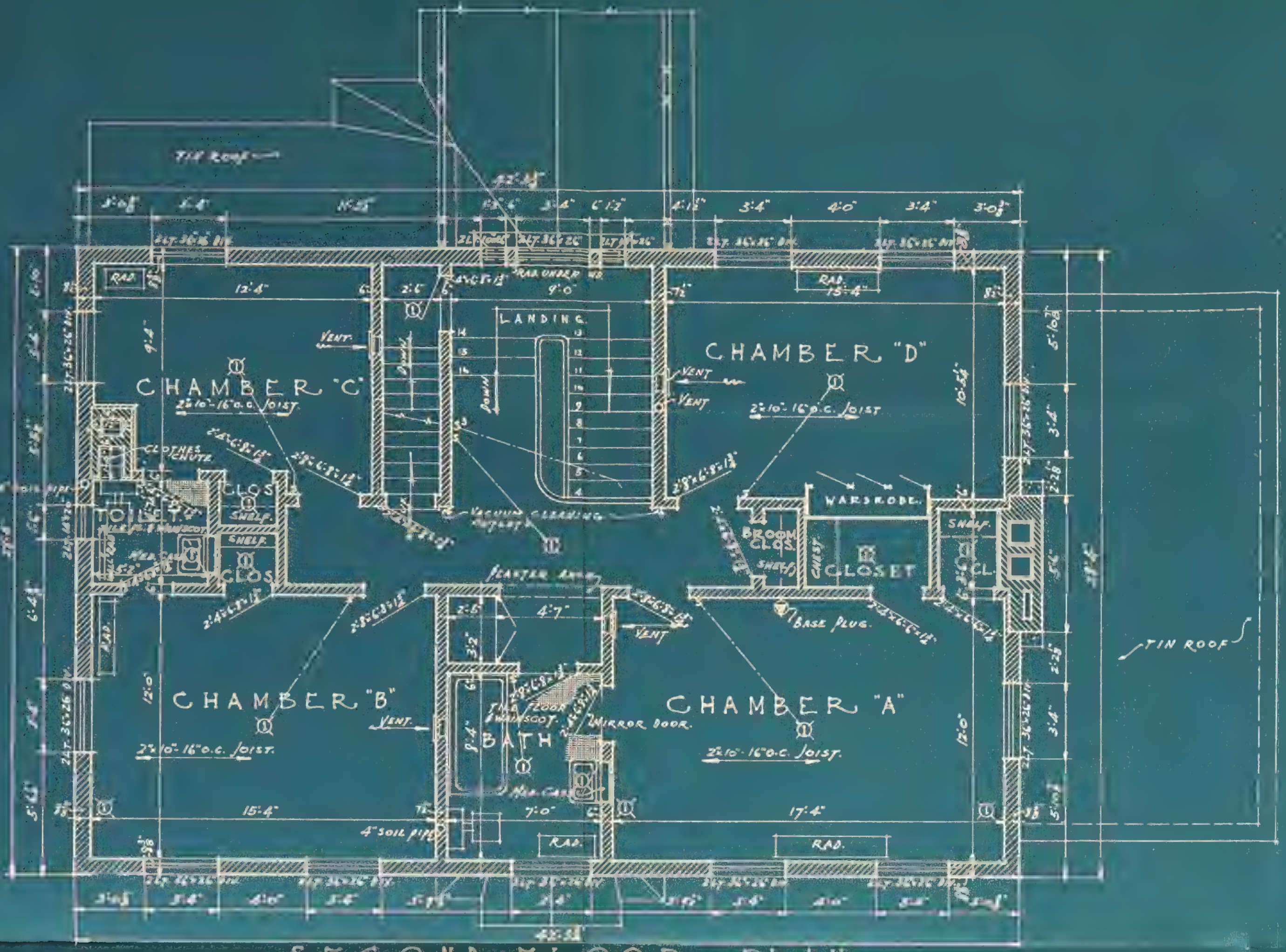




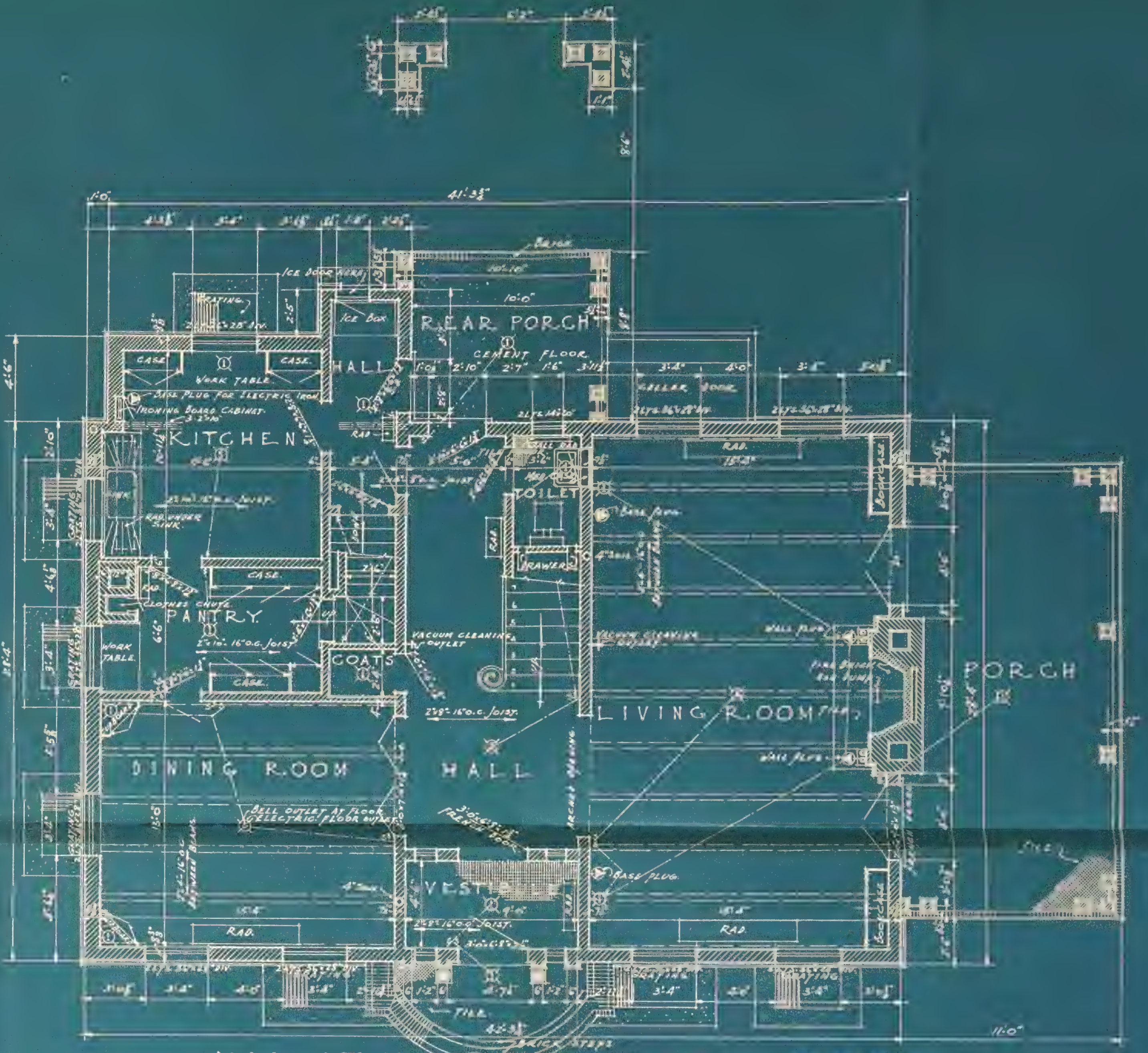
A Colonial House. Otto A. Merman, Architect

Complete Working Drawings in Blueprint Insert in this issue

Scale:
Basemen



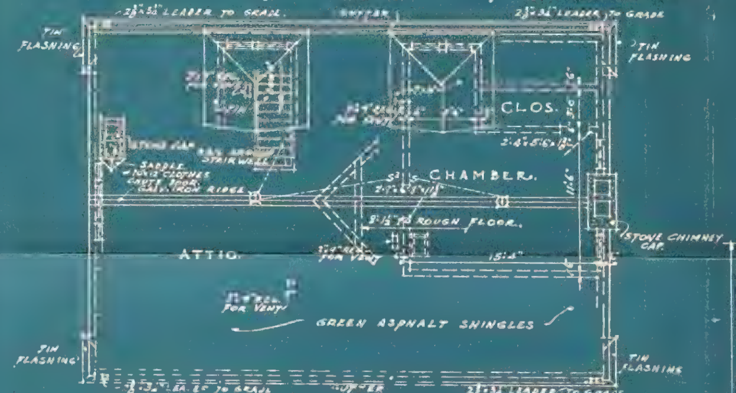
·SECOND·FLOOR·PLAN·



·FIRST·FLOOR·PLAN·

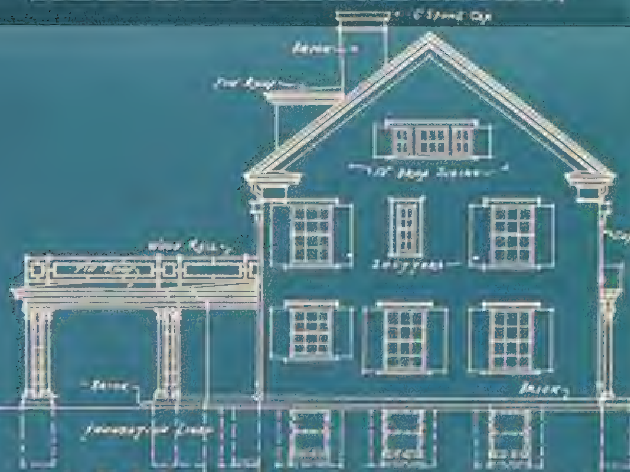
·FRONT·ELEVATION·

·RIGHT·SIDE·ELEVATION·

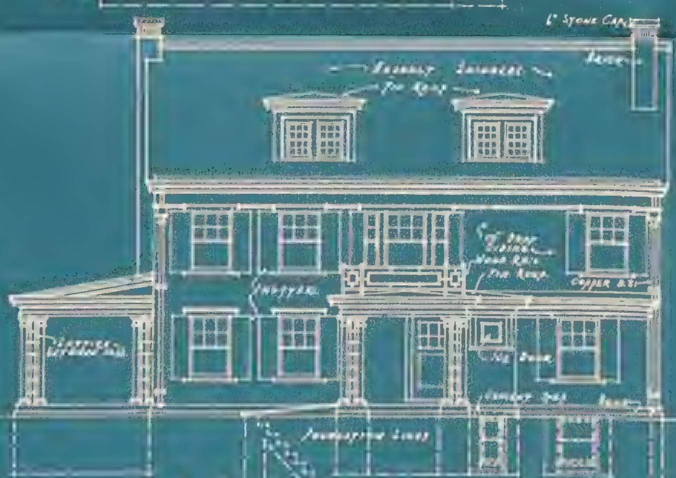


ATTIC & ROOF·PLAN·

·BASEMENT·PLAN·



·LEFT·SIDE·ELEVATION·



·REAR·ELEVATION·

NATIONAL BUILDER

April, 1921

A COLONIAL HOUSE

Bentley & Merman, Architects

Scale: First and Second Floor Plans, one-fourth inch equals one foot
Basement, attic and elevations, one-eighth inch equals one foot.

See Photograph and Descriptive Article in Reading Pages

A Colonial House

Otto A. Merman, Architect

Complete Working Drawings of This House are Shown in the Blueprint Detachable Insert in This Issue

THIS month's supplement illustrates a somewhat larger and more expensive type of house than is usually shown in these pages. It is in line, however, with NATIONAL BUILDER's policy to serve every one of the thousands of readers who look to these pages for information regarding the planning and design of modern buildings fresh from the hands of the workmen.

The mere fact that in the past you have not been called on for a building similar to any of the numerous types that have formed the subject of the supplements is no assurance that the future will not bring forth just such a requirement. In other words, the supplements should be kept, as they may prove of considerable value in the future. In a way they represent a form of insurance and the basic principle of insurance is to prepare for future contingencies rather than for what has occurred in the past.

Another valuable feature of the supplements is that they offer a means of obtaining expert advice, the probable value of which may be determined by referring to their work as evidenced in the supplements. That is, the buildings illustrated bear the name of the designer to whom might be submitted any requirements for a building of a similar nature.

The subject of the present supplement is a Colonial house designed by Otto A. Merman, architect, of La Crosse, Wis. The construction is of frame with asphalt shingled roof and concrete foundations.

Much of the attractiveness of the design is due to the long lines of the front which are accentuated by the horizontal lines of the cornice and the siding. The Colonial style is naturally adapted to long horizontal lines such as these, and failure almost invariably attends an attempt to apply a Colonial treatment to a two-story house with a narrow front. In fact, this abuse has given use to the term "pill box" which is so generally applied to small, square, modern houses of so-called Colonial design.

The entrance is a well-designed feature in which the projecting portion has a vertical feeling offering a contrast to the horizontals of the remainder of the house. This is in accordance with the treatment of old Colonial work of the best period. The chimneys are broad, as in the old work, and the shutters are, of course, a characteristic of the style. The use of small panes of glass in the sash is always effective and the red brick base and steps which harmonize with the chimney. The trellis-work and the wooden railing are interesting and well designed.

The basement has brick partitions as a protection against the spread of fire. The location of the clothes chute in the chimney is as exceptional as it is good, as this location offers no complications in plan, such as those usually encountered when an isolated chute is employed, and what is perhaps more important, the fire hazard of a chute of wood construction is replaced by the comparative safety of a masonry one. This safety could be further increased by using metal frames and doors in the chute openings.

The basement contains rooms for the laundry, heating plant, fuel and ashes. The vegetable room has more light than is customary; in fact, such rooms are frequently unlighted, as most vegetables and fruit keep better when away from light. The basement is unusually well lighted by means of double-hung windows placed in areas. The basement toilet is convenient to both the basement and the outside stair.

The first floor is typically Colonial, with a wide central hall flanked by the living room on one hand and the kitchen on the other. Doors at the end of the hall lead to the kitchen and to the rear porch which forms an auto entrance. There is a toilet under the main stair and a convenient coat closet.

Both the living room and dining room have real ceiling beams with two by fours cut in between to support the floor above. The under surface of the two by fours is plastered and the main beams left exposed below the plaster, another common treatment in old Colonial work. The living room fireplace is at one side, and beside it are French doors to the porch which has a floor of quarry tiles laid on a concrete base. Double fold French doors open from the hall into the dining room which contains two corner type china closets.

The pantry contains built-in cases, a work table and a design case for the storage of extra dining table leaves. There is also an opening to the clothes chute and a door to the basement stairs. The kitchen has a built-in ironing board and a long work table with cases at each end. A hall between the rear porch and the kitchen forms an entry in which is located the refrigerator and the back stairs to the second floor.

The arrangement of the second story hall is unusual, but apparently good. The main and the back stair have a landing in common three steps below the second floor. The hall contains a closet for linen and one for brooms and has a door opening from the attic stair. There is one complete bathroom and a separate toilet room. This arrangement should prove almost as satisfactory as two complete bathrooms and results in a saving of space. A door to the clothes chute opens from the toilet room. Each bedroom has cross ventilation and closets. The closets in bedrooms "B" and "C" are rather small, however. The projecting wardrobe in bedroom "D" is one method of increasing closet space.

The attic provides considerable storage space and has the rough framing placed for a future room for the maid.

Fire Tests

The Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters, and the Bureau of Standards, Department of Commerce, Washington, D. C., have conducted jointly an experimental investigation of the resistance of columns, loaded and exposed to fire or to fire and water. The purpose of the investigation was to ascertain (1) the ultimate resistance against fire of protected and unprotected columns as used in the interior of buildings; (2) their resistance against impact and sudden cooling from hose streams when in a highly-heated state. The fire test series includes (1) tests of representative types of unprotected structural steel, cast iron, concrete-filled pipe, and timber columns; (2) tests wherein the metal was partly protected by filling the re-entrant portions or interior of columns with concrete; (3) tests wherein the load-carrying elements of the columns were protected by a two-in. or four-in. thickness of concrete, hollow clay tile, clay brick, gypsum block, and also single or double layer of metal lath and plaster; (4) reinforced concrete columns with two-in. integral concrete protection. Copies of this 389-page report may be had by the payment of $2 to the Associated Factory Mutual Fire Insurance Companies, 31 Milk St., Boston, Mass., or to the Underwriters' Laboratories, 207 East Ohio Street, Chicago, Ill.

Giving the Public a "Taste of Home"

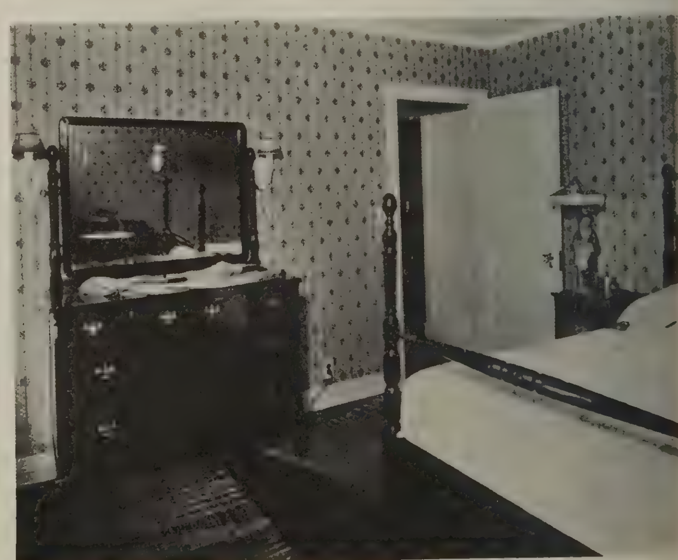
WITH the stabilizing of prices, now in the offing, and with building practices clarifying, the most favorable timeliness attends the comprehensive "Own Your Home" Expositions held in the Coliseum, Chicago, March 26 to April 2, and on April 16 to 30 at the 22nd Regiment Armory in New York City as the third annual exposition.

Fifteen thousand dollars in prizes for the best plans of small houses has been paid by the building material interests as reported last month.

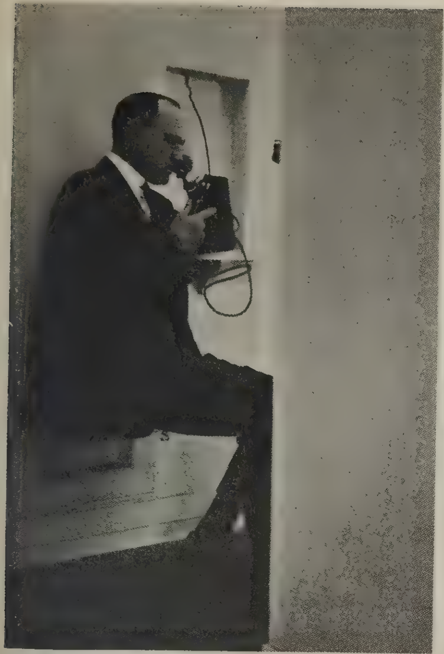
During April a building show will be held at the Auditorium, Omaha, Neb., and an "Own Your Home" exposition will be held April 25 to May 1, at the Coliseum, St. Louis, Mo., under the auspices of the Building Industries Association.

Electrical home equipped through the co-operative efforts of the electrical industries of Southern California as a means of educating the public in modern electrical conveniences and economies. Nineteen thousand persons visited this home in three weeks

Interior of living room electrically equipped



Interior of one of the bedrooms in the modern electrical home

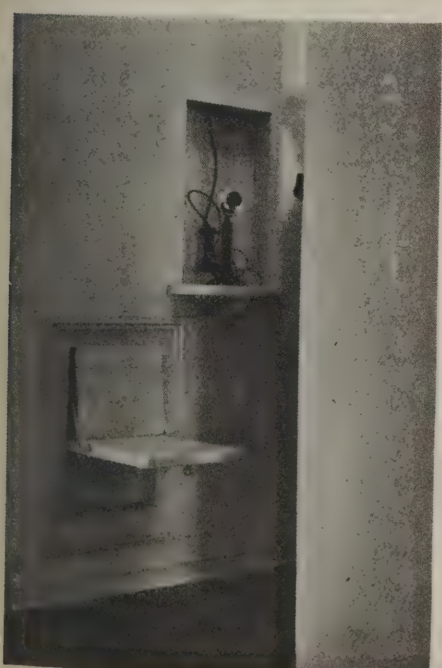


Convenience of a telephone niche and wall seat

The list of the concerns and of the individual architects, contractors and engineers participating in this forward movement to give the public an intimate view of what can now be done in and for modern homes of all kinds is thoroughly representative.

That public interest is awakening throughout the country is indicated in the success of exhibitions of limited scope. This was splendidly illustrated in the success of "the modern electrical home" which was opened to the public in Los Angeles some months ago under the auspices of the California Electrical Co-operative Campaign Committee. In the first three weeks that this completely furnished bungalow was open for inspection it was visited by 19,000 people. Nearly 3,000 persons visited the structure in one Sunday.

The report says the display proved the benefit of co-operation not only on the part of the electrical contractor-dealers, lighting companies, electrical manufacturers and jobbers, but also on the part of home builders and sanitary plumbing manufacturing company, a pressed brick company, and a wall paper and paint company. All of these concerns and interests together with a leading dry goods house and a motor car dealer shared in making this modern electrical bungalow a genuinely helpful stimulus to the home builders' business. This united effort not only emphasized the value of electrical appliances in the home and the desirability of proper electric wiring, but it also enabled the public to better appreciate just how attractive new homes are when completely furnished. One difficulty which every designer and builder of homes experiences when dealing with the public is to make plain just how the house in question will appeal when fully fitted and equipped for occupancy. This difficulty was entirely overcome by this co-operative display.



Folding wall seat open

Hidden light with reflector helps to sell this house, adds much to the beauty of lawn fetes and protects the owner against invasion of the home by burglars. Being of dark metal only the upper portion of the funel-shaped reflector shows behind the shrubs

The bungalow selected for this advertising campaign is a six-room kitchen and bath stucco (on hollow tile) dwelling with brick foundation and tile roof. The round arch leading to the covered entrance way, and the low square tower at the juncture of the two wings of the structure give a suggestion of Spanish mission style.

The plan agreed upon by all the cooperators in this enterprise was that no effort was to be made on the part of those in charge to sell either the house or the appliances shown. In fact the "guides" in the home were in most cases unable to answer inquiries as to the cost of various articles or the house as a whole. This was intentional, the purpose being to stimulate interest and attract the largest possible attendance. Finding that there was nothing to be sold visitors seemed to take greater pleasure in carefully inspecting the entire house, asking questions about the use of appliances, etc. A rough estimate of the price at which the house would be sold with furniture. electrical equipment, etc., is $20,000. The dwelling is in one of the most attractive residence sections of the city.

In all details of the house the architect, E. B. Rust, Los Angeles, has endeavored to introduce the latest ideas. An instance of this is the folding seat for the telephone in the hallway. The instrument stands in a recess in the wall and the seat when not in use folds into another recess leaving only a panel visible.

In advertising the home display window lights similar to those used in retail store windows were placed at various points close to the foundation and all but concealed by shrubbery. The lighting effect produced in this way was responsible for bringing in many hundred visitors and has suggested to builders and contractors that homes for sale can be advertised even better at night than by use of signboards, by illuminating them in this fashion. It is a practical adaptation of the show window method to the real estate business and while not altogether new, perhaps, seldom has been more effectively and pleasingly used than here.

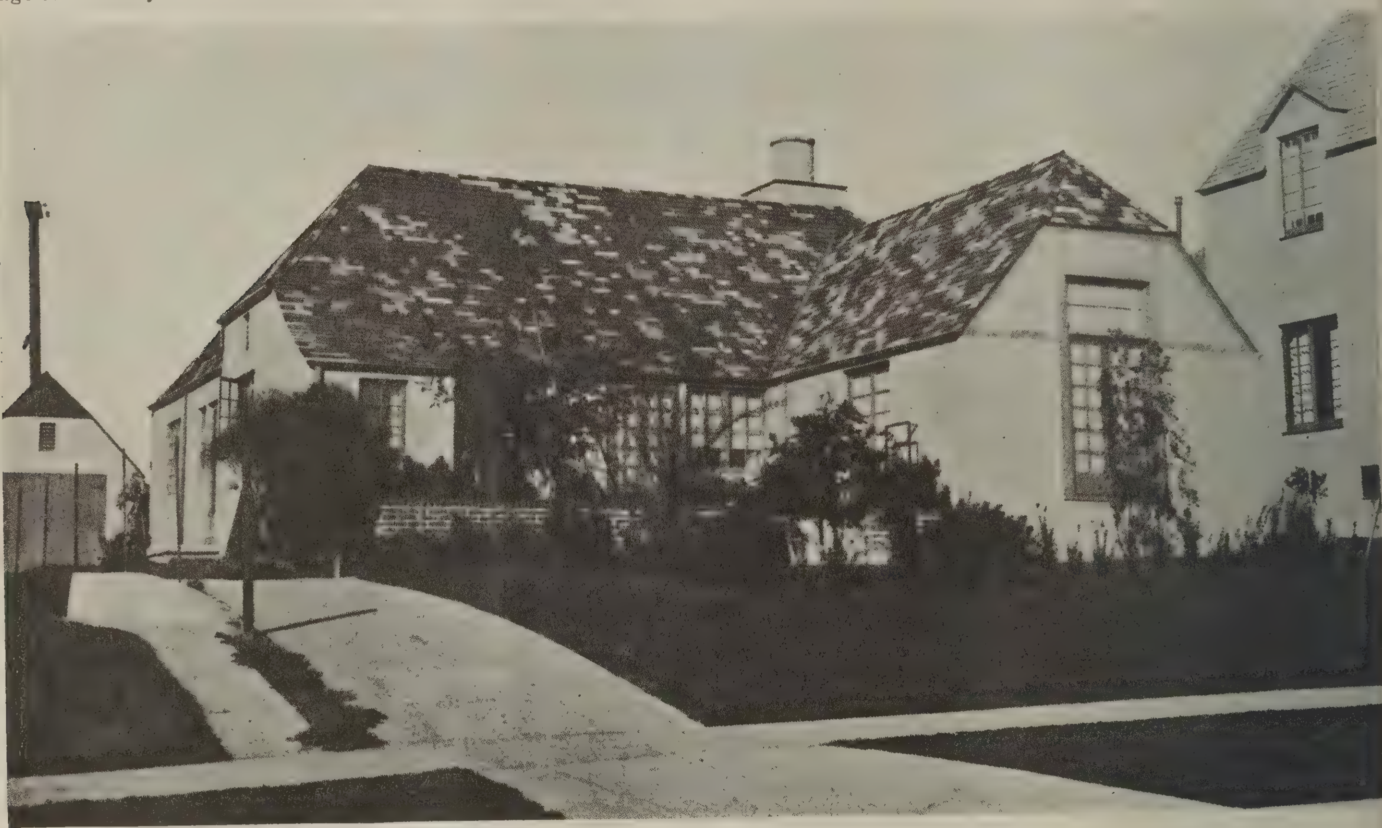
Puzzle—Who is Going to Set the Refrigerator?

1. Plumber claims it is a sanitary fixture, and also that it is piped for hot and cold water, and has a drain.
2. Plumber puts in refrigerator coils.
3. Till setter has to set the refrigerator tile at building, instead of having it done at the factory.
4. Glazer has to set the glass at the building.
5. Carpenters must do the work at the building as the refrigerator is mostly wood and therefore is cabinet work.
6. Electricians have to wire the refrigerator at the building.
7. Painters must paint the refrigerator at the building.

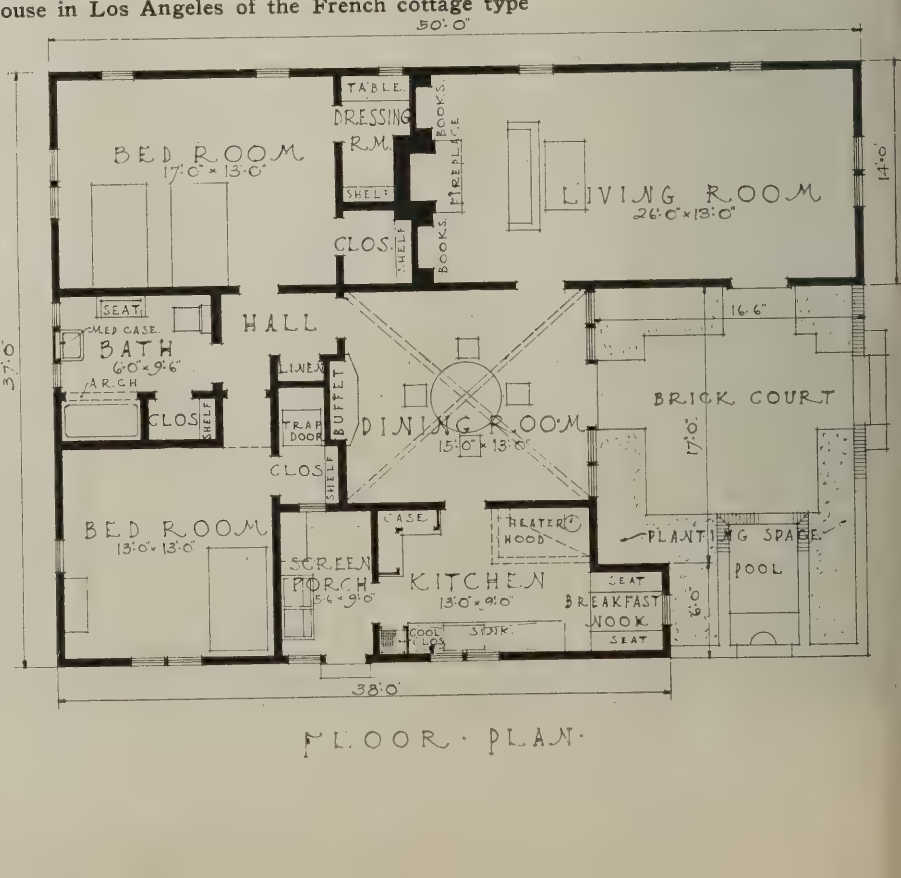
A French House in Los Angeles

By G. E. McDonald

THE quaint and satisfying small house illustrated here is one built for a Los Angeles bride by the Garden City Homes



A small house in Los Angeles of the French cottage type



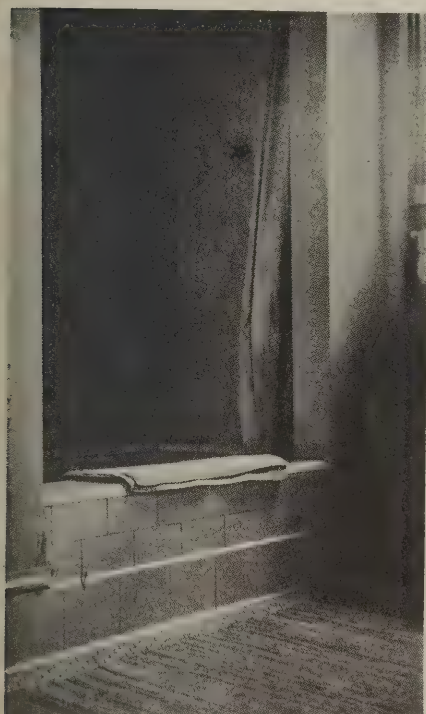
Company of that city, and is modeled after the French cottage type.

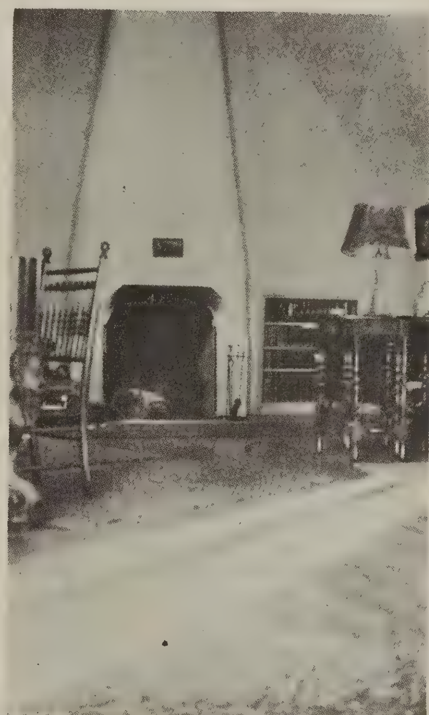
The outside finish is of stucco. The shingled roof has been stained to imitate the mellow, many-colored effect which time and the uninterrupted growth of mosses and lichens have brought about in the roofs of the old French houses. Perhaps the most interesting feature of the exterior, aside from the generally interesting lines of the building, is the open Medici court, an attractive Southern variant of the sun porch. This feature fills in an angle of the house and consists of a platform or terrace raised on brick ramparts to the level of the ground floor. It is paved with concrete, and at the farther end a rectangular pool with pond lilies and gold fish adds a decorative and not too formal note. The court is protected from the chill winds of the north by the house wall, and a hedge planted around the edge combines with potted plants and shrubs and vines to afford a screen from the street. In the summer a colored awning gives the necessary shelter from the sun, the glow of which penetrates to the interior of the house through the expansive French doors.

The interior is equally individual in treatment. The living room has a barrelled vaulted roof and the fireplace at the far end instead of the usual mantel and built-in features, has a great hood reaching to the ceiling. A large studio window furnishes the light for this room. There are numerous built-in cupboards and closets throughout the house, and the dining room has a particularly interesting sideboard with shelves set into an arched recess with drawers and doors below. The walls in this room are finished rough in imitation of the plaster work of earlier times. The ceiling is groined and vaulted. In the bathroom an alcove contains the bath tub, which is sunk below the level of the floor. A breakfast alcove of simple design is an important feature of the kitchen, where various cupboards and built-in conveniences, utilizing all available and otherwise waste space in a most economical manner, give the finishing touch to this interesting structure.


The studio window in living room


The side entrance


The bath tub is in an alcove, and sunk below the floor line

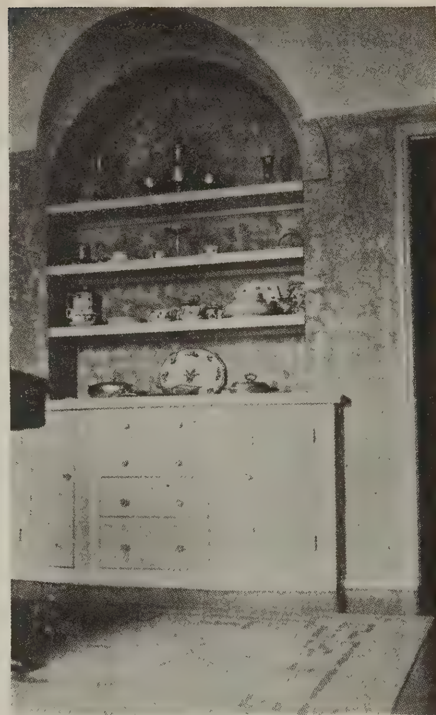

The fireplace in the living room is of unusual and effective design

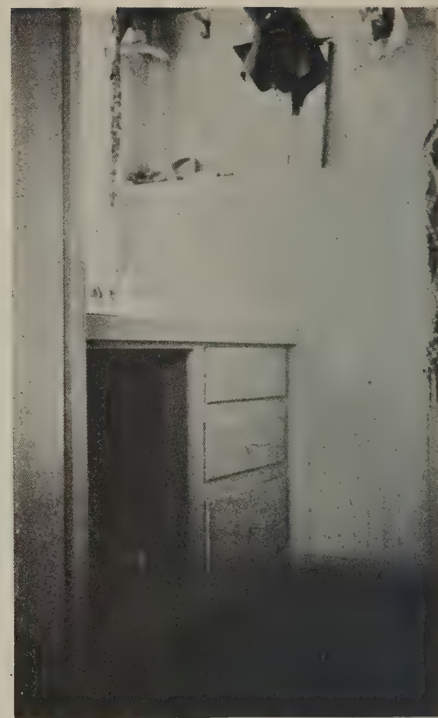

Napery cupboard in rear hall


The terrace


The lily pond in the court


A glimpse of the laundry, and a roomy cupboard


A built-in sideboard of good design adds distinction to the dining room


Built-in features in the dressing room

Saw Mill Waste and Cost of Lumber

In Mobile, Ala., the representative of National Builder called on the National Timber Co., of which M. H. Eichberg is manager. Relative to the high cost of lumber for building, Mr. Eichberg said: "The enormous amount of waste that has been going on is in a large measure responsible for the present prices. This waste is of two kinds: (1) There is the waste forced on the mills by the men who want only a certain dimension of lumber, but refuse to take the other dimensions into which the logs will cut. During the war the United States government wanted timbers of a certain large size and would take no others. We were selling oak timbers for $50 a thousand, and the government kept raising its prices till they reached $150 a thousand feet. We let those orders go by us; for if we had taken them we would have had a vast amount of waste left on our hands. But many mills did take them.

"Our principal work is the production of oak timbers for bridges, wharves and ships. But we waste no by-products. We get our timber from the Escambia River region in Florida. We have just built a new mill and we are selling or using everything that comes from the logs, unlike any of the other mills that are engaged in our line. First, we get out the oak timber. Then we saw all the dimension lumber we can from what remains. After that we work up the slabs into firewood for Mobile and Pensacola. The sawdust we burn to run the mill or to sell for the smoking of meat. We thus have no slab pile to burn as most mills have. We produce so much firewood that Mobile and Pensacola cannot use all of it. The income from the fuel wood meets the payroll. I am now figuring with a steamship company to take part of the wood to New York. I know of at least 20 mills that tried to produce oak timbers, but they failed because they did not turn their by-products into money.

"There are three things that should be done away with in the production of lumber if lumber is to be furnished to the builders at a fair cost. The first of these is staving. The white oak stave is in demand for shipping in the rough across the ocean, where it is worked up as a stave for a wine cask. The stave man wants only the butt of the tree as high as the first limb; the rest of the tree is left to rot. This process has cluttered our forests and clogged our streams with down timber. There is enough wood being wasted in the South to warm the North in winter if it could be gotten to where it is needed. The second thing that should be done away with is the acceptance by mills of orders for the cutting of large quantities of material of one dimension, with no outlet for other dimensions that might be cut from the log. The third thing is the waste of fuel wood, the mills burning their slab piles. We are producing 20 cords of fuel wood a day and we are sawing only 15,000 feet a day. What must be the waste with those Mississippi mills that are sawing 100,000 feet of lumber per day!

"It is costing us $2.25 a cord to move fuel wood 50 miles by railroad. When it comes to hauling it as far as Birmingham, 275 miles, the cost is prohibitive. Fuel wood should be given a special low rate on the railroads; for its marketing will not only reduce the coal bills of all, but will indirectly reduce the cost of lumber to house builders by helping dispose of sawmill by-products. Do not forget that the people who buy lumber are paying for all this waste at the sawmills."

A Permanent Decline in Plasterers' Efficiency

Recently a representative of National Builder was talking with J. J. Campbell, vice-president of the Contracting Plasterers Association of Louisville, Ky., on the present situation in the plastering business. On the question of efficiency, Mr. Campbell said: "The efficiency of plasterers has been declining for the past 10 years. We used to get 150 and 160 square yards of plastering done a day per man. Three years ago the production had dropped to 125 yards a day. Now we are getting from 80 to 100 square yards per day.

I think we may look for some improvement in efficiency, but I do not believe we shall ever get back to 160 yards per day; for the boys who have learned the trade during the past few years have gotten into the habit of doing less than plasterers used to do.

There is also another factor that is resulting in less quantity of work being done by the plasterers, and that is the policy of the plastering contractors, which is to do a higher quality of work, which is our best way of competing with the plaster board that is being put on the market and the use of which is seriously cutting into the volume of the plasterers' business. A higher quality of work means fewer yards per day per man."

Housing at Manitowoc, Wisconsin

THE development at Manitowoc, Wisconsin, was erected by the U. S. Shipping Board Emergency Fleet Corporation to relieve the shortage of homes for the shipyard employes at that point.

The architect was Mr. Earl F. Miller, who also supervised the construction work. Mr. Miller's handling of this project had much to do with his appointment as chief of building construction for the remaining thirty-three projects of the corporation, involving a total expenditure of upward of seventy millions of dollars.

One hundred houses were erected at Manitowoc; twenty-eight 5-room houses; forty-eight 6-room houses, and twenty-four 7-room houses.

The construction is of frame throughout, finished with either siding or shingles. The basements are of brick with cement floors and the roofs are covered with asphalt shingles.

Ten types of floor plans and about twenty types of elevations were employed. Thus affording a somewhat greater variation of appearance than is generally considered necessary on work of this kind. It may be said, however, that the effect as a whole is not displeasing, probably because of the use of similar materials throughout the project. The introduction of other materials—brick or stucco for instance—in a few of the houses, as was done on some projects, would probably have spoiled the effect in this case. A dozen houses, however, varied in design, if built of the same materials, will usually form a pleasing group, provided the individual designs are passable. Make four of them frame, four stucco and four brick, though, and you usually have chaos, especially if they are placed close together. Of course where houses are quite similar or alike in appearance the use of various materials is frequently necessary to provide variety.

In all of the houses at Manitowoc, either vestibules or halls are placed at the entrances, a wise provision in cold climates, but frequently ignored by designers of small houses. All of the houses have heating plants, baths and other modern fittings. With the exception of one bed room in house number 7, every room in all of the houses has cross ventilation, another important provision that is often overlooked by designers.

House number 1 contains 5 rooms. The entrance is from a small porch into an entrance hall which contains a coat closet and the main stair. There is also a grade-line entrance with space for a refrigerator. The hall may be reached directly from the kitchen. The living room and dining room connected by a wide cased opening complete this floor. The second floor contains two bed rooms and a bath. The front bed room has a wide dormer which forms a feature of the exterior. Each bed room has ample closets, and a linen closet is provided in the hall.

bed room has ample closets, and a linen closet is provided in the hall.

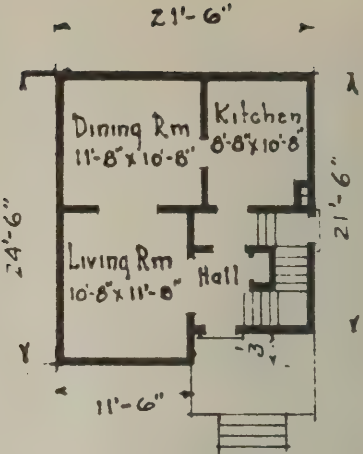
Two types of exteriors are shown for house number 2. This house also contains 5 rooms. The entrance is through a vestibule into the living room, at the opposite end of which is the main stair and a coat closet. A grade-line entrance with refrigerator space is provided under the main stair. The living room and dining room are connected by a cased opening. The second floor contains two bed rooms across the front and a hall and bath at the rear. Bed room and linen closets are provided.

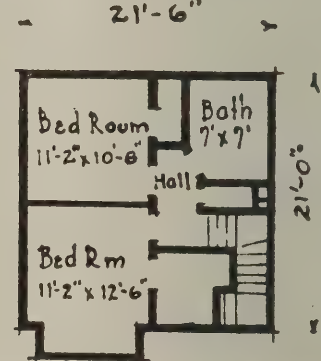
Development at Manitowoc, Wis. Earl F. Miller, Architect

House number 3 has 7 rooms. The entrance is through a small hall which opens into the dining room on one hand and the living room on the other. A coat closet is provided in the vestibule, and the main stair rises from the living room. The kitchen has an outside entrance and contains the basement stair. The second floor contains four bed rooms and a bath. All bed rooms have closets, and a linen closet opens from the hall.

House number 4 also has 7 rooms. The entrance is through a vestibule into a central hall which has a coat closet and contains the main stair. Wide cased openings open from the hall into the living room on one side and the dining room on the other. A grade-line entrance with refrigerator space, leads to the kitchen and the basement stair. A corner porch opens from the living room. The second floor contains a bath and four bed rooms, each of which contains a closet. A linen closet opens from the hall.

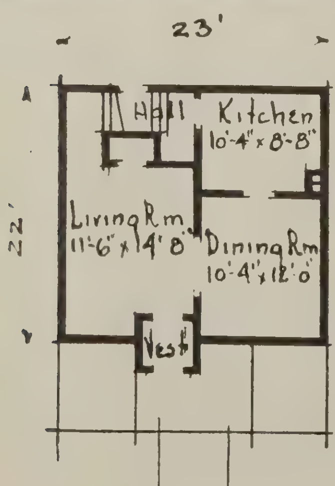
Fig. 1—Five-room house





House number 5 is another 7-room house. The entrance is through a vestibule into a hall which opens into the living room at one side. The hall contains the main stair and a coat closet is provided in the vestibule. A wide cased opening connects the living room and the dining room. The basement stair leads from one corner of

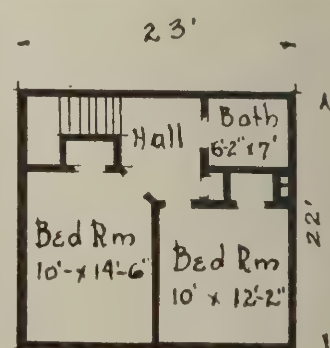
Fig. 2—A five-room house. Two exteriors of same plan



the kitchen and there is a small porch at the rear. The second floor has a bath room and four corner bed rooms, each with a closet. No linen closet is provided.

House number 6 has 6 rooms. The entrance is through a vestibule into a small hall which contains the main stair. A coat closet is provided in the living room. Cased openings open from the living room into the hall and into the dining room. There is a grade-line entrance with space for a refrigerator. The second floor contains three bed rooms and a bath. A linen closet is provided in the hall, and each bed room has a closet.

All of the remaining houses shown are of the 6-room type.



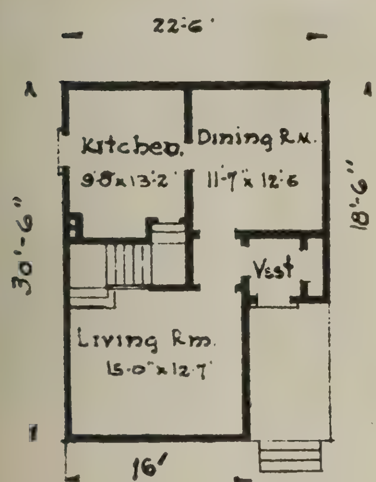
In house number 7 a vestibule containing a coat closet opens into the living room. The main stair rises from one corner of the living room. A hall between the kitchen and living room leads to a grade-line entrance at the rear. The second floor contains three bed rooms, one of which does not have cross ventilation. Each bed room has a closet, and the bath and a linen closet open from the hall.

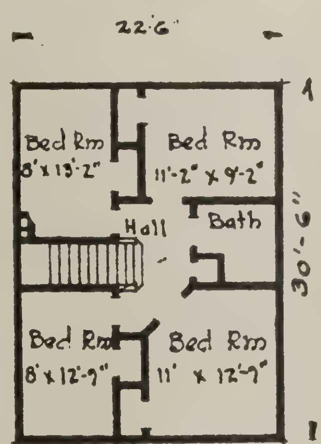
Two exteriors are shown for house number 8. The entrance is off a corner porch which opens into a vestibule containing a coat closet. The main stair rises from the living room which opens into the dining room through a cased opening. A grade-line entrance with refrigerator space leads to the kitchen and the basement stair. The second floor contains three bed rooms and a bath. There is a linen closet in the hall and each bed room contains a clothes closet.

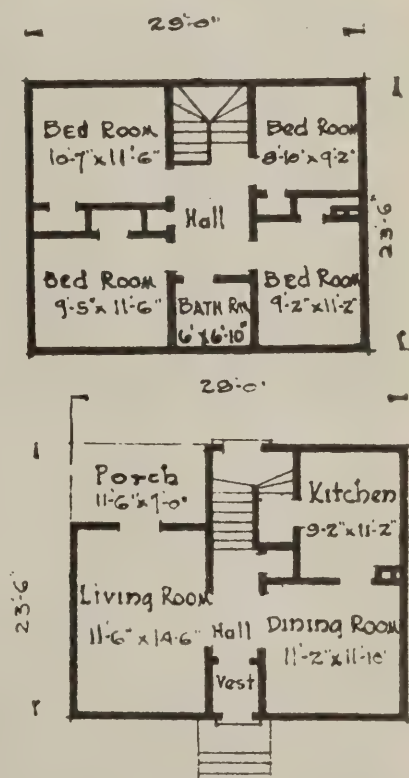
Two exteriors are also shown for house number 9. The entrance is through a vestibule into a central hall which has a coat closet at one end. Cased openings from the hall lead to the living room at one side and the dining room at the other. The main stair rises from one corner of the living room. There is a grade-line entrance which leads to a rear hall. The second floor contains three bed rooms, each with a closet. The bath and a linen closet open from the hall.

Fig. 3—A seven-room house

Fig. 4—A seven-room house







Money for Building

By Walter Stabler

Comptroller of Metropolitan Life Insurance Company

From an address delivered before the Eighth National Conference on Housing in America, held under the auspices of the National Housing Association, New York City

MY duties are the placing of mortgage loans for the Metropolitan Life Insurance Co., and this has brought me into contact with people from every part of the United States, with bankers, real estate men, housing development men and people generally who are interested in this subject which is at the present time very definitely and strongly on the minds of the whole country.

Better Rates on Large Loans

It was formerly our practice to lend our funds only in large sums on large improvements, apartment houses, office buildings, department stores, properties that are considered as the choicest class of real estate investments. You can readily realize that to make loans on that kind of property an in large sums involves a minimum of investigation, of expense of looking after it, and of risk, and we have always found it possible to obtain even better rates in the large loans than in the smaller ones, for the very simple reason that we have very little competition in the making of large loans.

Reason for Small Loans at Lower Interest

But with the beginning of the housing shortage, we felt that the situation had changed so materially that we should have to modify our methods. When you realize that our company, as the largest industrial insurance company as well as the largest ordinary life company, has about 20,000,000 policyholders in this country, and represents probably 16,000,000 to 17,000,000 different persons, you will understand that we feel we have a definite responsibility to these people for whom we are trustees as well as for the funds that are in our charge. There is one other company that has done a great deal of this business—two other companies that have done a great deal of business, not just on the lines we are doing it—the Equitable Life Assurance Society has loaned on about 5,500 houses, representing an investment of $15,000,000 to $16,000,000, and they have agencies in about 150 or 160 cities.

I venture to say that there are very few of our policy holders who have not felt the stress of these recent times, with the impossibility, in so many cases, of finding proper places to live in and the tremendous increase in rentals that they have been obliged to pay.

I have felt a great deal of sympathy for this class, particularly the class of people of limited, moderate incomes, who have probably been living comfortably on the rent they had to pay, but when it doubled or trebled, it became a real tragedy. And it is that tragedy that I think it is the duty of all of us to try to prevent or to mitigate as far as we can.

Loans Only on New Buildings

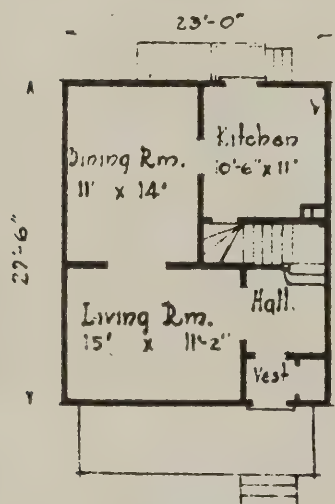
We therefore decided, about the middle of 1920, to restrict our loans entirely to loans on small dwellings—new ones, not old ones—and new moderate-priced apartment houses. We could have loaned our assets, if we had wanted to, on what we call replacement loans (loans that were "called" because the holders of the mortgages were suffering from the income tax); but to replace those loans simply meant that that much money went out of the mortgage market, because the people who collected their mortgages never put it back again into real estate.

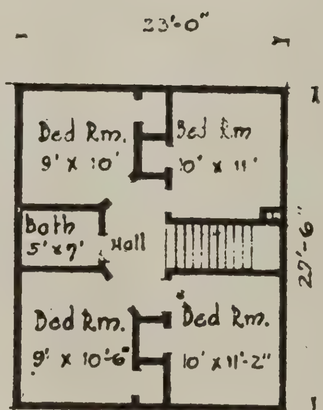
Basis of Values on Which Loans Are Made

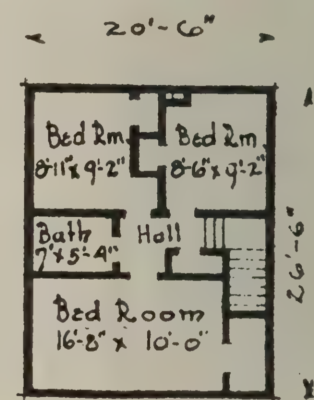
Therefore we decided on this campaign which we have lately been endeavoring to carry on to the limit of our ability. The loans that we make on dwellings are based upon 50 per cent of the land value and 50 per cent of the actual construction cost of the buildings, omitting carrying charges, overhead or profit. I know perfectly well that these items of overhead, carrying charges and profit, are usually considered as elements of value in all building operations, built for sale or for rental; but because of the excessive cost of building of all kinds we felt that as trustees for the funds we should use every possible care not to overloan. The laws of the State of New York place upon us a very definite

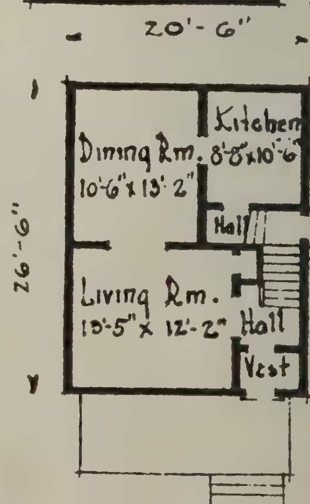
Fig. 5—A seven-room house

Fig. 6—A six-room house









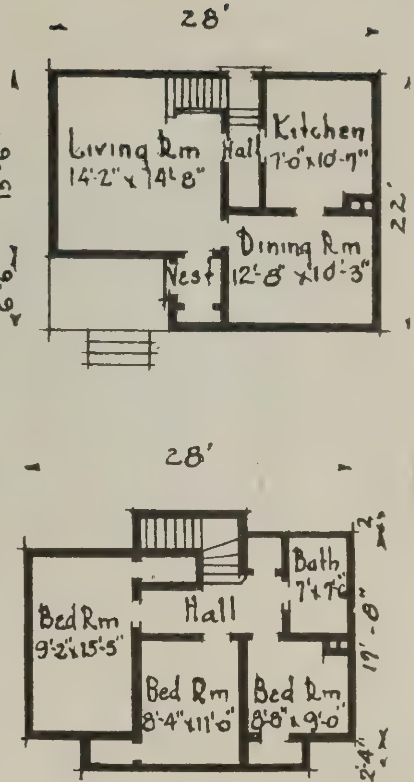
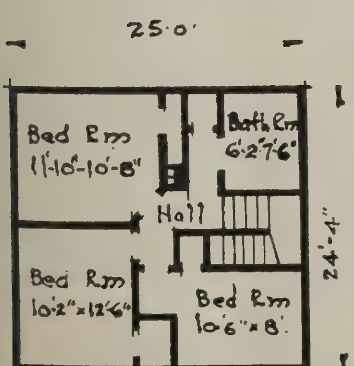
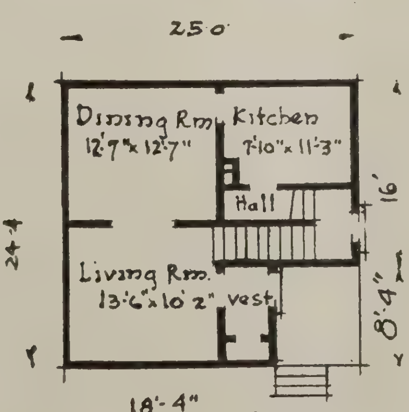


Fig. 7—A six-room house

Fig. 8—A six-room house with two exteriors for same plan



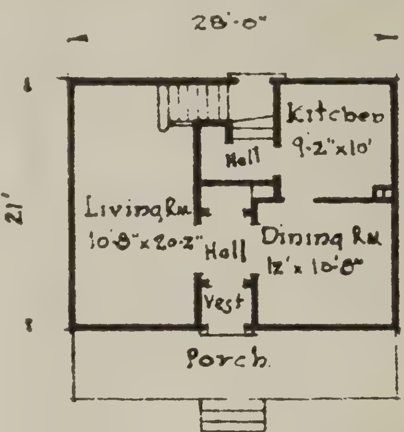


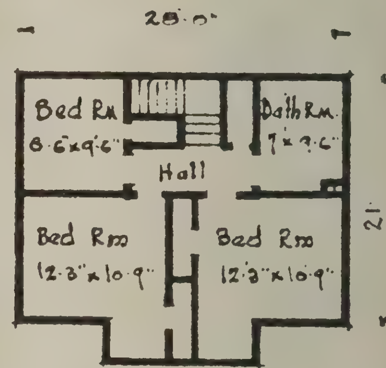
responsibility. We are investigated every three years and the properties upon which we hold mortgages are appraised, and if we have loaned too much we are told to scale them down or call the loans. No real estate officer likes to be put in the position of having to call loans. It is something our company never does, so we have to use care in making loans.

Term of Loans and Interest Rates

These loans are made for 15 years at the interest rates current in the section where the loans are made. The interest is payable semi-annually and on every interest

Fig. 9—A six-room house showing two exteriors of same plan





date an installment of 3 per cent is payable on account of the principal, so that in 15 years all of that loan is paid except 10 per cent. We will, however, take larger installments after three years, and we will receive payment of the entire amount after three years, so that the matter is as flexible as it can possibly be made for the borrower, and at the same time he has a contract which cannot be disturbed for 15 years unless he takes the initiative and wants to vary it in the way I have suggested.

Loan Is Amortized—Interest and Principal Reduced with Each Payment

This means that the owner of the house pays the first year 12 per cent, or 1 per cent a month, on the amount of the original debt. He keeps on paying 6 per cent of the debt, and of course his interest is decreased with every payment of principal. We have more than one reason for making loans in this way. A life insurance company is really a great organization for thrift, because the people who pay life insurance premiums are saving that money for a rainy day and to provide against death earlier than is expected; but we believe, and we believe it very strongly, that the people of this country need to be taught thrift in every possible way.

Co-operates with Building and Loan Association

We are working in co-operation with the building and loan associations, which do the same thing (and the good that has been done by those associations cannot possibly be measured; they are one of the greatest institutions for thrift that exists). The Metropolitan Life Insurance Co. is trying to work with those associations and teach the people to save money, and not only teach them to save it, but force them to save it.

Value of Installment Feature in Loans

It is unfortunately the habit of the American people generally not to save any money, not to pay a mortgage unless they have to. Here is one instance: I have a small mortgage on my place and it hasn't any installment features and of course I am not paying anything on it, but if I were obliged to do it, I would find the money for the installment just as I find it to pay my life insurance or any other fixed charges that I must meet. It is our sincere desire that these home-owning loans will assist in the great work, than which there can be nothing more needed in this country.

You can, I think, realize that to make thousands of loans in all parts of the United States is entirely beyond the ability of any set of officers in a home office. If we had to do this work directly ourselves, I would absolutely throw up my hands and say that it cannot be done, but we were determined to do it and the idea was to devise some way by which it could be done with absolute safety and with the least possible expense or delay. We could have kept inspectors traveling all over the country and looking at every loan that came in, but that would be extremely expensive, not at all certain and generally very unsatisfactory.

Local Interests Make the Loans

Therefore we decided that we would arrange with local people to make these loans. We have therefore selected either a bank, a trust company or a mortgage guaranty company in the different cities to act as our loan representatives. There are very few towns of any size where some of the bankers do not have about as intimate knowledge of real estate values as the average real estate man; or if they do not have it, they know where to get it. They know the people to whom the loans are to be made; they know their general character, their responsibility as to keeping their engagements; therefore these bankers must know whether or not the loans asked for are within the limit that we set and whether the man who is to borrow the money is one that can feel they can safely do business with.

Construction Loans Made by Local Banks

These banks make the construction loans, if it is necessary. We do not make the loans until the houses are entirely finished, our counsel has approved the title or they have produced a policy of title insurance, and the house is entirely ready for occupancy. It is not necessary that they be sold. In fact, we want to take the obligation on the whole group of the builders who originally erect them.

The bank then collects the interest and installments. They make these collections in any way they please. Some of them induce the borrowers to pay these installments monthly or quarterly, so that on the interest date the bank is in possession of the funds to remit to us the interest and installments. In all the states where the interest rate will permit it, a higher rate than six per cent is charged. We must receive six per cent net for our money; for, I want to say to you that we are sacrificing considerably in making mortgage loans, because there are other investments that will pay better than six per cent and are perfectly safe. But the investment in that class of loans does not help the housing situation, and therefore we are not making loans of that kind, but we *must* get six per cent net.

Therefore, if a rate of 6½ per cent can be obtained, the bank collects interest at that rate and remits to us each six months at the rate of six per cent, retaining one-half of one per cent for its services in making these collections, and further agreeing that in case of default of any of the covenants in the mortgage, that, on our request, the bank will re-purchase the mortgage from us. A local bank can nurse a mortgage along, knowing the man, knowing that he is entitled to consideration, that he may be in present hard luck; they can use their judgment as to whether or not a foreclosure is immediately necessary, and in most cases it results in saving a foreclosure. We are not in position, to handle these matters in that way. We do not think that the local bank is assuming any responsibility that would mean any possible loss; because the loans, as I say, are made on a 50 per cent cost basis, and six per cent per annum is paid on account, and it will be a very short time before the loan is safe beyond any question.

Local Bank Profits More Indirectly Than Directly

The banks that have done this business, most of them have said to me that while there is not much profit to them in the one-half of one per cent that they retain, it does mean business for the bank. Many of the people who come into the bank to make these payments become customers of the bank.

But there is one thing that I have endeavored to impress on the minds of the bankers with whom I have discussed this question. I say to them whether you make any money or not, don't you think that you owe a definite responsibility to your community to have the community avail itself of the funds that we are willing and glad to lend? And some of them, most of them in fact, take that attitude, that whether or not they make any money is a secondary consideration, they do want to help their communities; and I am glad to say that a majority of them are doing it, largely with that idea in view.

Responsibility of Banks to Their Community

There are some bankers who, I am sorry to say, are so short-sighted that they can see only the profit and the possible trouble they may have with taking care of loans when they get in default; and I am frank to say that I get cross at people who talk to me that way. They say they need houses, they say they need our money, but they are not willing to take a little trouble or to assume a possible remote risk to help their community, and when people talk that way to me, I quit. If they do not think enough of their community to help it in this way, we certainly cannot force them to take the money, and we cannot do it in any other way.

Method in Operation Since June, 1920

Now this method has been in operation only since about June. It is quite an undertaking, to get a system of this kind put into operation, because it is largely a new system and needs a great deal of explaining to a great many people, but it is gradually spreading and we have agencies now in from 50 to 60 cities; and since the first of the year we have made and agreed, to make loans on over 2,000 dwellings in various parts of the country. These loans amount to between $8,000,000 and $10,000,000.

Loans Limited to Five Thousand Dollars Each

Let me say that the loans are limited in size to $5,000. That is the largest loan we make—and not less than $2,000; $5,000 is the maximum amount that we think ought to be invested in matters of this kind, because if we go beyond that, there is no end to the demands that would be made on us for houses of a much more pretentious character and to be used by people who, as a rule, do not, I think, particularly need the assistance that we are trying to render.

On apartment houses the same basis of value is assumed, 50 per cent of the land value and construction cost of the building, but the size of the loan depends, of course, upon the size and value of the building. We have altogether loans on about 5,000 dwellings. Among them are about 1,700 or 1,800 that we made several years ago in Akron, O., to the Goodyear Tire and Rubber Co. and the Firestone Tire and Rubber Co., where the loans were made on the same basis, but are guaranteed absolutely by the presidents of those two companies. They collect the principal and interest in the same way and remit it to us without charge.

Our company has always been a large investor in apartment houses of all descriptions, and at the present time we have loans on over 600 apartment houses, housing considerably over 100,000 people and representing an investment of nearly half our mortgage investment (which are at this time about $300,000,000), so that we have about $150,000,000 invested in places where people live. We can do only a fraction of what is needed.

Just at present there is a slackening of demand for mortgage money, for two reasons: One is, that people are a little uneasy as to the present business situation, and the other is that normally the demand for loan on new houses slackens off in the winter. In the spring we expect to have a very considerable volume of that business.

Those Who Have the Means to Loan Warranted in Taking Risks on Future Costs

One thing I want to urge upon you is to use whatever influence you have with other insurance companies and with savings banks. The savings banks in all localities have just the same responsibility to their people, because they derive their money from the working people, and just now the banks, in my opinion, should use their funds almost to the exclusion of any other form of investment, to lend on new homes. There is no good derived from making loans on old homes to replace other loans; they should make up their minds to make them on new homes. They will say they are taking more risk, but it is right that they should take the risk. There is not any risk if it is properly done and properly watched, if installments are insisted upon it is just as safe business as can possibly be done.

Lenders Should Realize That Old-Time Prices Are Gone Forever

As to the future cost of building, I believe that the cost of building will recede somewhat. It will never get back in my opinion, however, to where it was before the War. We are on a permanently higher level of cost of such things, and I think all lenders should make up their minds to that fact.

Soft Stones Sometimes Makes a Stronger Concrete Than a Harder Stone

It is a well-known fact that some soft grades of stone make a better aggregate for concrete than a harder stone. There are two quarries in Iowa producing two grades of limestone, one with a French coefficient of six (soft), the other with a coefficient of 8.1 (hard). But on testing these stones as aggregates for concrete it was found that the soft stone produced the stronger concrete. The reason assigned was that the softer stone was more porous and formed a better bond with the cement than the harder stone, and yet soft stone like the above is being rejected on certain classes of work where it would serve as well as the harder grades.—*Rock Products.*

An English Type Seen in Los Angeles--By G. E. McDonald

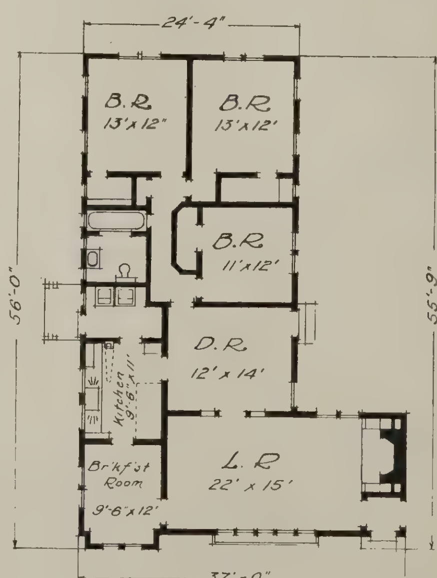
THE perfection and variety of architectural types seen in the newer districts and environs of Los Angeles are due not only to favorable climate and the vast amount of wealth expended in home building, but have been favorably affected to some extent by the vast "movie" interests centered there—who have emphasized correctness of type for the settings of their numberless plays of different periods and climes, and who seek insistently after the subtle charm of innate beauty and homeiness and life, and radiate this influence far afield.

Fig. 1—English type of cottage. Designed by Walter S. Davis, Los Angeles, Calif.

The quaint English type of cottage shown herewith was built under the personal supervision of Architect Walter S. Davis, of the Garden City Co., of Los Angeles, which specializes in the designing of distinctive homes and has gotten out a book on the subject.

Though this cottage is so new that its first lawn is still as sparse and soft as the down of a young man's first moustache, yet the place has already the unmistakable quaintness and glamour of the old wayside cottages seen along the rural lanes of Kent and Devonshire, and needs only the kindly touch of time to make the picture complete with setting of hedge and hollyhocks and pungent smelling shrubs.

Opening the front door, one is admitted into the spacious and well-lighted living room, the walls rough-plastered and overcast with the soft tiffany blend of dull, rich colorings. To the left is the ample fireplace with convenient built-in bookcases on either side—the one common mantle shelf over all being arranged with an eye to the interests of the children in making a good showing of waiting stockings in a long row for old Santa Claus the historic night before Christmas.



Across to the right one gets a glimpse of the sunny breakfast room, also in old ivory trim, having a broad window seat across the front and in the back corner a specially designed old English sideboard, built for the place, though a movable piece. A door connects with the kitchen, having built-in cupboards, shelves, etc., while beyond and opening outdoors is the screen porch containing laundry tubs and having proper shelving, etc.

The dining room proper is a stately apartment, separated from the living room by double French doors, amplified on either side by glass partitions of similar motif, and blending admirably with the living room as one apartment on occasions of receptions, etc.

The interior hall, finished in white, connects the front of the house with the three bedrooms and the well-arranged bathroom. The convenient placing and good lighting, as well as ample closet space of the bedrooms will be at once noticed.

DEMONSTRATIONS of rapid construction are interesting mainly as showing the advantages of adequate preparation and not of the ability to make a pretense of stability with flimsy material.

Fig. 2—Back porch. Note French door.

Fig. 3—The casement window and close-cropped eaves in old country style

Fig. 4—Looking from breakfast-room toward fireplace and front door

Fig. 5—Looking from living-room toward dining-room and into hall at left. The French doors between living-room and dining-room give spaciousness and unity of effect

Fig. 6—This quaint English sideboard was designed for the house and set up as soon as the house was completed. While movable, it is looked upon as a built-in feature

The Rat Becomes a Factor in Building Construction

W. C. Frederic, an architect of Pensacola, Fla., tells a correspondent of NATIONAL BUILDER that the rat has become one of the great factors in the building repair work and construction in that city. The United States government, in its efforts to keep out the bubonic plague, caught about 20,000 rats in Pensacola, and, on examination, found about 10 of them affected with the plague. Stringent regulations were at once issued by the government requiring that every building and wharf be made rat-proof. Otherwise the port would be closed to shipping and the city placed under quarantine regulations. Said Mr. Frederic: "And that is the reason why we have not been doing much in the building line. We have been spending all our efforts and money in rat-proofing the city. I estimate that this rat-proofing campaign has cost the people of Pensacola about half a million dollars.

"In the case of residences, trenches had to be dug to a depth of 18 inches below the bottom of the foundations and the foundations made rat-proof with the help of concrete. Wooden floors had to be torn out. In some cases floors were covered with half-inch mesh wire and another floor laid over that. In all new construction a rigid inspection by the city makes sure that no rat can get into a building. The problem was a large one, because most of the residences in this city are frame, even if stuccoed on the outside. But it has meant the complete extermination of rats."

As rats destroy hundreds of millions of dollars' worth of property in this country every year, all building construction should be rat-proof.

A GOOD WALL—Foreman: "Can yer hear me, Bill?" Bill: "Yus." Foreman: "Can yer see me, Bill?" Bill: "Noa." Foreman: "Well, then, it's a pretty good wall."—*London Punch.*

Building a Geometrical Stair

By John Y. Dunlop

THE design and construction of a staircase is a matter of great importance in the appearance and comfort of the house and is a detail which is very often left very much to chance.

No flight should rise more than eight feet without a landing; landings between flights should be of a length and width not less than the width of the stair, and winders should be avoided as much as possible.

In planning a stair the position and size of all adjacent openings must be taken into consideration, so must the width and length of the flights and the height of the stories.

All this is the work of the architect or the building contractor if he is the author of the design of the house.

The general rule is that in the most of cases the stair builder is very seldom responsible for the actual planning of stairs. The architect or contractor furnishes the stair builder with a scale drawing of the arrangement of the staircase and a sheet of details. The sizes of the different parts in the stair, the materials to be used, and the amount of labor in each case is given in the specifications. In this way the stair builder has a definite plan to go on and he has only to devise the method he intends to adopt in carrying out the work.

Usually there is a choice between two methods. The first is to build the stair in the workshop or mill in such portions as will allow it to be taken to the job and set in position. The other method is to prepare all the material as far as the shaping and finishing of each piece is concerned and then fit the parts together at the job.

The latter plan is the method generally adopted by the small contractor and is the way in which I was taught in my apprenticeship. Of course there is no doubt but that the building of the stair in large sections in the workshop or mill has many advantages because full use of the machines can be had in the fitting of the various parts together. Then there are always facilities in the shop which can not be had at the job, so that there can be no doubt but that the contractor who can tackle work in the shop will always be looking to the interest of his bank account.

Whether the stair is being built in the shop or on the job, always prepare the story rod on the job and from it have framed in position the landing at the required level.

Then to the landings fit the patterns for the stringers of the stair, which are notched and fitted onto the landing framing in every way the same as the stringers are to be. On the patterns set off the lines of the tread and the rise, so that practically speaking the path of the stair is marked off from top to bottom.

The reason that I am so partial to making the patterns on the job when the stair is to be built in the shop, is that by doing all the fitting of the ends of the patterns onto the landings I can have this work done on the stringers of the stair before they are put together, which means that when the flights of the stair arrive on the job it is simply a matter of lifting and setting them in the position for which they are intended. Otherwise I would have a lot of cutting and fitting at the finished sections and the flight would have to be turned over several times which not only means unnecessary handling but a waste of time.

Now we will consider the stair shown in the line drawing. First I would lay out my patterns for the straight portions, paying no heed to the curved part at the bottom except to note the exact height and location of the first straight step above the winders. (In this example step number 7.) For the sake of briefness we will consider this portion of the work done and will take up the construction of the curved part.

In laying out the material for the circle portion of the stair draw this part full size and make skeleton templates of each step. These templates should be the exact shape as shown by the enlarged plan, but would have added to the front edge the amount of the projection of each step over the front of each riser.

The heads for the winders may be cut out from planks and the tapered pieces at the end which is cut off could be glued on the back edge to make up the full width required at the wider end. The back edge of each head would then be planed up; the front edge molded, and if the underside was to be grooved for the cavetto molding, all that should be done before the step left the bench.

In the line drawings two methods are shown suitable for the forming of the outer stringer of a geometrical stair, viz., close stringer and cut or open stringer. We will assume that the present example is being built with a close stringer and for that reason I have shown sketches of the construction of the circle stringers based on that method.

The outer stringer which is a continuation of the wall stringer is shown complete with the blocks for the steps. A stringer of this type is best made with three thicknesses of wood each bent, glued and screwed together. The outer layer is bent down onto a series of blocks which have been set up on the bench to correspond with the line of the stringer on the plan. Thickness number two is then coated with glue, wrenched down with a few struts and then screwed together. When the glue has hardened, thickness three is treated in the same way with the result that when the whole thing is dry the bent stringer retains its proper shape.

A development of the stringer is now made on a thin template so that it can be bent onto the concave side of the curved stringer. This allows the joints to be marked off and also gives the line of the blocks to support the steps and risers. These blocks should be cut with a curve on the back to conform to the shape of the stringer.

The stringer is now put back onto the bench and each block is glued and screwed to the stringer as shown in the drawing.

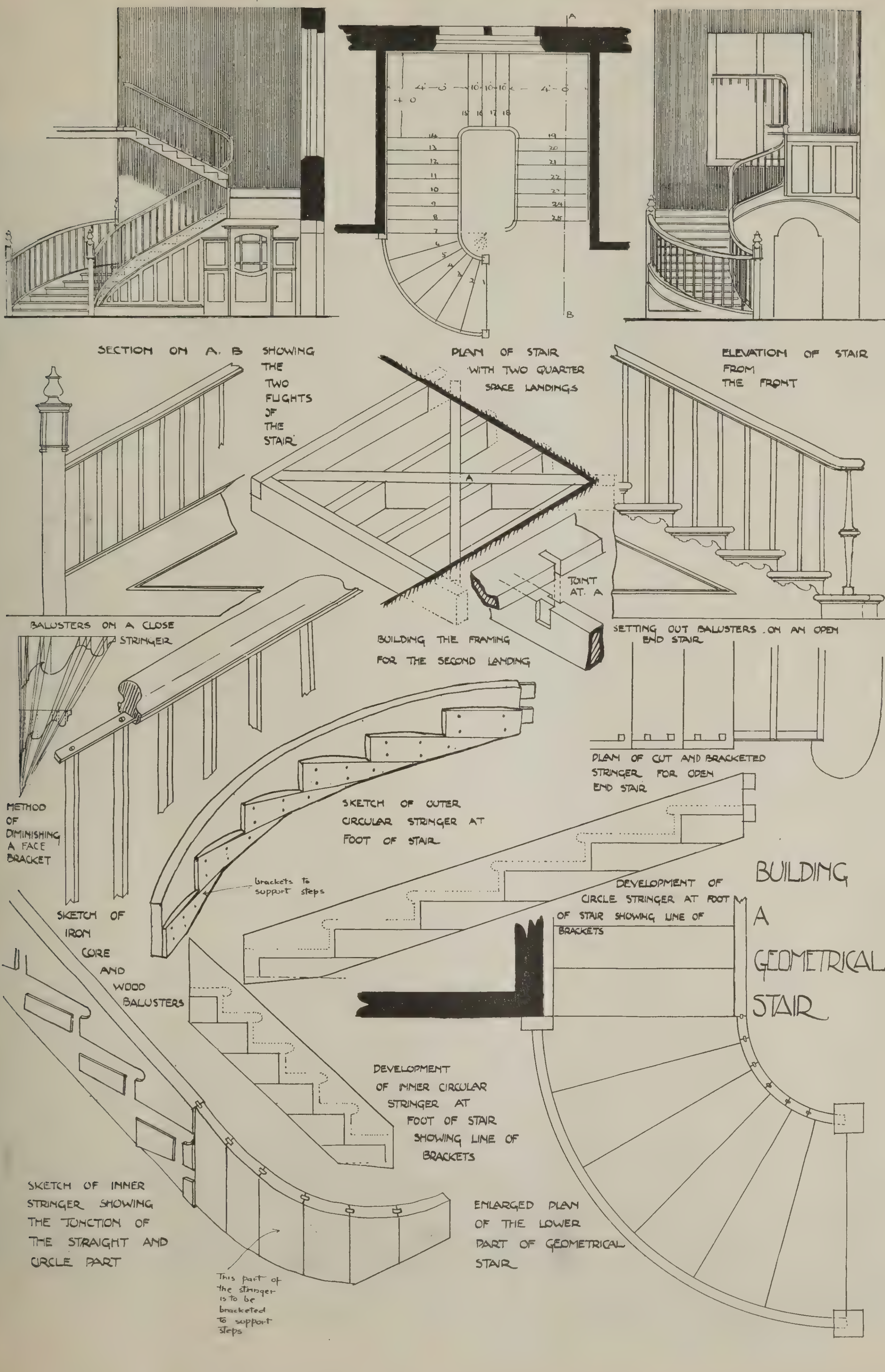
The inner stringer for the curved part of the stair being of a shorter radius is built of staves that are made circular in sections to follow the curve and are grooved and glued together. A sketch is shown of the staves attached to the straight stringer and ready to receive the blocks for the steps. The joint between these two parts is further strengthened by two strips of thin iron screwed to the outside of the stringer.

In building a stair of this type I always start by having the wall stringers set up in position first. In this way if there is any adjusting to be done to get the flights to come in line with the different floor levels I have the several flights to work on.

A very important part in the construction of this type of stair is the hanging of the second landing which must support itself and part of the weight of the top flight. A sketch is shown of this framing, and also a detail of the joint of the angular framing which carries the outer corner of the landing.

With the outer stringers in position the inner ones are set level across and then comes the fitting and wedging of the steps in the straight flights. The winder steps are simply fitted onto the blocks on each side and nailed down. They should always be made a good fit to the stringers as we can only depend on the thickness of the veneer which is to be added to the inside of the stringer to cover the point made by the end of the step.

Rough carriages are used between the stringers for the dual purpose of further supporting the stair and also for supporting the plaster or paneling on the soffit. Weak carriages are very often the cause of creaking stairs, but as an increase in the depth of the carriage causes an increase in the width of the stringer stairs are very often


SECTION ON A. B SHOWING THE TWO FLIGHTS OF THE STAIR
PLAN OF STAIR WITH TWO QUARTER SPACE LANDINGS
ELEVATION OF STAIR FROM THE FRONT
BALUSTERS ON A CLOSE STRINGER
BUILDING THE FRAMING FOR THE SECOND LANDING
JOINT AT. A
SETTING OUT BALUSTERS ON AN OPEN END STAIR
PLAN OF CUT AND BRACKETED STRINGER FOR OPEN END STAIR
METHOD OF DIMINISHING A FACE BRACKET
SKETCH OF OUTER CIRCULAR STRINGER AT FOOT OF STAIR
brackets to support steps
SKETCH OF IRON CORE AND WOOD BALUSTERS
DEVELOPMENT OF CIRCLE STRINGER AT FOOT OF STAIR SHOWING LINE OF BRACKETS
BUILDING A GEOMETRICAL STAIR
DEVELOPMENT OF INNER CIRCULAR STRINGER AT FOOT OF STAIR SHOWING LINE OF BRACKETS
SKETCH OF INNER STRINGER SHOWING THE JUNCTION OF THE STRAIGHT AND CIRCLE PART
This part of the stringer is to be bracketed to support steps
ENLARGED PLAN OF THE LOWER PART OF GEOMETRICAL STAIR

stiffened by rough bracketing instead of using a deep carriage.

Now would come the general finish of the landing such as the projecting nosing at the edge and the continuation of the stringer or skirt detail around the landing from one stringer to the other. The outer stringer has also to be finished in this case to receive the panelling on the hall side as well as the arched ceiling under the cross flight, and the landing has to be furred down to form the curved line for the plaster arch.

A very interesting bit of work for the stair builder is the scribing of the veneer which is to cover the faces of the curved stringers. This piece is made thick enough to finish with the face of the straight stringer but must be flexible. It is bent around the stringer and is either scribed in the usual way with a pair of compasses or with a special instrument.

The top edge of the stringers are finished with a double molded plate or shoe. A very simple way to obtain the true shape of these pieces on the curved stringers is to bend a flat piece of wood the thickness of the plate on the edge of the stringer and trace both top edges of the stringer on the underside of the wood. Draw the joint line on the top and bottom ends and cut them off. Then cut the plate parallel to the curved lines and mold to suit the straight portion.

In setting off the handrail place the balusters in line with the face of the stringer and the faces of the risers. The intermediate balusters are then spaced between them. In the case of a close stringer, balusters are often spaced according to taste but it is not advisable to have them any more than 5 inches apart.

All wood balusters should be housed into the stringer or step. At the top they should also be let into the handrail a little, although a common plan is to prepare the underside of the handrail with a groove into which the balusters are placed. In geometrical stairs the balusters are very often screwed to an iron core which is fixed to the underside of the handrail.

With straight balusters there is very little difficulty in setting out the length, but with turned and molded balusters considerable care is often required to make them uniform.

In the simplest turned balusters all of the turned portions are the same length which means that the square portions are also uniform in length when used on a close stringer stair. On an open stringer stair, however, the square portion of each baluster on the same step will vary. In that case a very simple way to set out the balusters is to draw the outline of a couple of steps and balusters full size. Then on the two balusters that are in line with the faces of risers, mark off the height of the straight portion. A line drawn through these points will give the length of the square portion of the intermediate balusters.

On an open stair a very common method is to make all the square portions next to the step and handrail the same length. In this way the length of the turning varies according to the position of the baluster on the step—the front baluster having a short molded part, while the intermediate is much longer.

The arrangement of the handrail in this type of stair is often continuous, running the full height of the stair without intermediate newels. In some cases the handrail starts from a scroll or wreath on the top of a series of balusters, but the favorite arrangement is to begin the handrail at an ornamented and paneled newel post which marks the beginning of the rise toward the upper floor.

Two Country Houses

Fig. 1—The edge of the lawn marks the beginning of the shore; beyond lies the bay

The vicinity of Narragansett Bay has long been noted for its country homes. The accompanying photographs show two examples of houses near Narragansett Pier, on the west shore.

Figure 1 is an especially attractive example of a small country place, with a garage forming an important part of the group. The trellis fence and pergola make the house appear low and sturdy, a very important consideration for a house in an exposed location.

Figure 2 has a rather picturesque appearance, but is not nearly so attractive as the other house. It has a "piled up" look doubtless due to additions added from time to time without much regard for appearances.

Fig. 2—These country houses often have a small beginning and are added to from year to year

Some Novel Porch Lights

By Charles Alma Byers

This hollow pier contains the porch light

Another lantern shaped porch light, or Japanese design

THE matter of providing the front porch or veranda with an electric light is ordinarily handled very simply. In fact, in respect to both connections and fixture, it is usually handled in practically the same manner as if the porch or veranda were an ordinary inside room. Perhaps, for instance, the fixture itself will consist merely of a light globe of some kind suspended or protruded from the ceiling, or it may be projected in bracket fashion from the wall. Often, in fact, if the latter or bracketed type is used, there will be a pair of the fixtures—a light on either side of the front doorway.

In the accompanying illustrations, however, are shown some porch-lighting schemes of an entirely different kind. And while they are novel both in design and in the lighting effect produced, they are practical and have engaging possibilities in a decorative way as well.

The first of these porch lights is designed as a rather massive pier set in the center of the outer or front wall that forms the front porch's railing enclosure. The pier, like the wall, is of white cement stucco over ordinary brick, ornamented with blue-red brick exposed. The top part of it, further decorated with a wood frame painted white, is hollow, and in each the front and the rear face is set an art-glass window, while there is also a pyramid-shaped cap or top of art glass. The electric light globe, with the feed wire conduited thereto, is enclosed in this hollowed top of the pier, and the light therefore shines through the front and rear sides and the cap, the opalined-colored glass naturally producing a very pretty effect. Incidentally, the house number is painted on the front window of the pier, and is consequently illuminated whenever the light is turned on.

Porch lights concealed in a pair of large round columns. Light window in nearest column open; other closed

Two of the other porch lights here illustrated are also of the pier type. The fixtures themselves, however, are designed as Japanese lanterns. One of these is set on the round cap of a round cement pier located at one side of the steps which lead onto the front porch, and the other occupies the square cement top of a clinker-

A lantern-like porch light supported by a cement pier

brick pier, partly covered with vines, which acts as the center support of the front porch's front railing. The former fixture, which possesses a pyramid-shaped top, is made of black-painted metal, with a square of amber-colored glass in each of its four sides. The other fixture, which is somewhat the larger, also has a square base, but its top is designed with upward-turned edges, very much after the style of the typical roof of a Japanese house. The metal frame and top in this case consists of hammered copper, and the glass in each of the four sides is of varying shades of amber, wine and green. Both fixtures are stationarily fastened to their respective piers, and the wires which connect them up electrically are extended up through the inside of the masonry upon which the lantern-like fixtures rest.

The remaining illustration shows still a different porch-lighting idea. The electric lights here are placed inside a pair of large round columns. There are four of such columns across the front of the house, used to help support an overhanging extension of the second story, while outside the row of columns is a deep cement-paved terrace. The lights are featured in the two center columns—one on either side of the front entrance—and, being placed so as to shed their rays directly upon the doorway, are cleverly hidden from street view. At the height of nearly six feet each column, which is of wood and plain design, has a small rectangular hole cut through to its hollowed interior, which openings are finished with neat metal frames and equipped with hinged glass doors. These doors are curved to correspond with the round surface of the columns, and the glass of which they are composed consists of several narrow strips, producing a sort of prism effect. The light globes are placed just inside these glass doors or windows and the electric wires are dropped through the hollowed columns from above.

The builder who wishes to break away from the ordinary styles in porch lighting will doubtless find the suggestions offered through the accompanying illustrations very interesting—and, moreover, susceptible to considerable variation. Incidentally, each of these porch lights is controlled, of course, through an inside switch.

Application of Portland Cement Stucco on Concrete Blocks

G. S. B. asks about cement stucco on concrete blocks:—The booklet, "Recommended Practise for Portland Cement Stucco," is a reprint from the proceedings of the American Concrete Institute. Paragraph 7 of page 2 covers the case of the application of portland cement stucco on concrete blocks, and reads as follows:

"7. Concrete Block.—Concrete block for stucco walls should be rough and of coarse texture, but not weak or friable. Block should be set with cement mortar joints, which should be raked out or cut back even with surface. Before applying the stucco the surface should be brushed free from all dust, dirt, and loose particles, and should be wetted to such a degree that water will not rapidly be absorbed from the plaster, but not to such a degree that water will remain standing on the surface when the plaster is applied."

The explanatory notes on page 3 amplify that paragraph and give the reasons behind its provisions. E. C. Carlson of Cicero, Ill., has built some 200 houses of hollow concrete block, the exteriors being coated with portland cement stucco. He is building 4-, 5-, 6- and 7-room bungalows of this construction. Three coats of portland cement stucco are applied directly to the exterior without the use of lath or furring strips. Different colors and surface finishes are used in the final coat, for variety.

Promoting New Bank Buildings

THE architect or the builder who interests himself in the promotion of commercial buildings must be prepared to submit concrete evidence that the building under discussion will likely prove to be a profitable investment. Vague references to the psychological influence of a handsome building in attracting new business are apt to fall on deaf ears unless the argument is sustained by cold facts and figures that are based on the actual history of similar enterprises.

Take bankers, for instance. Conservatism and even open hostility toward a proposition to invest funds in a new bank building may usually be expected. To go before a group of bank officials, armed with nothing but a snappy bunch of sketches and a line of talk based on the theory that a new building stimulates the public's confidence in a bank and attracts new accounts is old stuff. It is, of course, a logical argument and not to be discarded, but to carry full conviction it should be supported by specific examples of the increased business that has occurred after the erection of new buildings.

In presenting an argument of this nature, it should be borne in mind that the volume of business may, or may not, indicate corresponding profits. In other words, a new building may be so efficiently planned that even without any material increase in volume, the business will show much greater profits than before, or vice versa. It is, of course, seldom possible for an outsider to learn the exact profits of a bank, but the amount of the surplus is a fair index of the prosperity of the institution and forms an excellent basis for judging its profits. Data covering a bank's business may be obtained direct or by referring to a banker's directory.

In view of the fact that conditions apart from a new building might be held to be responsible for an increase in business, it is well to accompany each example with a parallel statement showing the business of the closest competitor during the same period. In this manner it is usually easy to convince bank officials that a new building bears a definite relation to a bank's welfare and forms a highly profitable investment.

Working along these lines A. Moorman & Company, bank builders, of St. Paul, Minnesota, have recently compiled a chart that is used by them in presenting their proposition to bankers. The chart contains a tabulation of figures covering fifty representative banks that have been built by the company within the past few years.

The chart is divided into columns the first of which contains the name of the bank. Then follows the location, date built, rating when building was built, present rating and the growth. Next is given the corresponding ratings for the bank's nearest competitor and its growth. The last column

Fig. 1—Jackson National Bank, Jackson, Minn. A Moorman & Co., architects and builders

Fig. 2—Dysart Savings Bank, Dysart, Iowa. The growth in surplus alone paid for this building in less than three years

Fig. 3—State Bank of Watertown, Watertown, Minn. Deposits increased more than two hundred thousand dollars

shows the gain of each of the fifty banks over its nearest competitor.

The result is illuminating to say the least. The first place the chart shows that the growth in surplus alone amounts to $822,000 or an amount almost equal to the total cost of the 50 new buildings. Their growth in deposits was well over $25,000,000.

At the same time their nearest competitors increased their surplus only three hundred thousand dollars and their deposits grew but slightly over fourteen million dollars. In other words the fifty new banks led their nearest competitors during the period by over a half million dollars surplus and eleven million dollars in deposits.

It is also interesting to note that the gain in surplus of the new banks is about three and one-third per cent of the gain in deposits, while at the same time the competitor banks show a gain in surplus of only slightly more than two per cent. This of course may be laid to differences in management, but it seems plausible to consider that it is in part due to the superior efficiency of the new buildings, both in arrangement and in stimulating better work among the employees.

Because of the difficulty in obtaining accurate data it is of course rather difficult to apply this method of comparison to other lines of business. There are, however, occasions when it is possible to obtain such information and those who are interested should file it away for reference at some future time when it may prove useful in dealing with a client who is somewhat dubious of the real value of a new building to house his business.

Simplicity Houses in Birmingham

O. L. Bunn, secretary of the Chamber of Commerce, of Birmingham, Ala., in conversation with a representative of National Builder, thus describes one way in which some of the people of that city have been trying to reduce the housing shortage:

"The house shortage has been felt acutely here for a year and a half, and today everything in the city is rented. You would not be able to find even an empty garage.

"Two of our real estate men worked out a scheme that has proved a perfect success so far as it applies. It was assumed that a good many people owned lots on which they expected to build some time. *Now* was not considered a good time to build a permanent residence, but a garage could be built on the back part of the lot and could be used as a temporary residence during this time of stress, thus emptying one living apartment for further use.

"Then the idea was added of making the garage big enough so that the servants could live in the back part of it after the permanent residence was built. So a design was made for what we are now calling a simplicity house. It contains a living room and kitchen in one end and two bedrooms with a bath between in the other end. These houses have been well built and are costing about $2500 each, for it is not known how long they may have to be used as a principal residence. They are made artistic, and vines and flowers climb over many of them.

"The idea has proved popular, and I suppose that between 500 and 600 of these simplicity houses have been built in a period of six months. They can be built in from 15 to 20 days each, which is another item in their favor. There is another big thing in favor of them and that is that they insure that the owner will finally have a much higher type of garage on the back of his lot than he would otherwise have had, and this is good for the community. Because, in many cases, the kind of building put on back lots for servants' quarters is not an ornament to the neighborhood.

"When the owner gets ready to build his own residence he will be living on the lot and can thus the better supervise that work. When he is ready to abandon the simplicity house he can knock out the partition between the kitchen and living room, put in a big door, and his garage is ready."

A Modern Ice Cream Plant

Fig. 1—The exterior is of cream colored terra cotta with well considered detailing. Otto J. Merman, architect

IT IS related that the well-known sighs of Alexander the Great were interposed by an indulgence in iced beverages. Also that Marco Polo, the pioneer globe trotter, gathered many foreign recipes for water ices and milk ices to supplement those in vogue in the French and the Italian courts. Charles the First of England went so far as to pension a French cook, de Mireo, who introduced the royal palate to the novelty of cream ice.

As time went on ice cream became more commonly known until as early as 1786 an advertisement in the New York "Post Boy" invited our forefathers to partake thereof at one dollar per quart.

To come down to more recent times, the most of us remember when with considerable anguish—tempered but slightly by the gastronomic reward that was to follow—we were attached to the handle of a perverse contraption known as an ice cream freezer and instructed to "turn the handle till she won't budge." Less frequently we enjoyed the supreme delight of hoisting our short pants onto a stool in the corner drug store and recklessly ordering a nickel's worth of cream with extra vanilla on top.

Fig. 2—View of the general office looking from the lobby

In those days ice cream was an event, a name to conjure with. It was the perfection of luxury, an indulgence identified with the Fourth of July, midsummer parties and the entertainment of important guests. By no means was it to be mentioned in the same breath with food.

Tempus fugit! Authorities state that at the present time we are consuming more than two hundred million gallons of ice cream annually. Instead of a mere dainty it is now recognized as a highly nutritious food. Millions of dollars are being spent in providing modern facilities for the manufacture of ice cream.

The new plant of the Tri-State Ice Cream Corporation at La Crosse, Wisconsin, is the last word in the scientific and sanitary preparation of this important food product. The architect, Mr. Otto J. Merman, has provided a building that is not only utilitarian to the highest degree, but is also a handsome tribute to the ice cream industry.

Both the design and the construction of the building typify the purity of the manufactured product. The walls are of hollow tile, faced on the exterior with cream colored terra cotta. The interior walls are of glazed hollow tile and white terra cotta. The floors are of concrete and mastic construction, in some cases covered with quarry tile. All exterior frames and sash are of steel. Floor drains have been generously provided so that the entire plant may be literally washed out with a hose. Large windows and vestibules furnish all work rooms with an abundance of fresh air and light. In fact this is justly considered to be one of the most sanitary plants in the country.

The main entrance opens into a lobby which leads to the customers' desk in the general office. The lobby is finished with a tile floor and marble wainscot, and glazed partitions at either side permit views of the manager's office and the manufacturing departments. At one side the lobby opens into the freezing department and adjoining the other side is a short hall containing a toilet room and a coat closet and connecting the general office and the manager's office.

The general office has a large window extending along the exterior wall and the floor is covered with battleship linoleum. A fireproof vault is provided and the office pictures are of special design. A glazed partition separates the office from the receiving room and an order and report desk for the use of drivers is placed along this wall.

The receiving room is used for weighing, sampling and checking raw materials. From this room a two-ton hydraulic elevator conveys them to the second floor.

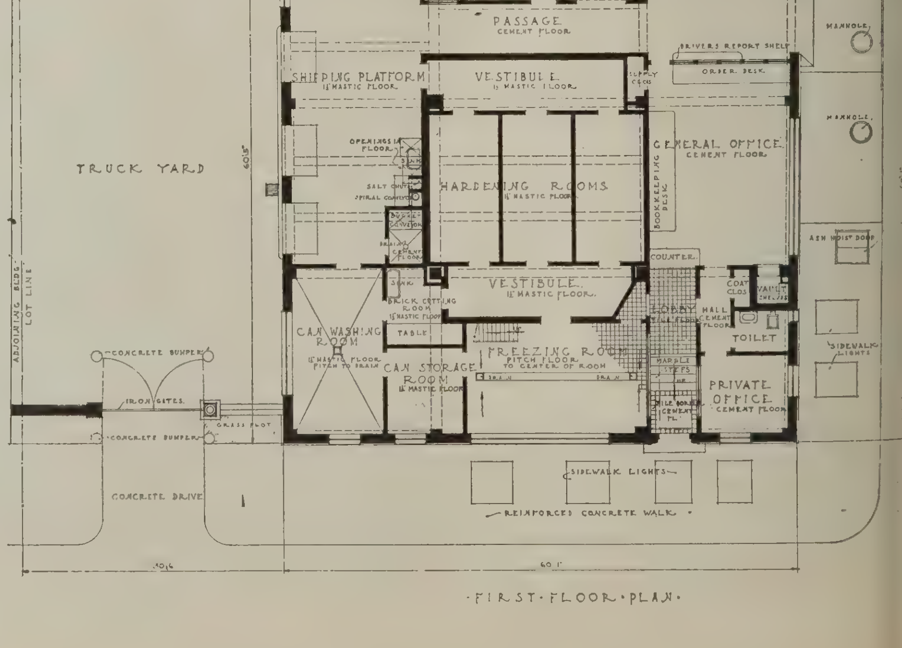
The raw products room on the second floor is insulated with cork. A temperature of a few degrees below freezing is steadily maintained in this room which is used for the storage of milk, cream, butter and other raw materials requiring cold storage. Dry storage for other materials such as sugar is also provided on the second floor.

Fig. 3—The freezing department showing freezers in the foreground with storage tanks on the balcony above

The creamery and the mixing departments adjoin the storage rooms so that unnecessary handling of materials is avoided. A laboratory for testing and analyzing products is located near the mixing room.

The mixing room is equipped with a combined mixer and pasteurizer, thus insuring the purity of the product by pasteurizing it during the mixing process. The mix is then pumped into the homogenizer, a machine which consists of a series of pumps and a special valve which operates under enormous pressure. This valve may be compared to a safety valve which "blows off" at a pressure of between four and five thousand pounds, forcing the fat globules between an agate disc and its seat, the pressure converting the liquid mix into a homogenous mass, thus imparting to the cream that so-called velvety or smooth taste. This machine is also used for converting unsalted butter into sweet cream, thus assuring an adequate supply of cream the year around.

From the homogenizer the mix is forced



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into the cooler which reduces the temperature of the mix to about sixty degrees. The mix is then run into large tanks where it is held for from 12 to 24 hours before passing into the freezers. These tanks are glass lined and are jacketed so that cold brine circulates around them, cooling the mix to about 38 degrees.

The freezing department extends through both stories, thus throwing the mixing and the freezing departments into what is practically one room. The freezing department has been made an attractive feature of the design, as its green tile floor, white terra cotta walls and bright machinery face a large window that is at all times in plain view of people passing along the street.

There are five freezers which have a combined capacity of 2,000 gallons per day. They are fed by means of gravity pipe lines leading from the storage tanks and the cream is frozen by circulating brine around the freezers at a temperature of about zero. The cream passes from the freezers into the cans when it has reached the consistency of thick syrup. It is then placed in one of the hardening rooms which adjoin the freezing department.

The hardening rooms are insulated with six to eight inches of cork and their temperature is kept around zero. They have a capacity of about ten thousand gallons of cream and are connected by means of two vestibules, one of which opens into the freezing department and the brick cutting room, the other giving access to the shipping department.

The shipping department contains an office for the shipping clerk and opens onto a covered platform from which the trucks are loaded. The shipping room is also conveniently placed with reference to the freight elevator, and bucket elevators are provided to convey salt and crushed ice from the basement so that they may be convenient for packing shipments.

The basement contains a complete ice making plant which has a total capacity of 24 tons. It contains a traveling electric crane for handling ice cans and is connected with the ice storage room by automatic doors. The ice storage room is insulated with cork and contains an ice crusher which is connected with a bucket elevator which leads to the shipping room.

Two compressors of 25 tons' capacity each provide the mechanical refrigeration that is required for the cold storage rooms and manufacturing processes of the entire plant, the ice and salt method being used only in packing for shipment.

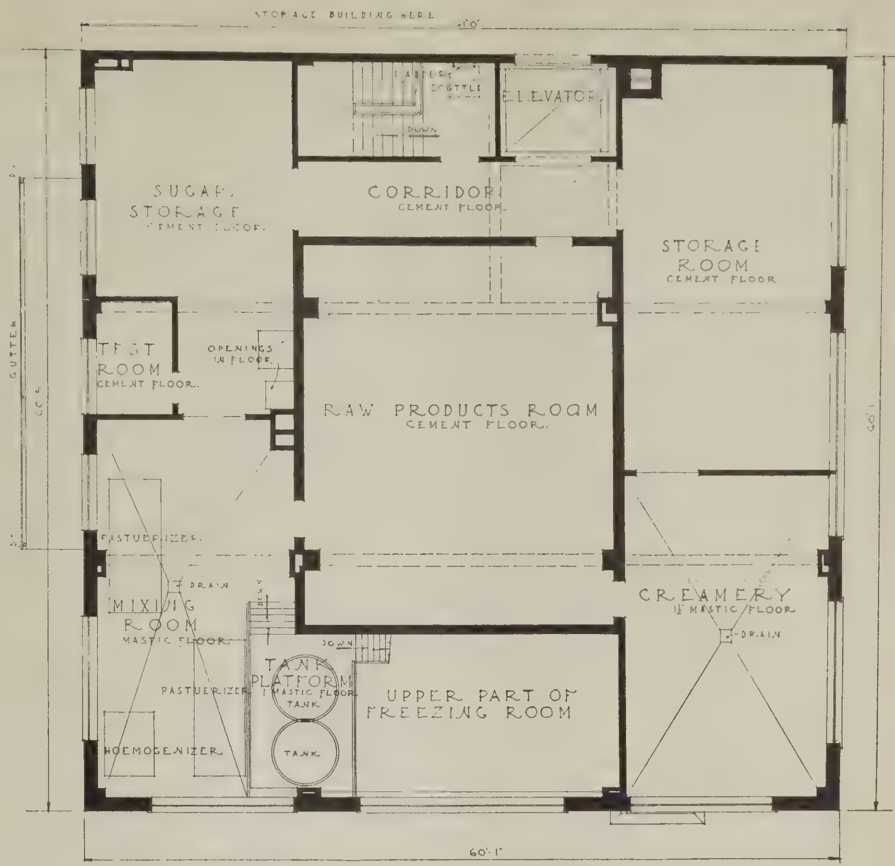
The salt storage room has a capacity of about two carloads, and is connected with the driveway by chutes through which the salt is unloaded from the trucks. It has a sloping floor which leads the salt to a spiral conveyor which carries it to a bucket elevator running to the shipping room above.

A twenty horsepower smokeless boiler with hot water tank attached, provides steam for heating, sterilizing and pasteurizing. There is also a pneumatic system of cold water circulation of the automatic type. A storage room for ashes and a fuel room having a capacity of two carloads of coal is provided under the sidewalk. All spaces under the sidewalks are lighted by sidewalk lights.

The can washing room is located in the basement to prevent the undue attraction of flies. After being washed and sterilized, the cans are conveyed to the can storage room adjoining the freezing room on the first floor.

The basement also contains a room equipped with toilets, steel lockers and showers for the convenience of employees.

There is also a paint department contain-



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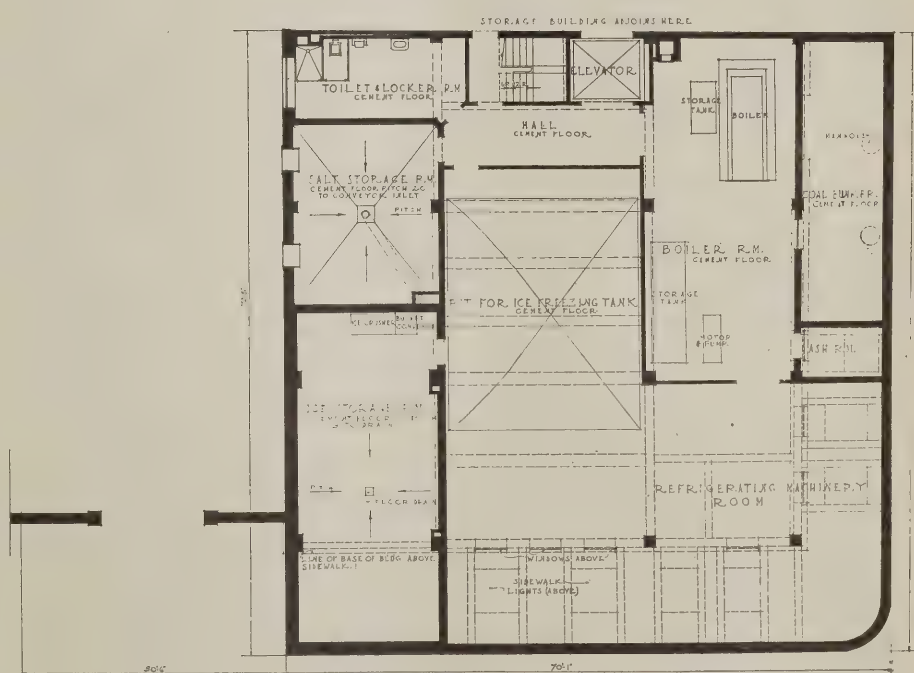


BASEMENT·PLAN·

ing a paint spraying machine that is used for painting tubs.

An old building adjoining the new plant is used as a garage and repair shop for the delivery trucks and also furnishes additional storage space.

The driveway is of concrete, well drained and has an attractive wall of terra cotta and ornamental iron gates along the street side. The gates are to be flanked with flower beds as an added attraction to this interesting structure.

Thoughts on Planning Church Buildings--By Charles lCressy

The following article is based upon an address by the author before a gathering of clergy and laymen in connection with the recent "Nation-wide Campaign" of the Protestant Episcopal Church, held in San Diego, California. It is published for the first time in the National Builder, for its suggestive value as propaganda in favor of better design among the churches

THOUGH my subject refers only to the work of the architect, planning covers more than this, and includes the non-technical work of those interested in church building.

Church design varies so extrordinarily in quality that something more than the varied ability of architects appears to be responsible for the failure common in every town, where neither money nor high motives have been wanting.

If good motives were sufficient for success, no such thing as an ugly or unsatisfactory church building could exist. When in every instance real sacrifice and earnest expression of faith is obviously present, some practical reason must be sought for too frequent failures. I suspect the non-technical control in most instances, as it is in the earliest stages of a building project that success is largely determined, and it is here that the personality of the administrative body has its effect for good or ill.

A church building above all others must have personality in design, and that feature cannot be bought, borrowed or stolen, for it springs only from the concentrated ability of one mind and not from co-operative effort.

First, in choosing the architect, absolute freedom from friendly bias and parochialism is essential, for in this the highest service to which an architect is called, only one thought must dominate—that of ability and fitness. A good design by a bad man (such a contradiction is possible) if for instance far to be preferred to the bad design of a pious man—for the man dies!

Design in building being chiefly the assembly of practical things in pleasing form, it follows that over-estimation of the "practical" man is possible, and that design in its true sense may be missing entirely from a well constructed building. Hence, the importance of finding spirit and personality in the work already built by the prospective architect. Most architects are appointed too late; that is, after vital work has been done.

Though a site is often decided by local conditions, the selection of material at least should not occur before the architect has given serious study to the design. Above all things, permanence and natural honesty in material is something to insist upon in church work, and that church honors itself which refuses to build if it cannot build well. Imitative material is second only to imitative planning as a barrier to progress in church design. Too often a committee takes the "safe and easy" way and decides to copy some existing building. I have yet to find an approach to success where this method is followed. Every site has its individuality of surroundings, approach, winds, aspect, lighting, or even soil and sanitation, on which particular features the whole plan may pivot and change. Much of an architect's success springs from the balancing of merits of location, and no committee, in expressing preference during the formative period of a plan, should ever lay down positive laws.

No successful church design was or ever could be paid for. The architect, in being given means to live, renders practical service as a matter of course, but as his personal contribution gives life to dead material and spiritual inspiration beyond measure or price, by pure creation of form.

Taking modern church work of various denominations as a whole, I have been struck by the uniformly high type of design resulting where central boards or technical advisory committees exercise an influence, distinct from the well meant, but wrong-headed patchwork of less experienced local effort. However monumental in character, most of the ancient churches give an impression of unassuming dignity. Time has had much to do with this, but the contrast with modern work calls strongly for greater simplicity in choice and finish of material and a more modest keynote in design.

I suggest as headings for further thought in planning church buildings the following:

(1) That a congested site means a restricted church.

(2) That even a little foliage may give great effect.

(3) That design begins with the first thoughts of form.

(4) That form is essentially architect's work.

(5) That material is no less important than form.

(6) That values in material may be lost in high finish.

(7) That useless towers are initially bad motives in design.

(8) That no tracery is better than mock tracery.

(9) That over-lighting is a common vice.

(10) That the Church School will thrive best above ground.

(11) That the Sunday School deserves a plan equal to any school.

(12) That theaters are safer than most churches.

(13) That good design includes good heat, light and air.

(14) That ample sanitary equipment is a neglected modern need.

(15) That temporary buildings can be well designed.

(16) That buildings may rise to bless and stay to curse.

(17) That repairs are the hind-sight of neglect in foresight.

(18) That glass, glitter and gloss are devils of unrest.

(19) That catalogue furniture is not always good.

(20) That quantity is the danger zone of decoration.

The particular conclusion I wish to leave in your minds is the immense power of a church congregation towards raising the standard of church architecture. It is inconsistent at least to find a public prompt in condemnation of bad music, calmly tolerating bad architecture or decoration and demanding more.

The Foreman Talks About Diagonal Boarding

By Edward H. Crussell

"BY GOLLY!" said Roberts, the apprentice. "The next job of diagonal boarding we have to do I'm going to fall sick, and stay sick until after its finished. I'll bet that if all the climbing I've done on this job was added together in a straight line, I'd be high enough right now to look into the second-story windows of the houses on the moon. Who started this thing anyway? And what's the use of it? Why can't we put the boarding on level like we do the siding? Every cut I make is two feet long, and half the nails I drive have to be pulled out again because they miss the studs."

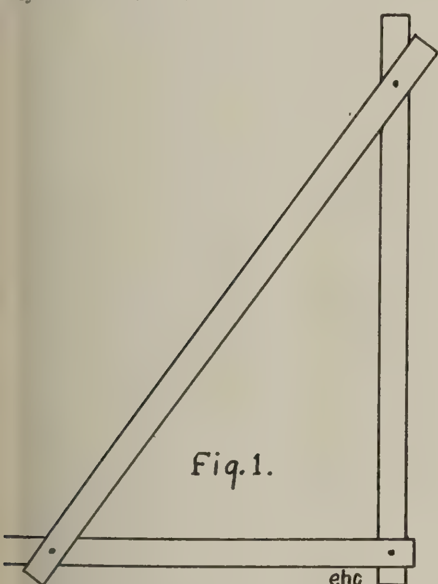


Fig. 1.

"You tell 'em Kid, don't let 'em make a goat out of you," said Browning with heavy irony. "Next time that spiral-legged architect comes around here, you tell him just exactly what your objections are, and I bet he'll never specify diagonal boarding again."

"If you really want to know the reason for diagonal boarding, Kid," said Shepard, who had been busy gathering some scraps of lath while the others were talking, "I'd advise you to make a few experiments like this. Nail three pieces of lath together in the form of a triangle (Fig. 1) and then nail four pieces together in the form of a square (Fig. 2), and see which form you can rack out of shape the easiest. That will soon convince you that there is a good reason for diagonal boarding, the triangle being the only geometrical form that cannot be racked out of shape without breaking the joints."

This explanation evidently failed to satisfy, for the following noon, Roberts brought his problem to the foreman, telling him at the same time of what Shepard had said. "Of course," said he, "I know all about the triangle being the only shape that cannot be racked out of shape—learned all that at school, but I can't see what that has to do with the matter. I'll admit, that if you were only going to put on one board, it would be better to put it on diagonally in the form of a brace, but that's no sort of proof to me, that when the entire side of a building is going to be closely boarded, it will make a better job to board it diagonally rather than horizontally. The two things are not the same, and I don't see why anybody should expect me to assume that they are.

"Besides, if diagonal boarding is so much better and stronger, why don't we see piano crates and other large boxes made in this way? Then, there is the rough floor; why should that run diagonally? Seeing that the foundation sits on the ground and the floor joists are fastened to the foundation; is there any special need for extra bracing of the first-floor joists? I'm ready to say that I'm just that thick-headed I can't see any good reason for all the extra work and waste of this diagonal boarding stunt, and I'm more than willing to have you straighten things out for me."

"Well?" quizzed the foreman, "What do you want me to do about it? Prove that you're right, or agree that you're wrong?"

Roberts pondered this for a moment, and then, "I'll leave it to you," said he, "shoot your dice," and he seated himself on an up-turned nail keg, with a well-simulated air of concentrated attention.

"In the carpenter's business," began the foreman, "there are a number of things that have been the cause of some heated arguments, and diagonal boarding is one of them. Personally, I haven't any use for it, and if it lay in my power to do so, I would prohibit its use. It is the biggest time and lumber waster left in the building field. It has only one thing to commend it, and that is, when wet or green lumber is being used, if it is put on diagonally, when it shrinks it will not pull the clapboards or siding apart as badly as it would if put on horizontally.

"There was a time when most people thought that the diagonal boarding offered better bracing facilities; many people think so still. Think so, because they have not given the matter careful thought. They are used to seeing diagonal braces in timber framing, they know the old story about it not being possible to rack a triangle out of shape, and when they see so much diagonal boarding being used, they at once assume that it is being used because it has proved to be the best and strongest method. As a matter of fact, and as you pointed out a moment ago, if only one board is to be applied, then for bracing purposes it must be put on diagonally, but if the entire frame is going to be covered with boards laid close together, then, if there is any advantage, it must be accorded to the horizontal method. First, because it is usually better

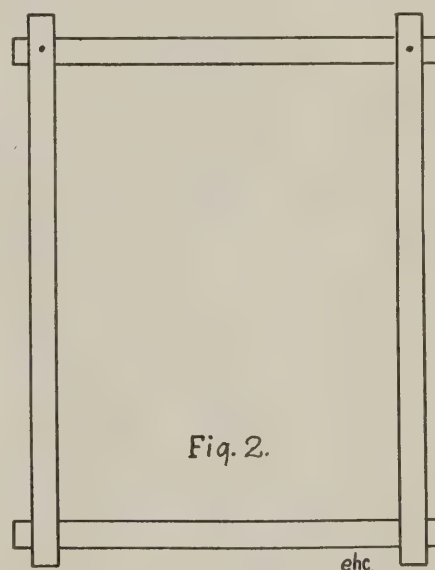


Fig. 2.

nailed; second, because there is no need of making a long unbroken joint in the center of the building, as there is with diagonal boarding; and third, because, seeing that the diagonal boarding is more difficult to apply and much more awkward to handle, it naturally follows that the average workman will not make as good a job of it as he will with the horizontal boarding."

Shepard, who had approached while the foreman was talking, at once began to offer objections. "If," said he, "you agree that when only one board is applied it is better if placed diagonally, how are you going to prove that it does not afford better bracing to place all the boards in that way?"

"I don't know that I can prove anything," began the foreman, "but let us suppose the side walls of a building to be only 20 inches high, wouldn't you agree that two rows of 10-inch boards put on horizontally would be just as good for bracing purposes as the same boards put on diagonally? And," he continued, when the other failed to reply, "if you do agree that one or two boards placed horizontally will properly brace the first 10 or 20 inches of the wall, how are you going to prove that the next board will not properly brace the next 10 inches, and

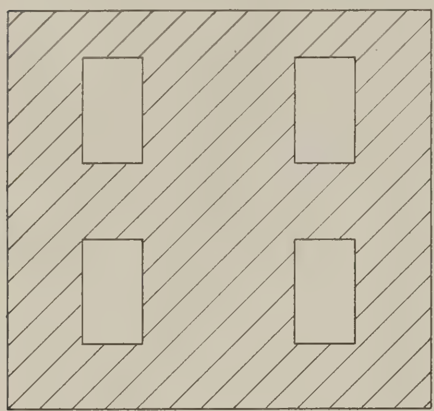


Fig. 3. ehc

so on up to the roof? Or, to take another example, if you think it necessary to go to all the extra waste and expense of diagonal boarding in order that the building shall be properly braced, what are you going to do about the thousands of houses that are built in the warmer sections of the country, without any double boarding whatever, either horizontal or diagonal, nothing but siding on one side and lath and plaster on the other?"

"I suppose," said Shepard, "that these houses are supplied with some other form of bracing, aren't they? Don't they cut braces in between the studs?"

"Sometimes," agreed the foreman, "but even so, if these studding braces are sufficient, wouldn't it be easier and cheaper to cut them in rather than to bother with the diagonal boarding?"

"I don't know," said Shepard, "and I'm going to argue with you, you always win in an argument. What did you mean by saying that the horizontal boarding was better nailed? Do you mean to assert that all men are like the kid here and can't find the studs because the boards run across them at an angle?"

"No. What I meant was, that there are usually more nails driven into the horizontal boarding. The general method is to drive either two or three nails to a board, over each stud and if this method is followed exactly, the nails will be farther apart on the diagonal boarding; consequently, there will be fewer of them, and when you come right down to brass tacks, the bracing qualities of either method of boarding depends entirely upon the holding power of the nails."

"Doesn't it take just as much material to cover the same space when it is put on diagonally?" asked Shepard.

"Leaving out the matter of waste," answered the foreman, "it takes exactly the same amount."

"Then, if you drive three nails to a board, over every stud," demanded the other in amazement, "how can you possibly make any difference in the number of nails used."

"Think it over for a while," said the foreman, "and then if it isn't clear to you, make a drawing to scale, of any rectangular space covered by both methods and count the number of nails in each."

"All right," said Shepard, "we'll leave that till later, but the next question you're not going to handle so easily. Why is it necessary to make a long unbroken joint in the center of the building when putting on diagonal boarding? I know that it is usually done, and I know that the reason why it is done, is because someone thinks that the boarding must run in both directions. I claim, however, that this isn't at all necessary, that we could just as well

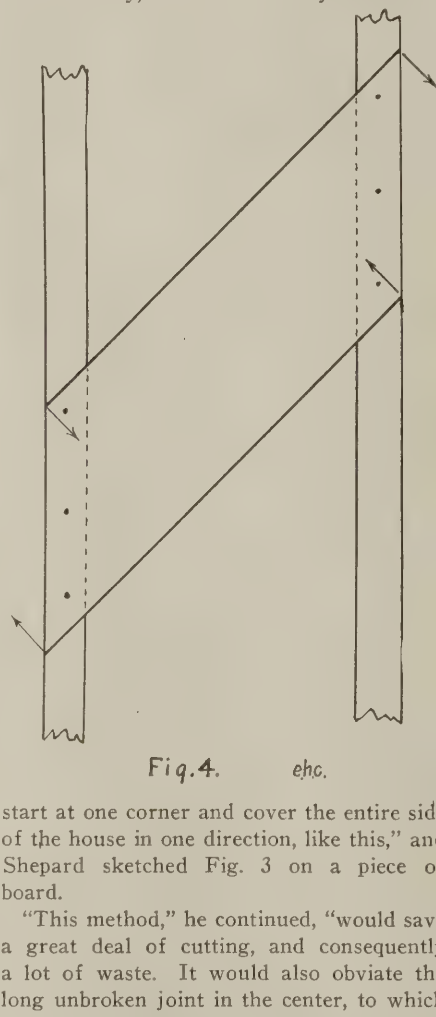


Fig. 4. ehc.

start at one corner and cover the entire side of the house in one direction, like this," and Shepard sketched Fig. 3 on a piece of board.

"This method," he continued, "would save a great deal of cutting, and consequently a lot of waste. It would also obviate the long unbroken joint in the center, to which you object, and which, I agree is a serious defect in this method of boarding."

"There was a time, Shepard, when I held the same opinion that you do about running the diagonal boarding all in one direction," said the foreman, "but I was jarred loose from that opinion by an unpleasant item of practical experience. It happened so long ago that I'm not afraid to mention it, more especially as it may help you to avoid the same mistake. At the time, I was building a one-story dwelling, with side walls about 12 feet high. The specifications called for diagonal boarding and in order to try out my theory, I covered the ends of the building with boards all running one way. The boards were square-edged, about 12 inches wide, and only a few days from the mill pond. They began to shrink as soon as they were on and about the second day I began to notice something strange in the appearance of the building. A short examination served to show that the strange appearance was caused by the building being an inch or more out of plumb at each end. I knew that the frame was plumb before we started sheathing it, and I knew that the braces and stay-laths had not been taken off too soon (something which sometimes happens), and for a while I was puzzled to find an answer to the question 'What threw the building out of plumb'?

"The fact that we had sheathed the two ends of the building in opposite directions, and that they were now both out of plumb the same amount in opposite directions, helped us to determine that it was the shrinking of the boards which was the cause of all the trouble.

"You may be wondering how the shrinking of the sheathing could throw the building out of plumb an inch in 12 feet, and I remember that it was some time before I was ready to accept any such idea; however, I was finally convinced, and experience and close observance since that time have served to strengthen the conviction.

"I don't know if I can make it as clear to you as it is to me, but something like this is what happens: Let us suppose a piece of wide board, cut to an angle and nailed to two studs like this (Fig. 4); now when this board shrinks the direction will be in the line of the arrows and as the nails are not placed opposite each other, it is easy to see how this shrinking will throw the tops of the studs over to the right."

All hands considered this sketch for a moment, and then, "I want to believe you, boss," said Roberts, "in fact I *do* believe you, but at the same time I have to say that your sketch doesn't make things absolutely clear to me. While I believe that one piece of board would twist the studs over to the right, it seems to me that two other pieces of board, one above, and one below this one, would serve to counteract the effect of it. In other words, your arrows would be pulling against each other, like this (Fig. 5).

Shepard also had some objections to offer along the same line.

"I said I didn't know if I could make it clear to you," explained the foreman. "And, of course, if the subject was as simple as my sketch there'd be nothing to make clear. And if there wasn't something to counteract the effect of the shrinking of the sheathing there wouldn't be any chance for an argument at all; because, instead of being an inch out of plumb, the walls would more likely be six or eight inches. What you've got to remember is, that the twisting strain is always there, and that only a few boards without others to counteract against them, are enough to throw the tops of the studs over.

"The combined effect of the shrinking of all the boards, is as if a gigantic clamp was stretched diagonally across the building from upper to lower corner and then twisted tight; this is counteracted by the pull of the nails in the longer boards, but the 'clamp' always has a little the best of it. Perhaps this wouldn't be so if some good long braces were introduced into the framing itself, but how often do we see that done? The diagonal boarding is usually supposed to be all sufficient and all other bracing is omitted."

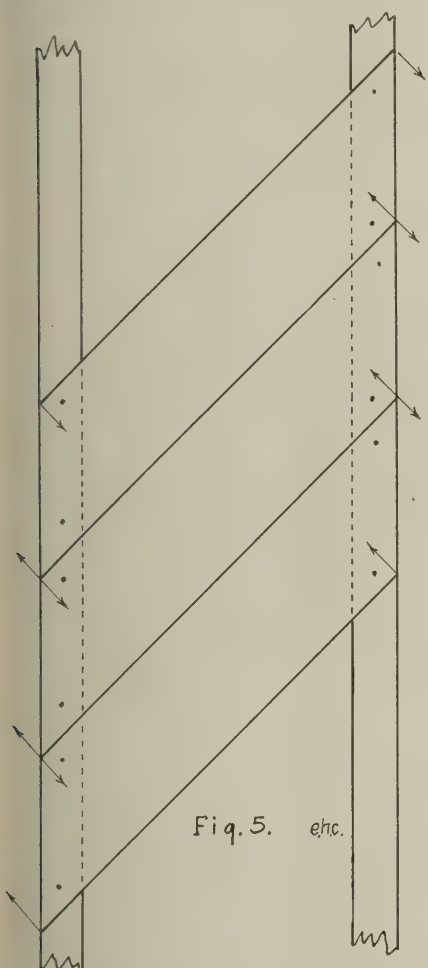


Fig. 5.

"Then," said Shepard, "are we to understand that you think diagonal boarding entirely useless, and that if it was left to you horizontal boarding would always be used?"

"No. I think horizontal boarding just as good for bracing purposes as the diagonal, but the fact remains that, because of its lower cost, people will use wide unseasoned lumber for the under sheathing, and when this is placed horizontally, it surely plays the mischief with any siding that is nailed over it. My preference is neither for the horizontal nor the diagonal, but for the vertical.

"To put on vertical sheathing, it is usually necessary to cut in horizontal girts, or nailers, between the studds; consequently, this method costs more for labor and material than the horizontal, but not more than the diagonal, and it is in every respect a better job than either of them. Vertical sheathing, with a ply of building paper and then the siding nailed across it at right angles, is the strongest and most weatherproof wall that can be made out of boards. The shrinking of the wood doesn't affect it, and a house boarded in this manner could be bowled end-over-end by the wind without racking the walls out of shape."

"All right, boss," said Roberts, "just one more question and we'll close the investigation. What is the philosophy of laying the rough floors diagonally? I can see why it isn't practicable to lay both floors in the same direction, especially when rough, uneven lumber is being used for the sub-floor, but why isn't it possible for us to lay the rough floor across the joists, and the finished floor at right angles to it?"

"There is no reason why it cannot be done," was the answer; "in fact, it often is done and the practice is getting more common all the time. About the only reason that can be offered for a diagonal sub-floor is so that the upper floor may be laid at right angles to the floor joists and nailed to them. This might as well be classed as no reason at all. The length of nail left for entry into the joist after the nail has been driven slantwise through the rough floor, is so short that its power for good can be entirely disregarded, but people can be found who will make quite an issue of it.

"As a young fellow, I once had the owner of a building go to the boss and try to get me fired, because, according to his notion, I was not properly nailing the floor and did not know my business. It did no good to point out to him that the floor joists were two feet apart and that I was driving a nail about every 16 inches—he wanted the floor nailed over the floor joists, so to save argument that is what we did."

Bricklaying, North and South

S. L. Fulghum, general contractor, of Pensacola, Fla., discussing in his office with a writer for NATIONAL BUILDER the methods of bricklaying, North and South, said: "In our organization we keep all the year round a general superintendent and three sub-superintendents, whose salaries go on all the year around. These in turn hire foremen to work under them, but these receive pay only when they work. However, we are able to keep them in the organization, as there is generally something being done —a lot of small stuff when there is nothing big on hand.

Effect of the War

"The big war has greatly changed all our building conditions down here. Take, for instance, the foremen. The old-time foreman is useless now. He hires and discharges men at will, just as he did before the war, but the resemblance stops there. He used to be a hard boy over the men; but he is not that any longer, as the men won't stand for it. The game is changed. He now has to be considerate of the men or he will lose them; and there is no certainty that he can get others. Also, he can't rush his men as he used to, for they will not stand that, either. And I do not expect to see any change in this or any increase in efficiency of the men down here, the bricklayers especially. Out of this situation comes one of the hardest problems we have to solve at this time.

The Colored Bricklayer

"The colored bricklayer has learned that he does not have to work for the small wages he formerly worked for; that he does not have to do as much work as he used to do; and that he can quit here and go North at any time and work for higher wages than he is getting in the South. At least he thinks he has learned that. As a matter of fact, he can work the year around in the South and only six to eight months a year in the North, which is an offset to the higher wages.

"But many of our best colored bricklayers have gone North and are remaining there. They have six of my own bricklayers up there that I wish they would send back. The Southern bricklayer (though generally a colored man) will lay more bricks than the Northern bricklayer, though the latter is a white man. Some of your snowbirds come down here and work through the winter, but they go back in the spring, and any plant on which they happen to be working finds itself without men. They cannot stand our summer sun beating down on their necks as can the Southern colored bricklayers.

Bricks Per Day

"Before the late war our bricklayers used to lay 1800 bricks a day when working on a 12-inch dead wall, American bond. The same men now lay only 1200, which indicates about 66 per cent efficiency. The 1800 bricks was only a fair requirement, where mostly common bricks were used. In using pressed brick for facing and common brick for backing, the bricklayers now lay only 250 pressed brick a day, with the backing. It used to be 350 pressed brick a day with their backing.

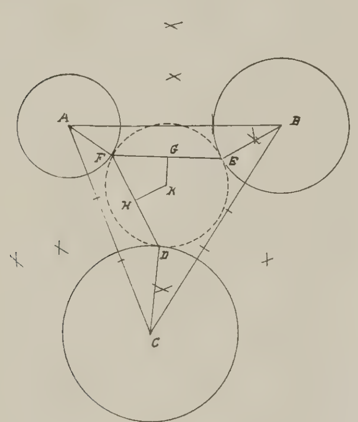
"I have no idea that the present percentage of efficiency is to be improved among our bricklayers in the South, for the reason that so many went North and remained there that it has rendered the rest very independent. Also, it is a saying down here that a man, to be a good bricklayer, must have a strong back and a weak mind. This saying illustrates why the Southern contractor is not expecting much improvement in efficiency among the present force of bricklayers."

Questions, Answers, Kinks and Discussions

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

A Problem in Circles

E. W. Cook, Tecumseh, Neb., offers the following solution to the problem propounded by F. Motherspaugh, of Sherwood, O., in the March issue of NATIONAL BUILDER:



"Connect centers of three circles by lines AB, AC, and BC. Bisect angles ABC, BAC, and CAB, and produce AF, BE, and CD. Draw EF and FD. Bisect EF in G and draw GK at right angles to EF. Bisect FD in H and draw HK at right angles to FD. The point of intersection of GK and HK at K is the required center for the fourth circle."

Arch Radius

H. C. Rowell, Berlin, N. H., and A. C. Minor, of Worland, Wyo., bring to our attention the error in arch radius determination appearing on page 61 of the February issue. In rule 2 the formula is used to find the diameter, which in this case would have been 60 inches, and not the radius, as stated. The derivation of some of these rules is interesting, the solution of one or two leads to the solution of ohers, and by "keeping your hand in" many inventive methods occur to one to help him over difficulties.

In Fig. 1 the rise and half the span are two sides of a right triangle. The side A and the Diam. are two sides of another right triangle of similar shape. According to Pythagoras $X^2+R^2=A^2$. Then A would be the square root of X^2+R^2. Since they are similar triangles the professors will let us say that $D\div A=A\div R$ or $D\div\sqrt{X^2+R^2}=\sqrt{X^2+R^2}\div R$ and by changing signals we have $D=(X^2+R^2)\div R$. The rule was "square one-half the span and add the rise squared. Divide the sum by the rise."

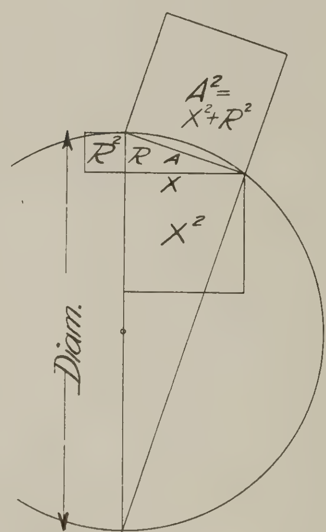


Fig. 1

C. Skinner, of San Diego, and J. B. Swanson, of Cleveland, send in the solutions of laying off perpendiculars at the center points of the two upper sides.

A list of names of those sending in the solution by square might be given here, but probably every carpenter knows of it and one illustration might do for all. (See Fig. 2.)

In some cases laying off the radius by square as shown is difficult for want of surface. Try this diagram (Fig. 3).

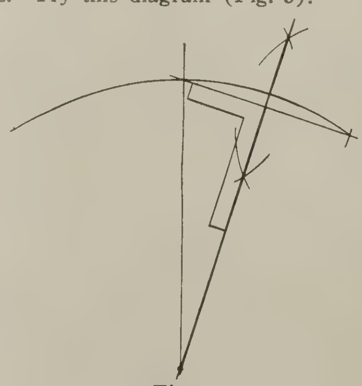


Fig. 2

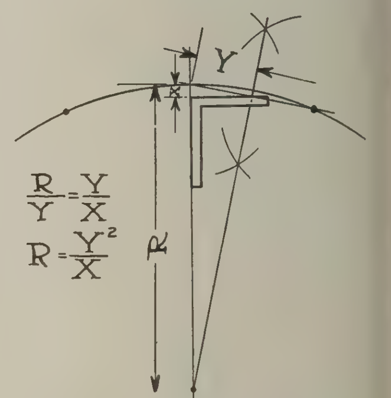


Fig. 3

But Joseph I. Henneman, of Millheim, Mo., sends in the description of an arch tracer (Fig. 4) which works on the order of a patternmaker's core-box plane. Drive nails at the outer points, place your pencil inside the vertex and swing to each side. Make the frame rigid and watch results.

"To find the skewback of any segmental arch" (Fig. 5), Jack Smith, Baltimore, Md., offers this solution: "Multiply one-half the span by the height of the arch. Divide this by the radius. The result will be the correct amount of skewback." Thus, if the span is 36 inches, the height is six inches, and the radius 30 inches:

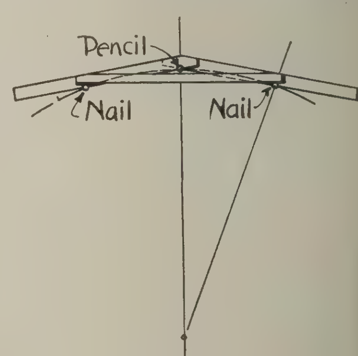


Fig. 4

One-half of 36 inches is 18 inches;
Eighteen times six is 108;
108 divided by 30 is $3\frac{3}{5}$ inches for skewback.

However, to return to similar triangles and the comparing of lengths of the sides, the figure shows that X is to Y as Z is to W. Or, $X/Y=Z/W$. But W is the radius

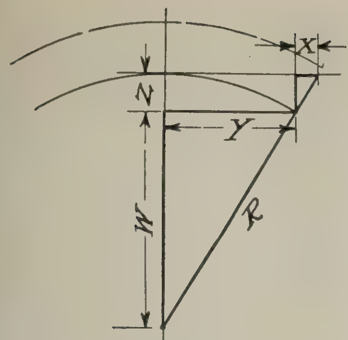


Fig. 5

with the height subtracted. So it would read X equals Y (half the span) times Z (the height), divided by W (the radius minus the height).

Scribing Material

The sketch, Fig. 6, shows the "kink" submitted by B. G. Houser, Stevenson, Ala.,

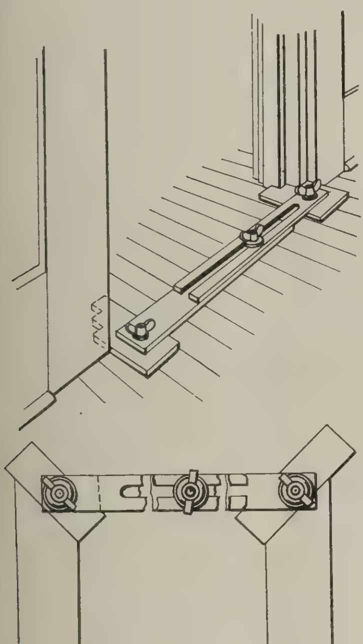


Fig. 6

for scribing material for thresholds, carpet strips, etc., and for mitre casing work where the opening is a trifle out of square. Several forms of end blocks can be used. The sketch, which is copied direct, readily explains itself.

Keel Blocks as Door Holders

John C. Miller, New York City, has been stealing ideas from the merchant marine. He employs keel blocks to good purpose in holding doors while fitting. With this support in place work can be done on either side of the door. (See Fig. 7.)

Mail Box and Milk Door

"The proof of the pudding is in the eating." E. J. Sheldon, of Rockford, Ill., may

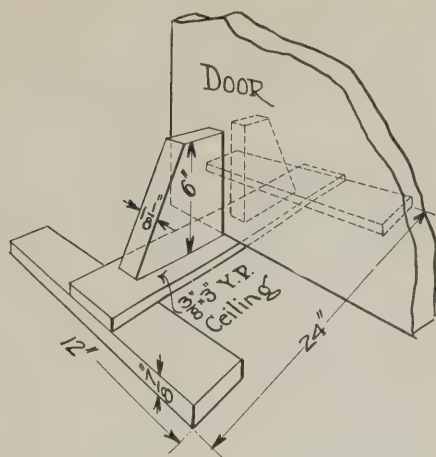


Fig. 7

be termed the "eater" as he has built the mail box and the milk door into his own house and subscribes to their worth. The ice man was banished from the kitchen and pantry by the double-door refrigerator. With these built-in mail and milk boxes a great many of our wives would be as well

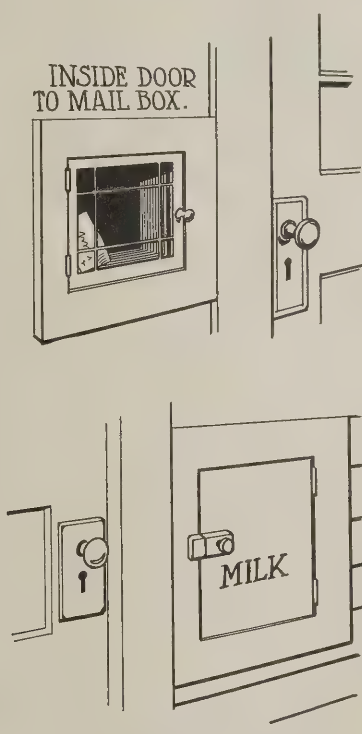


Fig. 8

pleased. I have accidentally kicked more than one bottle of milk off the porch, and have heard the milkman cuss the mud-rained bottles that were supposed to be returned clean. (See Fig. 8.)

Striking an Elipse

W. A. Fraser, Hiawatha, Kansas, writes: "The following is an accurate device for striking an elipse (Fig. 9), one I have long used but have never seen in a book. It is so handy and perfect that I am passing it on to my fellows. A little practice will put

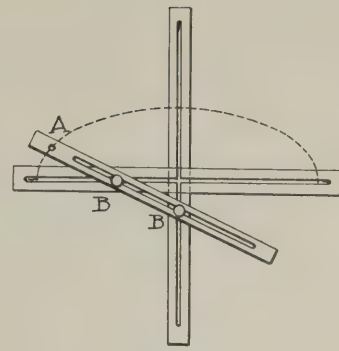


Fig. 9

one right, and the radius can be changed to fit any size or proportion.

"Make the cross shown in the sketch of ⅞-in. by 2-in. hardwood, jointed straight and halved together perfectly square. Fasten the joint with glue and screws. Groove both pieces one-eighth inch down the center as indicated. Make trammel with pencil marker *A* and two spacing pins *B* and *B*.

"To use, place the square frame on the work, door or other thing or pattern paper. The distance from the pencil to the first pin is the short radius of the elipse, and from the pencil to the second pin is the long radius. Start with the short radius pin at center, keeping both pins in groove, and mark."

Water Level for Foundation Work

Harry Pillard, Hallam, Neb., submits the following "kink," of which he says: "I use this on foundation work, principally in farm buildings or on foundations which have considerable length and breadth (Fig. 10). It is used in leveling up foundations and may be used to find the height of pillars at any given point.

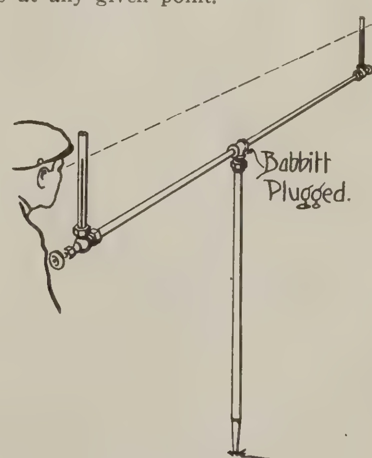


Fig. 10

"In the drawing you will note that it is made of ⅜-in. pipe, with a water glass at each end fitted to the pipe by glass gauge valve and bushings of rubber rings. It is absolutely necessary that these joints do not leak. Simply fill it with water to the height most convenient, and as water seeks its own level you can, by sighting from the height of water found in one glass to the other, find the proper height of any corner. It has a center post or spindle which is shoved into the ground. This is connected to the main by a T-joint, the lower part of which is filled with babbit, not permitting the water to go down into the post or spindle. By connecting the two with a coupling, the lower part being in the ground, the upper part by means of the threads in the coupling can be turned in any direction.

"This is an inexpensive level and, although not taking the place of a convertible level or transit, I think it is a very practical thing for the money."

Hanging a Sash

P. P. Johnston, Millerton, Ia., writes: "Here is a method of hanging sash (Fig. 11) which may be old to you or your readers, but one which I use almost entirely as it gives ventilation and at the same time neither puts the sash in the way by opening inside the room nor exposes it to the wind and danger of being broken by opening on the outside. The accompanying sketch ought to explain itself.

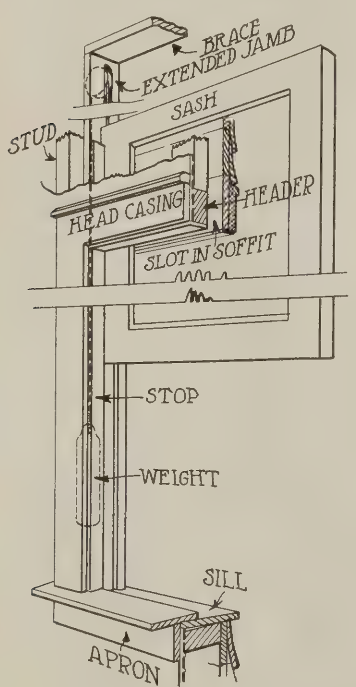


Fig. 11

"The jambs, instead of being cut off just above the soffit, are extended on up to within about three inches of the height of the sash, the jambs being cut away on either edge to allow for lath and plaster on the inside and the boxing on the outside. Leave a slot in the soffit just wide enough for the sash to pass through freely, place the sash pulley at the top of the extended jamb, and hang the sash as for an ordinary window. The studding directly over the opening should be turned sideways or flat to allow the sash to slide up and behind it. There should also be a strip fastened from the top of one jamb to the top of the other to stiffen the upper part of the jambs, thereby letting the sash work more freely.

"I have used this kind of sash frame in a good many buildings and it has never failed to give satisfaction.

A Weather-Proof Garage Door

L. R., Beaver Falls, Pa., sends us the following method of weather and burglar-proofing garage doors which are exposed to the weather: "Cut a small door in the

Fig. 12

panel. Hinge it on the inside and fit with a cylinder lock. Put cane or chain bolts on the inside, with astragal on outside of the same door. Nail a block to the floor at the bottom of the opposite door to hold the door from pushing in. The stop will hold the top of the door" (Fig. 12).

Rough Jambs for Gypsum Block Partitions

W. G. Moreland, Chadron, Neb., sends in the following method of making rough jambs for gypsum block partitions: "Select or joint the rough jamb straight and rip to width one-eighth inch wider than the gypsum block. I use ½-in.-1½-in. strips for grounds, nailing these to the rough jamb and letting them project three-quarters of an inch back of jamb on each edge of jamb. The head jamb is prepared in the same way. The side jambs are left long enough to set on rough floor. I set these rough jambs plumb and square and when the partition is set up they are already grounded and ready for plaster and trim."

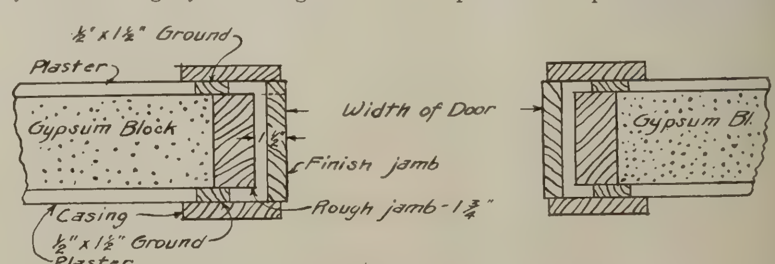


Fig. 13

Finishing the Edges of Felt Roofing

William C. Ladd, of Mendota, Ill., offers the following method of finishing the edges of felt roofing, to be used instead of bending it over (which frequently causes the felt to crack at the bend), and nailing the bent portion of the fascia board, leaving it to show in a rough, uneven fold, or nailing a light strip on top of the bend: "I let the edges of the felt roofing stop at the edge of the roof boards. Then I bend a 2-in. wide strip of galvanized sheet steel to resemble an angle iron and place it so as to

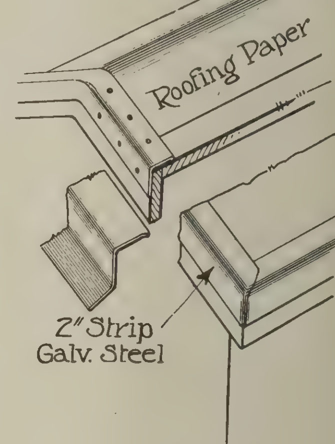


Fig. 14

cover the felt edges. This I nail lightly to the top and to the fascia board. (See Fig. 14.)

"This same angle strip can be used on the drip edge of the roof the same as on the gable edges, or it can be reversed and one edge of the angle given a return bend. When the other edge of the angle is nailed to the top edge of the face of the fascia board it will form a projection for the water to drip over instead of running down the face of the fascia board. This strip may be a plain flat strip with a return bend on ne edge, and nailed to the face of the roof o that the return bend will project about ne inch and form a projection to keep the vater from following down the fascia board.

"These return bends should receive the dges of the felt roofing, and be slightly inched onto the roofing to help retain it. Roof paint of asphaltum should be forced nto these bends to exclude the water.

"I find this plan gives the roof projecion a smooth, square-cornered edge instead of a rough, clumsy, bungling appearance uch as the old way does, and moreover here is no chance of cracking or weakenng the felt by the bending, which soon auses it to open for the wind and storm o enter."

Brick or Terra Cotta?

John Looney, Lawton, Okla., asks: "Can ou tell me where I can obtain examples of etters and numbers cut out of brick, showng cuts and joints, the letters to be about 4 inches high?"

Coal as a Pebble Dash for Stucco

W. R. T., of Gering, Neb., asks: "Can ou tell me if coal has ever been used as a ebble dash or aggregate for stucco finish? have made some experiments in a small vay with pea-size anthracite coal, used with vhite marble and find it makes a most eautiful finish. But the question is, will t stand the continued exposure to weather? Can you give me any information on this?"

Wants an Estimator's Reference Book

P. C. McGrane, of Elma, Ia., writes: Have you got an estimate book on hardware, cement, plaster, brick, etc.? I would ike to get something to estimate nails for er thousand feet of lumber."

We quote, by permission, from "The Building Estimator's Reference Book," ublished by the Frank R. Walker Pubishing Co., at 2209 Archer Avenue, Chiago, and retailing at $10:

"The quantities of nails as given below vill prove fair average for the various ranches of carpentry:

"Allow about 20 pounds of 6d nails to lace 1,000 feet of bevel siding, board easure, which is at the rate of 1¾ pounds f nails to each 100 square feet of surface.

"It will require about 25 pounds of nails each 1,000 feet of wood studding, board easure. When estimating the stud partions by the square containing 100 square eet, allow two pounds of nails to each 100 quare feet of stud partitions when placed 6 inches on centers. If the wood studs re placed 12 inches on centers, figure 2½ ounds of nails to each 100 square feet of artitions in the job.

"When placing wood furring strips on walls, it will require about 10 pounds of 8d nails or 15 pounds of 10d nails for each 1,000 lineal feet of furring strips. If the wood furring strips are estimated by the square containing 100 square feet, allow about one pound of 8d nails or 1½ pounds of 10d nails for each 100 square feet where the furring strips are placed 12 inches on centers. If the wood furring strips are spaced 16 inches on centers, allow three-quarters of a pound of 8d nails or one pound of 10d nails for each 100 square feet of surface covered.

"To case and hang one door, including nails required setting finish wood door jambs, wood stops, and casings on two sides of the opening, figure about one pound of nails for each complete opening.

"To place the interior finish around a window opening, including finish wood jamb linings, wood stops, stool, apron, casings, etc., allow about one-half pound of nails for each opening on the job.

"Figure about one pound of finishing nails to each 100 lineal feet of wood base, which includes allowance for nails required placing wood carpet strips.

"When estimating the nails required for placing wood joists, roof rafters, etc., figure from 12 to 15 pounds of nails per 1,000 feet of lumber, board measure, all depending upon the size of the timbers used. This includes sufficient nails to place wood bridging.

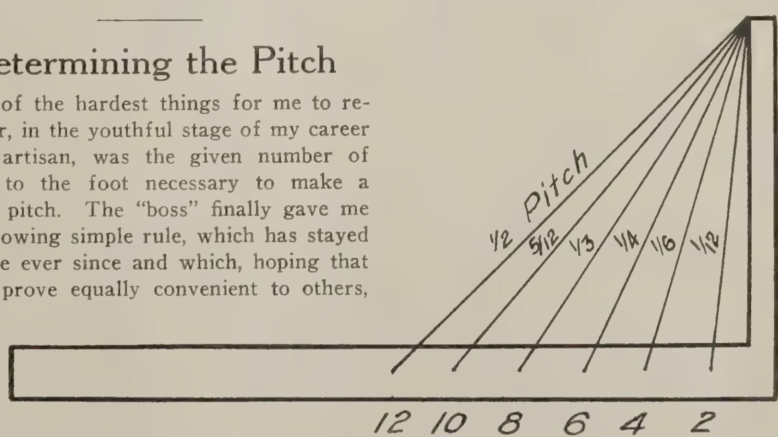
"On all wood floors up to and including four inches in width, the quantities are based on using 8d flooring nails. For common flooring six inches and over in width 10d nails have been figured.

"The quantities as given below are based on nails for 1,000 feet of flooring, board measure:

Width of Flooring	Joists or Furring Strips Spaced 12 In. on Centres	Joists or Furring Strips Spaced 16 In. on Centres
2 inches	40 lbs. 8d nails	30 lbs. 8d nails
3 inches	30 lbs. 8d nails	23 lbs. 8d nails
4 inches	22 lbs. 8d nails	17 lbs. 8d nails
6 inches	24 lbs. 10d nails	18 lbs. 10d nails
8 inches	17 lbs. 10s nails	13 lbs. 10d nails

Determining the Pitch

One of the hardest things for me to remember, in the youthful stage of my career as an artisan, was the given number of inches to the foot necessary to make a certain pitch. The "boss" finally gave me the following simple rule, which has stayed with me ever since and which, hoping that it will prove equally convenient to others,



I am passing it on: "Divide 24 inches by the fraction of the pitch desired." That is, if a half pitch is desired 24 inches divided by 2 will give 12 inches; if a one-third pitch is desired, 24 inches divided by 3 gives 8 inches; and so on. (See illustration.) —*L. S. Bonbrake.*

Test Shows Superiority of Wallboard Over Lumber Sheathing

Frederick W. Barrett, supervisor of buildings for the city of Hartford, Conn., under date of January 21, reports as follows to the Bishopric Manufacturing Company, Cincinnati, Oho:

I beg to advise that test has been made by your Mr. Storrs on wall as requested in my letter of November 30th. Test held at Hotel Bond Annex, December 17th. A load of 300 lbs. was used, deformation being measured at each loading. Result of test on ⅞″ M and B sheathing one side with wood lath on opposite side. Deformation as follows:

Deformation as follows:

300 lbs.	Deformation	7/32″
600 "	"	2 1/32″
900 "	"	1½″
1200 "	"	2¾″
1800 "	"	6 7/16″
2100 "	"	8 5/16″

When load was released, deformation showed 5 3/16″.

Results of test on Bishopric Board on one side with wood lath on opposite side, using same loading as on sheathing.

300 lbs.	Deformation	⅛″
600 "	"	¼″
900 "	"	9/16″
1200 "	"	13/16″
1500 "	"	1¼″
1800 "	"	1 9/16″
2100 "	"	2″
2400 "	"	2 7/16″
2700 "	"	3 1/16″

When load was released deformation showed 1⅝″.

The above test shows very clearly that Bishopric Board properly put on is much stronger than sheathing, therefore, I can see no reason why same should not be allowed to be used in Hartford where ⅞″ sheathing can be used.

Putting up the false work. "Art Foster in the foreground"

Extensions of gable is to cover the pump

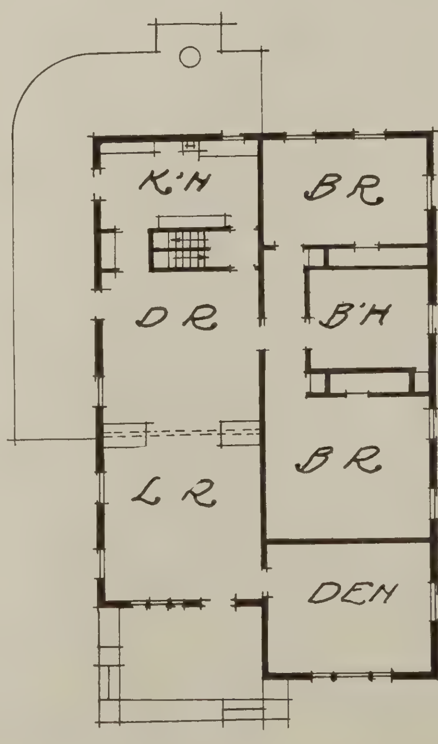
Two views of the completed bungalow

Building a Bungalow with Old Stuff

E. C. Rodert, of Blue Mound, Kansas, tells an interesting story of his experience in building a bungalow out of an old dwelling and a second-hand church. The builder, under certain conditions, has more concentrated exasperation to contend with than Christian grace can overcome, so we let Bro. Rodert tell his story in his own way, without the usual quotation marks. Bro. Rodert:

I often wonder if every builder is exasperated once in a while by some person who imagines he is the whole source of wisdom.

When we first talked of remodeling the house shown in Fig. 1, it was to be a Colonial design. I drew an elevation showing what it was to be like, and it suited to a "T." Then the moon changed, and with it the owner's ideas. It was to be a cottage, with a dormer east and west and the roof running cross-wise of the house. So I got ready to make a cottage, cut the rafters, and put up the false work shown in Fig. 1 (Art. Foster in the foreground) for rafter seat and porch gable. Then another whim seized the owner. On a Monday morning he drew a word picture of the house he wanted and which was finally realized. And we cut our rafters over and made arrangements to build this without a drawing or a sketch, just by guess and by chance. The result is shown in Figs. 2, 3 and 4.



In building this house not a stick of new lumber was used until we shingled. The owner had bought an old church, and the lumber from it was used in this house. So, in addition to other complications, we had to contend with nails and old, dry-rot lumber crooked and twisted by years of strain.

The original house was a cross between a farm house and a box car. The rear was flat-roofed, with a deck-house containing a water tank on the top. This was not a success; it was too hot in summer and too cold in winter. In wiring the old house, the wires had been run around the outside and into a room wherever they needed a light. There were four porches, two on the north and two on the south. No other modern improvements were present.

The house as it now stands, remodeled, is well wired and fitted with fixtures, pipeless furnace, electrically controlled water service, bath and toilets with a septic tank outlet. The upper floor is not finished into rooms. The porch work is a pretty piece of masonry, though it took an unusually long time for execution; the mason had the poorest kind of material for such work. The picture of the rear elevation shows a very pretty side of the house; the gable extending out covers the pump to the cistern.

The interior trim is pine, with oak floors. Columns separate the dining room from the living room, with French doors between the living room and parlor or den. I did not have a hand in finishing the house. The owner had exasperated me by a continual heckling over trifles until I had had enough of it, and I quit as the plasterers were beginning their work. I always shall wish I could have finished that house. I have some ideas I like to work out and which always please. But as it stands it makes a very pretty home for the old couple who own it.

Conducting Water Around Obstructions on the Roof

Oftentimes skylights, chimneys, etc., are so placed in relation to the roof as to make it impossible for the eave-trough to hang the full length of the eave. Fig. 1 shows a brick chimney offering interference of this sort, and illustrates the best way of getting around it. The trough is hung on the clear end of the eave, closely abutting the chimney. The balance of the roof-water is caught by the top chimney flash which extends on out to the gable at *X* and empties into the eave-trough at *Y*.

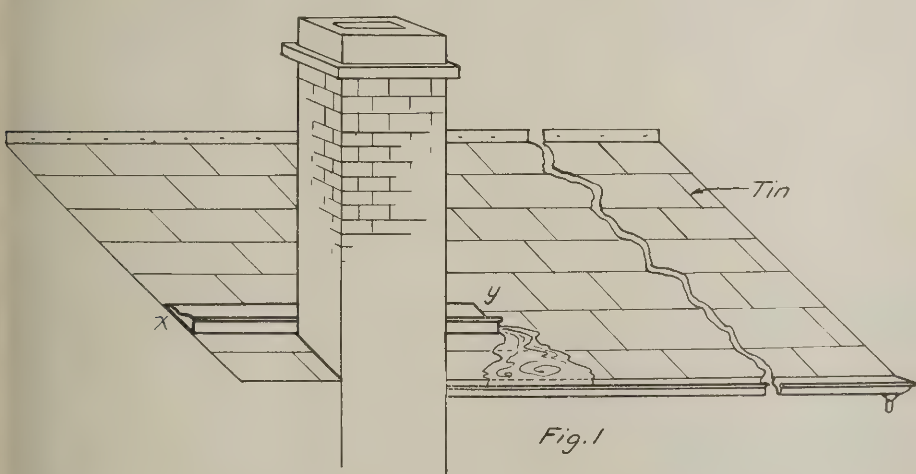


Fig. 1

If the obstruction is near the centre a V-shaped flash may be used; or in the case of a lengthened out space where it is necessary to have the water all diverted one way a 1x3 inch board may be used to construct a small channel acting in the same way as a regular roof gutter. This may be taken in as part of the obstruction flash and carried on, the water caught thus flowing out upon the roof again and eventually into the hanging trough.—*L. S. Bonbrake.*

Protecting footings

Protecting Footings

Many of the cracks in walls and, in extreme cases, the breaking of footings themselves are the result of the soil heaving under the action of frost. This danger is especially great if the foundation is allowed to stand open throughout the winter awaiting the resumption of work in the spring.

The accompanying illustration shows a method that offers considerable protection from the action of frost on footings. A layer of manure a foot or so deep is spread over the exposed footings and extends for two or three feet beyond the edge. Followers of this method state that a foundation is seldom, if ever, damaged by frost if this precaution is observed.

Where Cincinnati is on Housing

In Cincinnati the housing problem is an acute one, due to several factors that do not exist in other cities of its size. One of these factors is the conformation of the land. The heart of the city is in what is known as the "basin" while around this basin the land rises into considerable hills. The laboring people cling to the basin because it is near their places of business, and walking up and down hills does not appeal to tired workers, while riding to and from the suburban towns is expensive.

A Better Housing League was formed and has been at work for about two years. One of its first efforts was to awaken the citizens to the seriousness of the housing situation. A report by the United States Public Health Service declares that in Cincinnati there is a greater percentage of the population living in tenements than in any other of the big cities.

Steps have been taken by the Better Housing League to inaugurate an extensive house building campaign, which, it is declared, is ready to be carried forward as soon as cost conditions justify it. But the business men that are ready to put up the money, said "wait," and the laboring men that were going to have the houses built for them said "wait." An official of the Better Housing League tells the NATIONAL BUILDER that their investigations are showing that many of the factory employes have considerable sums of money ready to invest in homes. Of one tabulation of 643 employes investigated, 11 per cent could make a first payment of $1000 or more.

Circular Gutters

One of the most lucrative sources of income for the repair man of a tinship is the "roof gutter," and the reason for this can be attributed in large measure to the carelessness of both tinner and carpenter.

I have lined with tin many a gutter which had been made "skeleton" by the carpenter, i.e., made with only a bottom board, no side lining whatever, and nothing to which to nail except the cap and sheeting boards.

Under these conditions, wherever a seam had to be made in the tin, there would be no backing for seam support or wood into which nails could be driven for the security and solidity of the seam; and at times, near the outlet, there would be a space on the side from two and a half to four inches

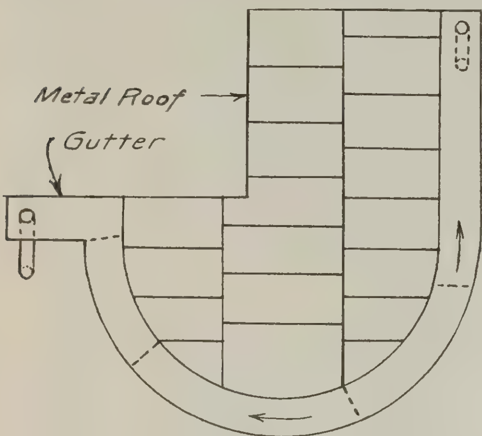


Fig. 1

filled with empty space. Now a good connection must be seamed, and not have the edges merely lapped one over the other, and it is impossible to mallet a seam down against empty air. So, where the foreman was good natured, we would have a carpenter set in a side "cripple," otherwise we managed to get something back of the seam ourselves. It does not require much, yet there should be something to back up the sides of a metal gutter for the metal is pressed out of line when soldering even if

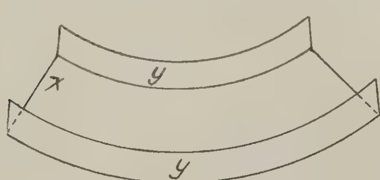


Fig. 2

it is only a lap joint which is being made with no wood support.

Some interesting problems present themselves in the construction of circular gutters. Fig. 1 illustrates a circular gutter with a two-way run of water, which necessitates a high centre and the direction of all seams in the metal towards the outlets.

As nothing approaching a practical or perfect construction can be secured by describing the proper radius on metal and cutting in for the height of the sides, forming up and soldering the same in a plain lap seam, I illustrate solid sides by Fig. 2, a section of gutter made at the shop by first getting the proper radius from the circular cut in the sheeting or front cap, and the

Fig. 3

height and depth at the building. Have the workman cut the bottom plate enough wider at the bottom of the gutter to allow for forming edges on the bottom, *X*, to seam onto the sides, *Y*, *Y*. These seams may be thoroughly soldered in sections, giving a wonderfully solid joint and solid sides.

Fig. 3 shows the edge formed outward at the bottom onto which the bottom edge fold is peened down for seaming.

When sufficient sections have been prepared, they are placed in position by commencing at the lower points of the arc of the circle. The sections are connected on the bottom either by seaming or by "blind nailing" (see *X*, Fig. 4). When the round of the circle has been laid, the top edges may be finished as shown at *X* and *Y*, Fig. 5. The back edge is formed an eighth of an inch or more for receiving the lower edge of the gutter course of sheets of the roof, which are peened onto this edge, as at *Y*, and malleted down as a seam. The front edge, *X*, must usually be reinforced with an extra piece of metal in order to give it sufficient width to allow it to extend over the cap and be nailed in front, as at *A*. This extra width will be notched in front in order to turn down smoothly the width of the cap edge (Fig. 6).

All roof gutters, whether round or straight, should be built up solid, higher at the back than in front in order that excess

Fig. 4

water will go over the front before it has a chance to get into the house at the back.

There are so many vital points to be observed in the construction of a perfect gutter that the work cannot be hurried up or any part of it slighted carelessly. *Seams* must not be made by merely lapping and soldering the edges, for such seams will not hold. The severe freezing weather of winter will burst them open, or the expansion and contraction of the metal will tear them apart. *Nail heads* must not be exposed. If it is absolutely necessary to drive a nail through the gutter material, first drive it through a small piece of metal which can be folded back over the nail head. Smooth out all *kinks* and buckles before nailing, for they will eventually wear into a hole at the bottom. The *end covers* need not be cut and lapped and soldered. Because of their inaccessibility these places are difficult to solder properly. I have described a

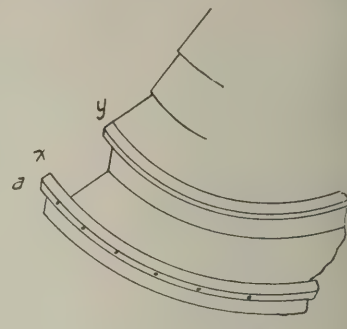
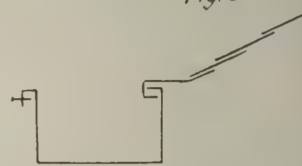


Fig. 5



Profile of Fig. 5

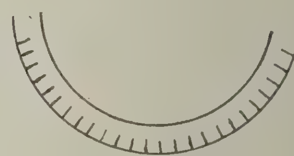


Fig. 6

very simple and effective method of getting around this difficulty, in the notes on "Solid Formed Ends for Roof Gutters."

Solid Formed Ends for Roof Gutters

An annoying situation which occurred frequently during my experience doing work in the country was the inability to get a tinner to solder up the ends of the roof gutters frequently installed in the roof of barns, dwellings and sheds. Without the ends soldered the water could not be controlled.

Knowing that sheet metal of the lighter gauges (27 to 30) could be formed into almost any shape, I experimented until I produced a perfectly solid end made from the gutter itself, with no possible chance

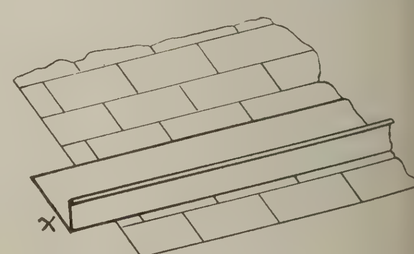


Fig. 1

for leakage. The metal is formed and laid back of the fascia board with the five-inch projection (*X*, Fig. 1) in the usual manner. This end is then sheared with a sweep similar to *X*, Fig. 2, and with a long-pronged set of pliers fold the flat metal up and inward as indicated by the dotted lines. If plyers are not at hand, a bevel-edged board may be used to drive the metal up

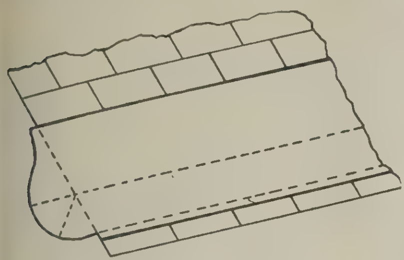


Fig. 2

and inward. When the metal has been raised half way or more toward the perpendicular the hands may be used to even and straighten out the two folds shown at the top edge of the end, Fig. 3. The top

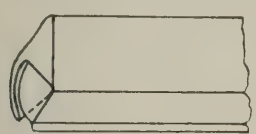


Fig. 3

fold may be hammered tightly together after the end has been pressed up to a perpendicular, but care must be taken not to mash these folds tight in the corner at the bottom or the metal may crack or break on the short curve. Let the fold spiral

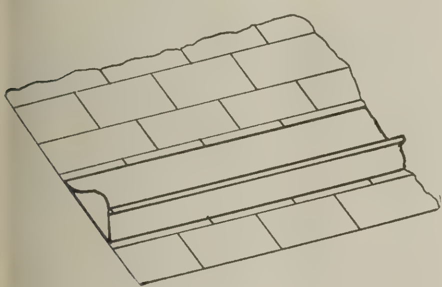


Fig. 4

up for an inch or so from the corner in the bottom of the gutter. When the end folds have been flattened and finished the top of the end may be sheared in a pleasing curve Fig. 4.—*L. S. Bonbrake.*

Solution of Retaining Wall Problem

The accompanying illustration shows the solution of a problem in grading which involved extending a driveway from a hillside street to the rear of a corner yard which had been graded up to the level of the front of the yard. A little study of the conditions indicated in the picture will show that it was not an easy problem to solve, particularly when it was desirable to injure the adjoining property on the hillside as little as possible by the presence of a retaining wall.

What the architect, in conjunction with a landscape gardener, did in this instance was to provide an inclined driveway at the extreme corner of the lot at a rise as gradual as possible, the width of the lot and the position of the dwelling being taken into consideration. Instead of bringing the drive right up to the edge of the retaining wall that was provided to separate it from the adjoining lower lot, a space about 30 inches wide was left as shown in the illustration which, when filled with earth to the different levels, provided terraces on which shrubs could be planted. In this way the harshness of plain walls was successfully broken without erecting an unsightly barrier and without shutting off the view from the lower lot.

To make ascent of the driveway easier for pedestrians a flight of cement steps was laid at the edge of the driveway next to the inner retaining wall.

Temporary bridge of concrete forms

Another Use for Concrete Forms

The accompanying photograph shows another use for the wooden unit forms that are used for concrete foundations.

In this case they are used as supports for a runway which forms a bridge for the use of wheelbarrows crossing the excavation from the mixer to the wall which is being poured. The fact that the bridge is stable, even tho its supports are standing in water, is evidence of its strength and stability.

GOOD SELLING POINT

"The only disadvantage to this house," objected the home hunter to the real estate agent, "is that it is so damp."

"Disadvantageous? How come, disadvantage?" snorted the agent. "In case of fire it's just so much less likely to burn."—*American Legion Weekly.*

Treatment of a retaining wall

Abusing Equipment

The U. S. Department of Agriculture and other agencies have long been engaged in directing the attention of farmers to the huge annual waste that is caused by neglect to protect agricultural machinery from the action of weather during the time that the implements are not in use in the fields.

It is said that placing implements in a shed doubles their life and that a shed costing 400 dollars will pay an annual return

Neglected equipment make leaks in profit

of more than 20 per cent, based on 1000 dollars worth of tools.

These statements offer food for thought to many builders who neglect this seemingly unimportant feature of their business. Some builders may be inclined to dismiss the idea by saying that equipment is their personal property and that if they feel able to afford the depreciation caused by the weather, they have a perfect right to do so. This, however, is far from the fact, as the item of depreciation adds to the cost of doing business. It represents "overhead" that is paid for by the builder's clients and they do not receive due return for this portion of their money. This annual waste incurred by builders who are careless with equipment no doubt causes a tremendous loss that undoubtedly plays no small part in adding to the cost of construction. Most of us realize that building operations will not reach normal activity until the cost of construction is considerably lessened, and we should be quick to seize any opportunity to effect a saving in expenses.

The man on the street is cultivating a rather annoying—to some people—habit of observation. If he intends to build, such apparently careless methods of winter storage of equipment as is shown in the photograph, is apt to cause him to make a mental note that the builder who is responsible for such carelessness won't have an opportunity to bid on *his* job.

Many break-downs of equipment on the job are due to poor storage. Rusty and heated bearings lower the efficiency, a dust-eaten bolt or a decayed piece of woodwork may have its origin in exposure to the weather during the winter, and yet does not develop a weakness until mid-summer. At that busy season perhaps resulting in a shut-down, more or less, expensive repairs and a delayed job; not to speak of the danger of injury to workmen who might be justified in bringing suits for damages.

A Special Truck Body

Builders are finding that trucks have adaptabilities outside of the work of transporting materials and that the varied ways in which they can be used to reduce cost and speed up work put them in a class by themselves. An instance of this is shown in the illustration of a special truck body devised by Frank P. Pursell, Los Angeles, Calif., who specializes in transfer work of heavy materials.

Immediately behind the driver's seat has been installed a winch which is driven from the countershaft of the machine. In order that this winch may always pull at right angles a trap door has been provided in the bed of the body beneath which is a strong ring anchored to an extra cross-beam of the frame. To this ring a pulley can be attached when needed, through which the rope or cable can be passed directly from the winch. Thus an object above or to either side of the truck can be raised or lowered by the winch with the same efficiency. This arrangement has proven particularly useful in hoisting steel girders in large buildings under construction. The truck backs into position in the building and quickly does the work for which a stationary engine would otherwise be required.

Removable extensions are provided either side of the truck body together with supports either side of the hood, on which long heavy beams often needed in moving large heavy objects can be carried without lessening the capacity of the body itself. The owner claims that these features have greatly lightened his work, at the same time increasing his efficiency to a marked degree.

A Substitute for Cork

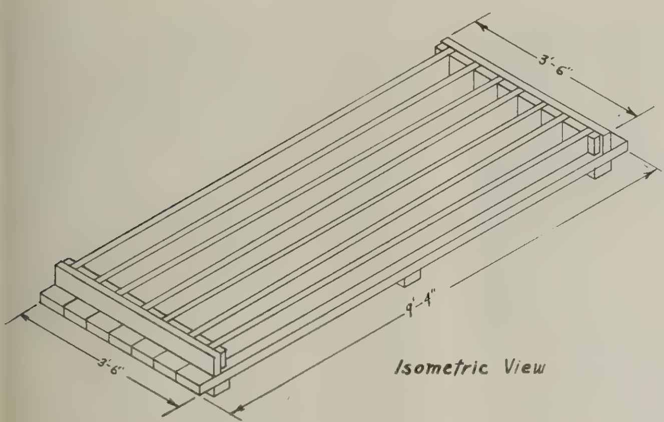
A chemical works at Bruenn-Koenigsfeld has been carrying on experiments with a view to finding a substitute for cork, says a Prague correspondent in the Times Trade Supplement, and these have now led to tangible results. Turf treated by a special patented process furnishes a material for insulation and building purposes that is said to be, in most respects, not inferior, and in some superior, to cork. The product is reported to be equally light, firm, and sound proof, to possess great insulating properties, and to be damp proof.—*U. S. Consular Reports.*

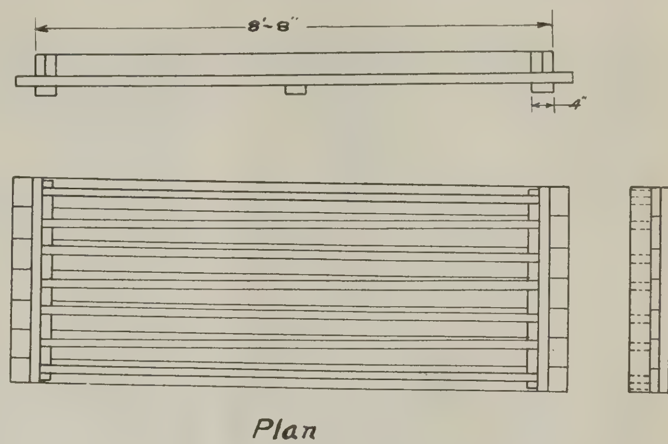
Truck equipped with a winch

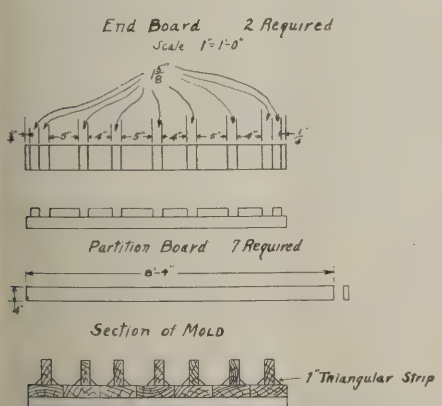
Concrete Fence Posts

The scarcity and the cost of timber for fence posts and the desire for a permanent durable post has served to direct the attention of farmers to concrete as a post material. The well built concrete post is a success, in spite of the fact that failure often resulted from early attempts to use this material for posts. The failure of concrete as post material can be attributed to poor materials, insufficient reinforcing and the lack of care in mixing and placing, but the experience resulting from such failure and the recent information published on the subject has enabled the average farmer to construct his own posts with a great degree of success.

Concrete fence posts are usually made from a 1-2-4 mixture. Aggregate larger than ¾-in. should not be used and in case that bank gravel is used, the aggregate should be run over ¾-in. and ¼-in. screens to separate the sand from the coarse material.







Some convenient form of mold should be constructed. The accompanying illustration shows an easily constructed gang mould. These forms allow the construction of a post 8-ft.-4-in. long, tapering from 4x5 at the bottom to 4x4 at the top.

Reinforcing is absolutely essential in a concrete post. Rods or wire should be placed in the post in such a position that they will be under tensile stress whenever the post is subjected to an outside stress. This means that they should be placed as near the corners as possible, being not nearer than one inch from the surface. Ordinary No. 8 or No. 9 fence wire placed in each corner is good. Two No. 12 fence wires twisted together is excellent for the concrete is not liable to slip on the wires. Iron rods, ¼ in. in diameter, placed in each corner is probably the best reinforcing material that can be secured.

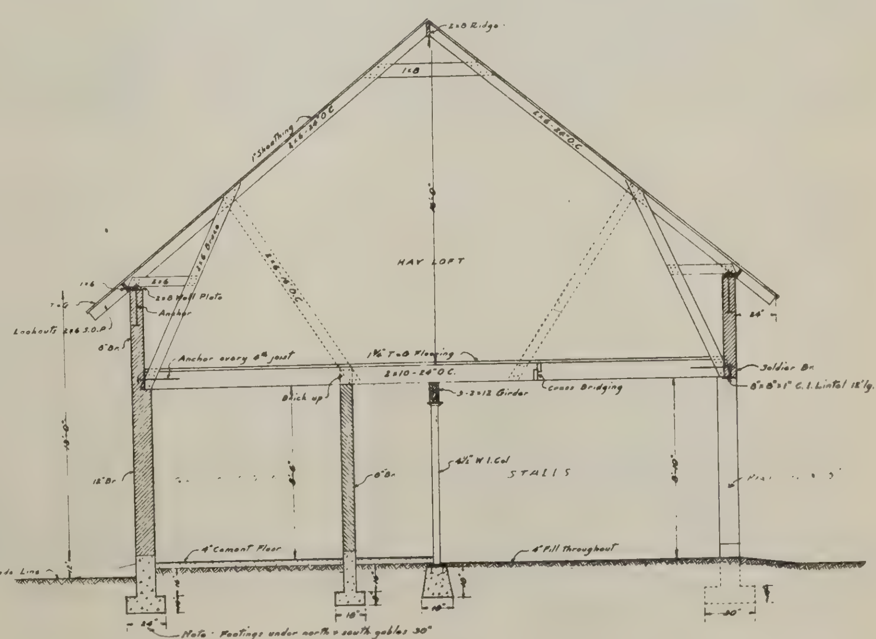
The materials should be mixed to a medium wet or wet consistency for the best results. Oil the forms thoroughly. Place one inch of concrete on the bottom of the mould, tamp in place and then locate the first two reinforcing rods. Continue the filling and tamping until the material comes within one inch of the top of the mould. Now locate and place the remaining rods, fill the form to the top and compact thoroughly. Smooth off with a trowel.

The forms can be removed in two or three days' time, but the posts should not be handled for at least one week. Sprinkling them with water every day delays hardening and consequently makes a much stronger post. At least a month should pass before setting them in the ground.

Framing a Gable Roof for a Barn

Frank W. Sharman of Tucson, Arizona, writes: "I desire to build a brick barn 30 ft. by 56 ft. with a simple gable instead of the usual gambrel type. Would the section shown in the accompanying sketch be entirely feasible and practical for this type of structure, or can you suggest some other type of framing and trussing which would be more economical or substantial? Should the 12-in. brick walls on the ends extend to the peak of the gables instead of the 8-in. as shown in section above the loft floor? As there is no frost or snow in this district, the foundation need not be built to resist frost action nor the roof framed to support snow loads.

"If you or your readers can give me any practical hints on these matters I should be pleased to read them in the columns of NATIONAL BUILDER, or by direct correspondence."



SECTION SHOWING TRUSS MEMBERS

Flower Boxes

FLOWER boxes are often useful when it is desired to relieve the severity of an otherwise plain design. There is perhaps no other single detail that is so successful in adding a touch of simple charm to a building that lacks such a quality.

The domestic character of flower boxes usually confines their use to dwellings. Under certain conditions, however, they have been successfully introduced into the designs of small libraries, schools and the like. To a more limited extent they have even been used on commercial buildings, factories and the like.

Flower boxes are usually supported by brackets that are built into the walls. In some cases the flower box sets directly on the brackets and is nailed to them. In other cases a wide shelf is built on the brackets and the loose box is placed on the shelf. Small balconies made of wrought iron are also used as supports for flower boxes. Boxes are usually ten inches wide and ten inches deep, the length varies with conditions. In good work they should be lined with galvanized iron and fitted with ½-inch drip tubes in the bottom at each end.

A frequent error in flower box design is to make them too plain. It should be remembered that in most sections of the country it is impossible to grow plants in the boxes throughout the year. Therefore, flower boxes should be designed so that they make an attractive appearance, whether planted or not.

The base appearance of many old houses could be overcome by the proper use of flower boxes. This opens another field to the builder who does odd jobs in the shop to keep busy during the dull season. Wood-working machinery is almost a necessity for getting out such work at a profit, as a well designed flower box involves such things as paneled fronts and ends, mitered joints, bottoms housed into the sides, mouldings run in place, scroll sawed brackets, and so forth; all of which can be done on a machine much faster than can be accom-

Fig. 1

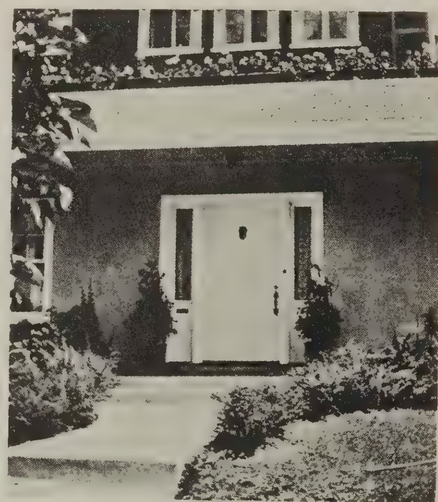


Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

lished by using hand tools alone.

The accompanying illustrations show some of the places where flower boxes may be used. Some of the photographs are not very clear, but they show enough to offer a suggestion.

Figure 1 shows a flower box beneath a stair window. This box would be more pleasing if brackets were used with it. Without brackets it has an unsecure appearance that is unpleasant.

Figure 2 shows a long flower box that extends the full length of a wide dormer. This treatment is an especially good one for the dormers of gambrel roof houses.

Figure 3 is a flower box over an entrance. Stucco and stained woodwork are used in its design, giving an effect somewhat similar to that of a small balcony.

Figure 4 shows flower boxes used under the second story French Windows of a row of duplex houses. Some of the windows have wrought iron baconies instead of the flower boxes.

Figure 5 shows a brick garage with flower boxes beneath the windows. The garage is in plain view of the street and the boxes go far toward relieving its rather plain apeparance.

Figure 6 shows a flower box used under a first story window that is rather high above the ground level. The box reduces the apparent height.

Figure 7 shows a flower box under a living porch window. The tops of the brackets are notched to receive the box.

It is perhaps well to call attention to the fact that flower boxes beneath casement windows opening out should be set far enough below a sill to prevent damage to plants when the windows are opened. The same requirement applies to windows on which blinds or shutters are used.

Arbors

MODERN arbors differ but slightly from pergolas, in fact the terms are often used interchangeably. An arbor, however, implies a somewhat smaller, less formal structure—a lounging place rather than one in which to walk. The first arbors were of a rustic nature, made of small branches laced together as a support for vines. Lately, however, they have taken on more architectural character and usually consist of small posts or columns with beams and open rafters over the top, and trelliswork at the sides.

Frequently the designs are quite elaborate

Fig. 1—An arbor used to mark the steps leading from a small sunken garden to the upper yard

with intricate patterns in the trelliswork and much study given to the design of the rafters and beams. Seats are often built along the sides, and trellis strips are laid closely on the rafters so that vines may form a thick covering.

Trellises are another of the things that can be made by the builder working in the shop during the dull season. Much of the tedious work can be shortened by using woodworking machinery. The arbors may be made to order or carried in stock for chance purchasers. Sometimes an arrangement can be made with a florist, landscape gardener, or furniture dealer to market arbors on commission. thus building up a nice business for both dealer and manufacturer.

Fig. 2—Potted plants are hung from the rafters of this rather elaborate arbor

All portions of an arbor should be primed before assembling and well painted afterward. Stain is also used for finishing arbors. The posts should be creosoted below grade and set in concrete. First-class materials should be used throughout as arbors are usually built of light material that must withstand constant exposure.

Fig. 3—A small arbor is often effective when used as an entrance to a house

Protection of Traffic

Whitewash is being used for a purpose that deserves special mention because of its value in safeguarding travelers on the public highway. Many state highway departments have established the commendable practice of whitewashing large stones, tree trunks, telegraph poles, culvert walls, bridge approaches, and other large or prominent objects along the roadway. This white coating makes readily visible what might otherwise be obscured by other features of the landscape or by darkness and has undoubtedly prevented a large number of serious accidents. In this day of constantly increasing automobile travel such precautionary measures are of vital importance.

"Whitewash and Cold Water Paint Preparation and Use Made Easy," issued by the National Lime Association, Washington, D. C., is recommended to those interested.

ENTRANCES

Fig. 1—Entrance to a library at Wyoma, Mass. Chas. D. Burgess, Architect. A simple but attractive design in stone

Fig. 2—A beautifully detailed colonial design on a residence at La Crosse, Wis. Otto J. Merman, architect

Fig. 3—An effective grouping of bay window and entrance. Housing development at Bridgeport, Conn. A. H. Hepburn, architect

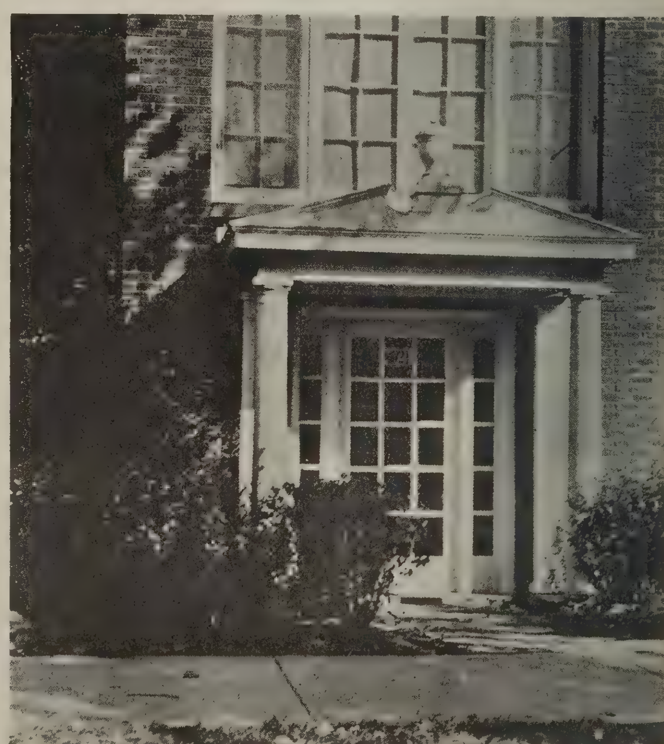
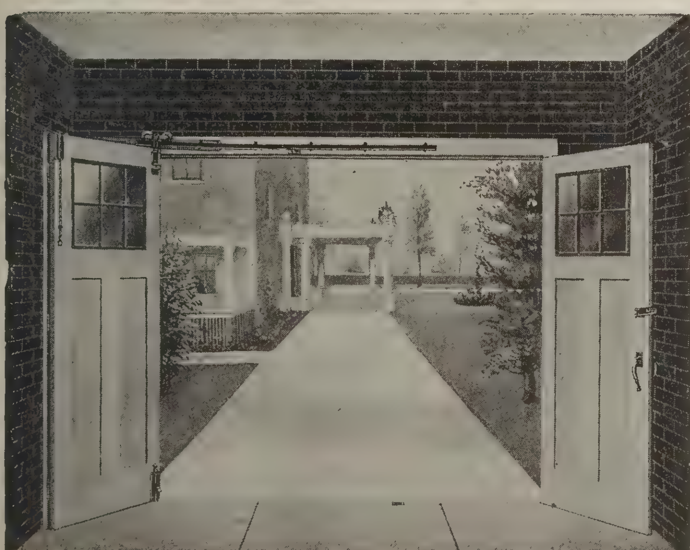


Fig. 4—An entrance to an apartment house in Chicago. A nice contrast of white woodwork and red brick



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National Mfg. Company
Sterling, Ill.

Announcements and Publications

Frank H. Quinby, architect, announces that he has moved into his new offices at 110 William Street, New York City.

Campbell Electric Surfacing Machines—An illustrated leaflet describing the line of Campbell machines for scrubbing, washing and sanding all kinds of floors; surfacing marble, terrazzo, concrete and granolithic floors. The machines are made in various patterns, from those designed for small jobs and operable from an ordinary lamp socket to those designed for monumental work driving a 24-inch grinding wheel. Issued by the Campbell Machine Co., 39 Haywood Street, Wollaston, Mass.

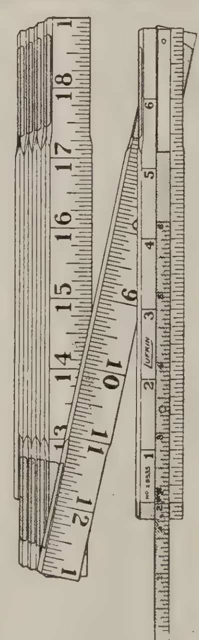
Freight and Passenger Elevators—Kimball Brothers Co., manufacturers of freight and passenger elevators, 9th and 11th Streets, Council Bluffs, Ia., announce the reorganization of the company officially and mechanically, and the breaking ground for a new "daylight" factory of concrete and steel, which will be completed about July 1. The company expects to improve and practically triple its production capacity.

Porete is a Porous Concrete — Announcing a new fireproof building material made of portland cement and sand reinforced with wirecloth, the Porete Manufacturing Co., 26 Verona Avenue, Newark, N. J., issue a leaflet with details and specifications for applying their specialty, which can be nailed on wood structures or applied with clips on steel frames.

Goodell Pratt 1,500 Good Tools—Tool Book No. 14, issued by the Goodell-Pratt Co., toolsmiths, Greenfield, Mass., is a handsomely-bound and well-printed pocket-size catalog and price list of 462 pages, with index of "1,500 good tools."

Concrete Work, Vol. I, by W. K. Hatt and W. C. Voss. The authors have put into this work not only the results of years of experience in practical teaching of the subject to technical students, but of the unusual experience of conducting highly intensive courses in concrete construction in training camps of the army under the stress of war conditions. The book is elementary and extremely practical. Its purpose is to extend the scope of work now possible to the concrete worker of unguided experience by bringing him to an intelligent understanding of the scientific principles underlying his art, with the hope that more concrete workers will develop the competency of foremen or local contractors for concrete construction. The course leads through blueprint reading, calculating of quantities, estimates of cost, selection and inspection of materials, selection and disposition of equipment, organization of gang, staking out, excavating form work, measuring, mixing and depositing concrete and protection of work, thus giving the student practice in doing the work of a local cement contractor or foreman on a small job. The book is published by John Wiley & Sons, Inc., 432 Fourth Ave., New York City, and retails for $4. Vol. II is promised shortly.

Lufkin Extension Spring Joint Boxwood Rule — A new six-foot extension spring joint rule particularly designed for taking inside measurements such as door and window frames and similar fixed points, but just as handy for ordinary measuring, has been placed on the market by the Lufkin Rule Co., of Saginaw, Mich. While similar in pattern to a spring joint rule it is made in genuine boxwood in natural finish. The first section of the rule is fitted with a graduated brass slide, which extends readily but is not loose, and is fitted with an end lock to prevent it falling out.



The application of this new rule is expressed in the illustrations. The graduation is consecutive inches and 16ths, both sides, with distinct lines and figures.

Aberthaw Tests of Concrete in Sea Water—This notable contribution to the science of building was organized by the Aberthaw Construction Co., of Boston, Mass., several years ago to determine whether or not concrete could be made so as to resist all effects of sea water and frost in a northern climate. In January, 1909, 24 specimen piers were manufactured and hung under the cap log of a wharf at the Navy Yard. In the manufacture of the piers, the concrete and the conditioning, the best skill obtainable and the greatest experience was sought for and employed. Photographs and records of the conditions of the specimens were made March 3, 1910, December 17, 1913, and June 9, 1920, and the latter with reproductions of the two previous records are embodied in a handsomely printed 38-page report issued by the Aberthaw Construction Co., as the series of 1920.

New Way Mixers — Descriptive, illustrated catalog, issued by the New Way Manufacturing Co., Eau Claire, Wis., showing the merits of the mixers manufactured by the company in mixing and discharge speed, light weight, simplicity, durability, and reliable power.

Lumbermen's Building Estimator—This work, by A. W. Holt, an experienced retail lumberman, was developed by him in actual practice and thoroughly tested. While designed for the use of retail lumbermen to lessen the drudgery of estimating it should be useful to builders for reference and for checking their figures.

The basic principle of this book is new but very simple. For example—The outside wall of a building of ordinary frame construction contains so many board feet of studding, sheathing, siding, so many lath, etc., for each square of surface. The approximate cost per square is, therefore, the same whether the building be large or small, and it is only necessary in finding the cost of outside walls to multiply the number of squares by the unit cost per square. The same principle of cost per square can be applied to floors, upper ceilings, roofs, inside partitions, etc., and thus the total cost of the completed building may be arrived at by figuring the number of squares and the unit cost per square in its component members.

The book carries this idea out at all the possible variations in price of lumber per thousand feet. It is also useful in figuring barns.

Bound in red leather, indexed, 5½x8½ inches; 148 pages. Price, $6.

Whitewash and Cold Water Paint Preparation and Use Made Easy—This valuable and concise pamphlet, issued by the National Lime Association, Washington, D. C., as Bulletin No. 304, compiled by Tyrrell B. Shertzer, B. S., C. E., engineer of the eastern bureau of the National Lime Association, includes in its title its description. Its source makes it authoritative.

Architect and Owner—Russell F. Barker, 1120 Farmington Ave., West Hartford, Conn.
Contractor—The Bent-Bartlett Co., 43 Ann St., Hartford, Conn.
Bishopric Medium Weight Creosote Stucco Base used on exterior.

WHEN BUILDING THAT "DREAM HOME" PROFIT BY "EXPERIENCE"

1—Skill or practical wisdom gained by personal knowledge, feeling or action; as, a means of experience.

2—The sum total of conscious events which compose an individual life. Thus Webster defines the word "EXPERIENCE."

Res.—Mrs. Wm. B. Green, 133 Steele Road, W. Hartford, Conn.
Architect—Russell E. Barker, 43 Ann St., Hartford, Conn.
Gen'l Cont.—W. A. Wilcox, 327 Trumbull St., Hartford, Conn.
Stucco Contractor—Peter Leone
Bishopric Stucco Base used on Exteriors

Mr. Russell F. Barker, Architect, Hartford, Conn., says:

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Mr. Barker is one of the leading Architects in this country. He has specialized for years on the scientific methods of home construction whereby the greatest living comfort and permanent construction may be obtained; therefore he is recognized as "authority."

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Vol. 64 May, 1921 No. 5

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NATIONAL BUILDER

Volume 64 Chicago, May, 1921 Number 5

The Situation

PARAPHRASING Lincoln's famous comment: "You can fool all the people part of the time and you can fool part of the people all the time, but you cannot fool all the people all the time," to apply to the "buyers' strike" and the investigations of the illegal practices, intimidations and extortions being conducted by the Dailey committee in Chicago following the exposures in New York, the presentation of conditions picking holes in each other's affairs, and as a house divided against itself cannot stand, the law, which has done so much to set the interests by the ears, is now busy trying to make everyone be good and behave.

The "mob psychology" which was incited by urgings to buy coal, or to do this or that, has been displayed in all its peculiarities, influenced by predictions and forecasts, asmuch as contractors are in the habit of bidding against each other for labor and so boost prices for labor just as buyers boosted prices of material. Labor is taking cuts here and there and resisting cuts with more or less futility, straining at gnats sometimes and swallowing camels, forgetting that as the enormous demand for building quickens, as quicken it will, there will not be enough high-grade mechanics to go

Visualizing materials in the form of homes and home conv eniences and comforts at the Own Your Home Expositions, Chicago and New York

all over the country, as shown on the two following pages, is more reassuring.

The public accepted conditions passively. The individual protest was only the concern of an individual and was smothered. Then the public, instead of accepting passively, simply refused passively to buy, and left the building industry to sozzle.

Nowithstanding the stewing of the culprits who have sought to "find a way to profit" under the fence, the real trouble with building in the country at large has been a lack of fair-minded consideration of the problems that the various interests have had to face. Opportunism has therefore run rampant, and labor, material, transportation and money interests have been busy and "hold your money and hold your wheat" arguments. Building business simply became frozen in its tracks in consequence.

The Own Your Home Expositions held in Chicago and New York, and exhibits of a similar character in various parts of the country have done much to stir the public to activity in buying. The Chicago city authorities are preparing to launch a "Pageant of Progress" at the Municipal Pier from July 30 to August 14 to stimulate building throughout the Middle West, and it is predicted that the show will be the most comprehensive ever given in Chicago since the World's Columbian Exposition.

The wages question is a "paper question" in the estimation of many contractors in- around, and that it will pay to quit stalling and get to work.

Where local chambers of commerce take hold of the situation and bring the community interests together in a community spirit, there has been shown a go-ahead spirit and activity in building that clearly shows this to be the way to get things going. This fact is reported in instances cited in the following pages, and notably, the Boise, Idaho, chamber of commerce building committee, which has compiled data to show that the cost of building is at least 25 per cent less than a year ago, proclaims the "Build Now" slogan, backed by Boise architects and contractors.

Fifty Million Dollars' Work Now in Hand by National Builder Subscribers

Figures Compiled From Answers to a Questionnaire and Returned up to April 21 Show That Fifty Million Dollars Work Is a Conservative Estimate as Others are Still to Be Heard from on Work in Progress

NOTWITHSTANDING a condition of confusion, such as possibly never existed before in the construction industry as a whole, building is going ahead on a much larger scale than generally believed. In response to questionnaires mailed out by NATIONAL BUILDER on April 10 returns received to April 21 showed approximately $50,000,000 worth of contracts signed and work already under way.

A very large percentage of this total represents houses varying in cost from $4,000 to $15,000 each, although there is a large amount of school work and a good sprinkling of hospital, lodge and church building also. There was little or no industrial building reported except in the South.

THE SOUTHEASTERN STATES

The South is the only section of the country where belief is general that rock bottom prices of labor and materials have already been reached. Labor in many communities in South Carolina and Georgia has been cut as much as 60 per cent of the 1920 peak prices. Reductions in prices of building materials amount to as much as 75 per cent in some communities.

In these localities—where reductions have amounted to 35 per cent or more—the opinion is quite general that there will be no further reductions. Labor is reported plentiful and willing and things would go ahead except for one thing—money.

The tightness of the money market in the South seems to be more acute than in other sections and may possibly be accounted for by the sharper and quicker shrinkage in wages and material values.

The quicker action in the South toward the return to "normal" conditions is in all probability accounted for by the operation of the law of supply and demand without the hinderances of organizations of both labor and material men. The returns, however, do not show that building in these localities has benefited particularly by their quick re-bound.

Some strange contrasts exist in the South, showing the effect of white organized labor and unorganized colored labor. Common labor in South Carolina and Georgia is reported as low as 12½ cents per hour, and wages of skilled workmen, such as carpenters and masons, as low as 50 and 60 cents. In the adjoining State of Florida, in the East Coast cities, wages in many cases have not receded any from the peak wages of 1920—common labor 50 cents and masons as high as $1.50. Yet Florida contractors and builders reported more building than Georgia and South Carolina combined.

MIDDLE ATLANTIC STATES

The farther north one goes from Georgia and the Carolinas, the less reduction is found in both materials and labor prices. The lack of wage reduction in mining and industrial communities is very pronounced. In the coal mining sections of West Virginia, building trade artisans and laborers alike are still receiving the 1920 peak wages. Notwithstanding this condition some of the largest housing projects reported are in these localities.

In the states north of the Virginias conditions vary greatly according to the size and character of the communities. There is more unrest of labor reported in this section than in all the rest of the country put together. Contractors and builders are about evenly divided on the prospects of strikes and labor troubles this season.

In the larger places and in the industrial districts organized labor has quite generally refused to accept wage cuts up to this time, although cuts as high as 50 per cent have been made in common labor wages. In the smaller places, often within short distances of the cities, skilled trades have accepted cuts up to 25 per cent without resistance. Labor of all kinds is reported plentiful, except in one or two isolated cases in New York State. Reductions in the price of materials vary all the way from nothing (in some parts of eastern Pennsylvania) to 40 per cent.

Building exchanges in nearly all the larger cities have taken the wage problem by the horns and announced wage cuts of 20 to 25 per cent effective May 1 and June 1, at which times strikes, lock-outs and other labor troubles are freely predicted.

NEW ENGLAND STATES

The conditions in the big cities and industrial districts of New England are very much like those of the Middle States. Strikes are already under way in Boston and elsewhere over the matter of enforced wage reductions. As in the states south further controversies on the wage question are looked for on May 1. Reductions in building material prices of from 8 to 50 per cent are reported.

There are many remarkable contrasts, even between communities in the same state and seemingly very similar in character. For example, the New Hampshire city of Nashua reports a 10 per cent wage reduction and a 9-hour working day, while Berlin, N. H., reports a 20 per cent reduction and an 8-hour day.

NORTH CENTRAL STATES

The Northern industrial districts from Buffalo to Green Bay, Wis., generally show slight reductions or no reductions at all in wages, except in the case of common labor. On the other hand, building material prices show drops of from 25 to 50 per cent from the 1920 peak prices. Michigan reported the largest total of work under way of any state and yet wages there seem to have decreased the least. A great deal of this building work, however, is schools and hospitals for which there is urgent need because of the recent big increase in population.

The sudden collapse of the rubber industry in certain Ohio cities is clearly reflected in the present prevailing wage scales. In Akron, for instance, building trades employes have accepted reductions of from 35 to 50 per cent with apparent cheerfulness. In Cleveland, Toledo, Chicago and Milwaukee, on the other hand, where unemployment and bubble-bursting have been less conspicuous, no wage reductions had occurred up to May 1, although in each case negotiations were under way to effect a 20 to 30 per cent reduction by peaceful means if possible.

In southern Ohio and Indiana a much less conciliatory attitude is assumed by builders and contractors toward labor, and several peppery suggestions are made for ridding the industry of unions altogether. This attitude is probably engendered by price cuts ranging from 25 to 50 per cent in building materials—greater than in any other section except the South—and through knowledge of conditions in such places as Akron where labor has accepted similar cuts.

In the "corn belt" States of Indiana, Illinois, Iowa, Kansas and Nebraska, the decrease in value of agricultural products is keenly felt and it is, of course, recognized that neither labor nor building materials have come down in proportion, although there have been reductions of from 20 to 40 per cent in the smaller rural places.

SOUTH CENTRAL AND SOUTHWEST STATES

The Mississippi Valley States from Missouri and Kentucky to Louisiana are more in the condition of the Central States than of their Southern neighbors to the east. Reductions in wages are not as much as would be expected from general conditions, although price reductions in materials as high as 50 per cent are reported. Very little work was reported except in the States of Kentucky and Tennessee. In New Orleans labor is not plentiful and in a cranky mood, according to reports, so that srikes are looked for.

To the west, Texas and Oklahoma show considerable activity, especially Texas. Labor here, however, has not recovered from the oil-boom days and is still getting, in many instances, the 1920 peak wages. The reports from this section do not show any attempt on the part of employers to force reductions, as is being done in the East, although labor is reported plentiful.

NORTHWEST STATES—ROCKY MOUNTAIN STATES

Conditions in the Northwest States from Wisconsin to Montana are still unsettled owing partly to the fact, however, that the construction season here had hardly opened on April 10. These are chiefly agricultural states where building trades labor never reached the peak prices of other sections. Consequently the wage reductions reported, varying from 10 to 30 per cent, mean more than the same figures in some other sections. Material prices have gone down in about the same proportion, so that conditions there look sound when the season does open.

Farther west in the mining states of the Rocky Mountain region the results of well organized labor are again seen and wages have declined but little (generally about 10 per cent). Building material prices have declined all the way from 5 to 50 per cent. Except in isolated cases building trades labor is reported plentiful and contented, no strikes are anticipated and apparently no organized efforts have been or are being made by employers to force present wages down, except in Denver and a few of the other large cities.

WEST COAST STATES

Wages in southern California are generally about 10 to 15 per cent less than the 1920 peak prices of labor. Construction material prices also have dropped only 10 to 15 per cent in this section. A considerable volume of work is going ahead and stable prices of both labor and materials are desired rather than lower prices. In San Francisco there has been no drop in wages since 1920.

In Oregon and Washington conditions are more nearly like those in southern California. Wages have come down 10 to 15 per cent in most cases—sometimes as much as 25 per cent. Material prices are down in about the same proportions. Labor is plentiful and strikes are not anticipated.

GENERAL CONCLUSIONS

The greatest confusion exists over the future course of material prices. Opinion in every locality, state and group of states except the South is just about evenly divided on the subject of further reductions. Whether the reduction has been 40 per cent or 10 per cent, some see no further reductions and about an equal number are confident there will be more price slashing.

In the South and Southwest where building material price reductions have amounted to 35 or 40 per cent, there is more unanimity of opinion that present prices are rock bottom.

It is not safe, however, to draw any conclusions from general averages and there is every evidence that attempts to do this is one of the causes of the existing confusion. The rise in prices and in wages was by no means uniform and therefore there can be no uniform reductions. Statistics are more apt to be misleading than otherwise if they are based on average nation-wide conditions and an attempt is made to apply them to local conditions.

Reports sent in by NATIONAL BUILDER readers show almost as much variation within the borders of a single state as between the most distant parts of the country.

Contractors to form any idea of future conditions as applied to their own work must study local problems, prices and wages. During the war there was a marked shifting of population and a concentration of labor in the industrial centers of the East and Middle West. Eventually there must be a redistribution of this labor. Until this occurs any attempt to generalize is likely to lead to false conclusions.

Pertinent Suggestions

"GOOD, ambitious and willing workmen, ready for a good day's work."

"We must have real trade schools."

"Labor is not plentiful—Men are."

"Realize that value received must be given to the public; and the sooner the newspapers stop giving out false statements regarding reductions in the prices of materials, the better it will be for all concerned."

"Newspaper publicity in the right direction—at present, instead of working up building initiative, they are undermining the public's confidence to start operations and indirectly advising procrastination."

And "procrastination is the thief of time"—time the most precious thing we have in the world.

The analysis of the questionnaires makes it very evident that resumption of building thus far is not necessarily dependent on either reduced wages or further reductions in material prices. Many state that these reductions must be made before construction work can be resumed. Others want assurance that present prices will not rise.

Reductions varying from 10 to 75 per cent in the price of building materials are practically universal, while a great many localities scattered throughout the country have had as yet no reductions in wages of skilled building labor. Also it is shown in the questionnaires that material prices have dropped lower, in percentage of 1920 peak prices, than have wages.

Building material producers are obviously bidding for a resumption of construction, while union labor, with less general knowledge of actual business conditions and less experience with broad economic business considerations, is inclined to stand pat.

High wages, high prices of material and high interest rates for mortgage money, are universally blamed for the present situation and the questionnaires show that any one of them alone will deter building even if the others are favorable.

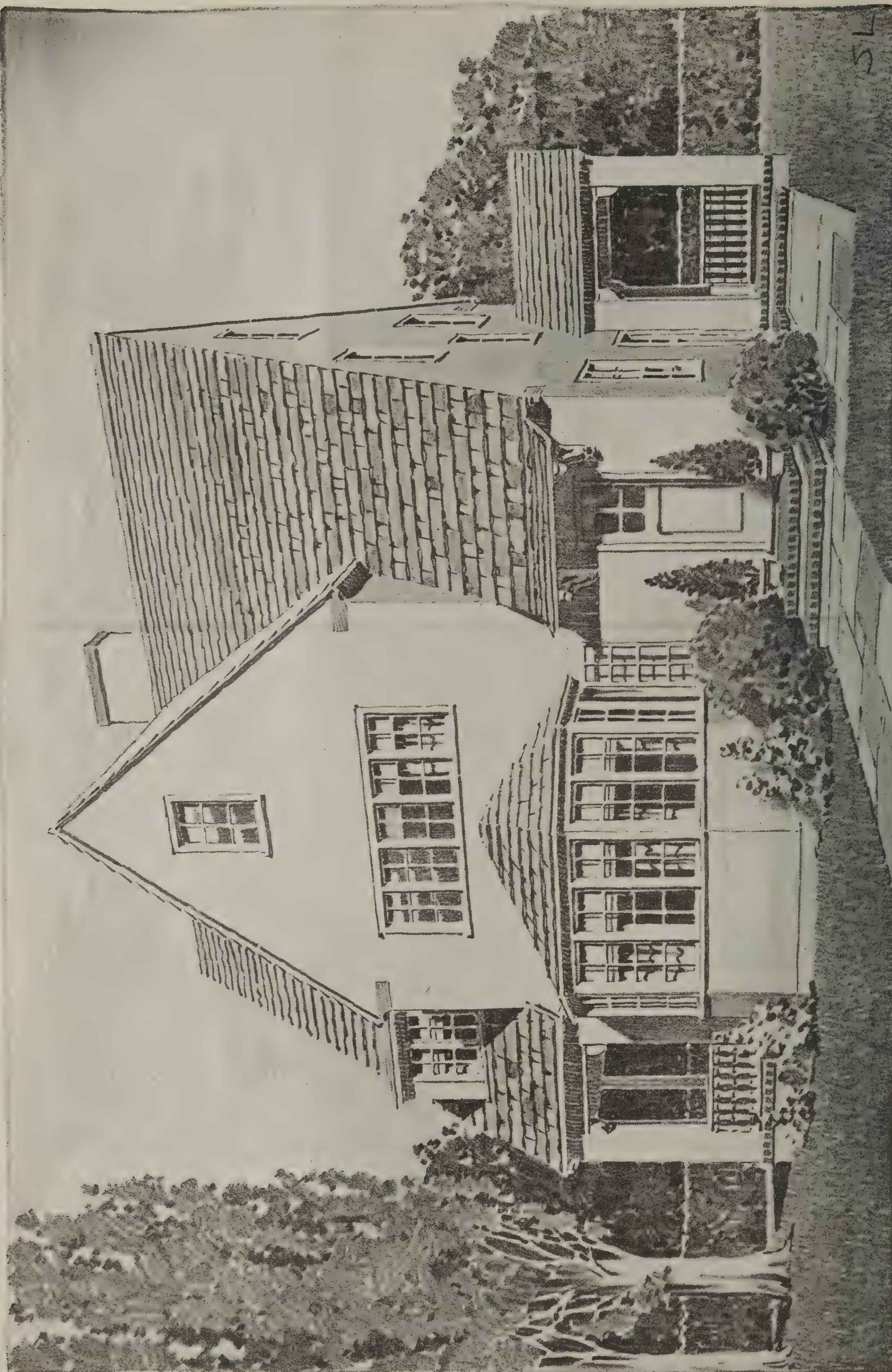
WHAT THE BUILDING INDUSTRY NEEDS MOST?

Not many say it, in so many words, but many infer it: Stop worrying about world and national problems, prices, wages, etc., and concentrate your attention and energies on your own little bailiwick. A builder in a small town in New York State, where reductions in wages and material prices have been far less than in some other places, reports everything humming. Why? Because the local Chamber of Commerce got busy and brought about an understanding between the three interested parties—the builder, the unions and the buying public.

One Nebraska builder aptly writes: "Lack of building seems to be on account of the general unsettled conditions rather than price; so many wage earners are uncertain of the length and steadiness of employment." Another builder writes that the thing most needed is "to know what is coming and be prepared."

No man in America is probably wise enough to make predictions. But any group of local builders can pretty nearly determine with the help of their local Chamber of Commerce, or other local business organization, what is going to happen in their own community, because any community can about decide its own destiny, just as in the New York State case referred to.

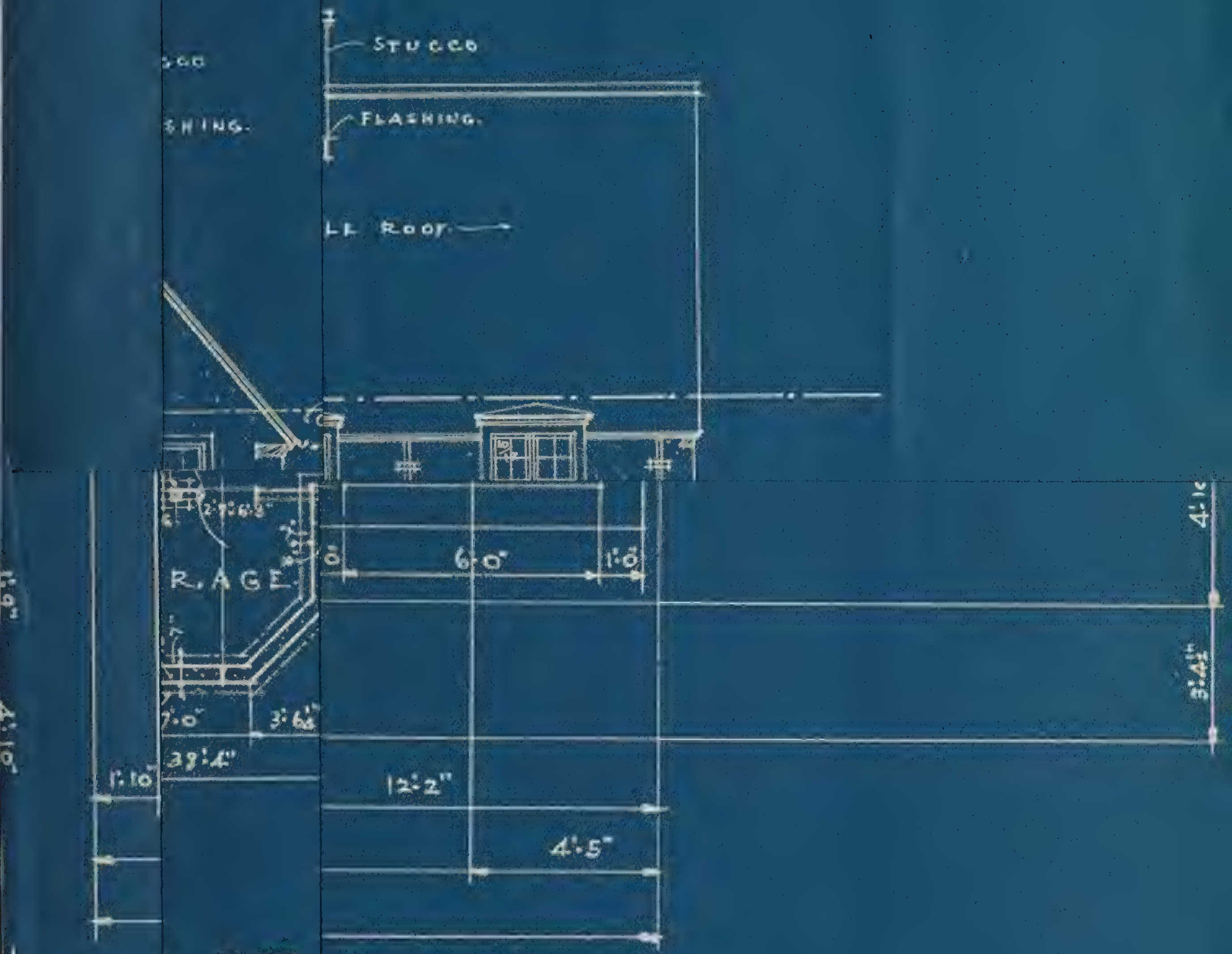
Nothing much is to be gained by "passing the buck" to union labor, the material man, the railways, or any other agency. The co-operation of all these is necessary to success of the construction program. As one builder puts it: "More confidence in each other and more interest in each other's welfare."



A Six-Room House of English Type

Designed by Trowbridge & Ackerman, Architects, for the Curtis Companies, Inc., of Clinton, Iowa

See descriptive article on following page



STUCCO
SHING.
FLASHING.
LE ROOF
R.AGE
6'-0"
1'-6"
7'-0"
3'-6½"
38'-4"
1'-10"
12'-2"
4'-5"
3'-4½"

NT LAN.

NATIONAL BUILDER
May, 1921

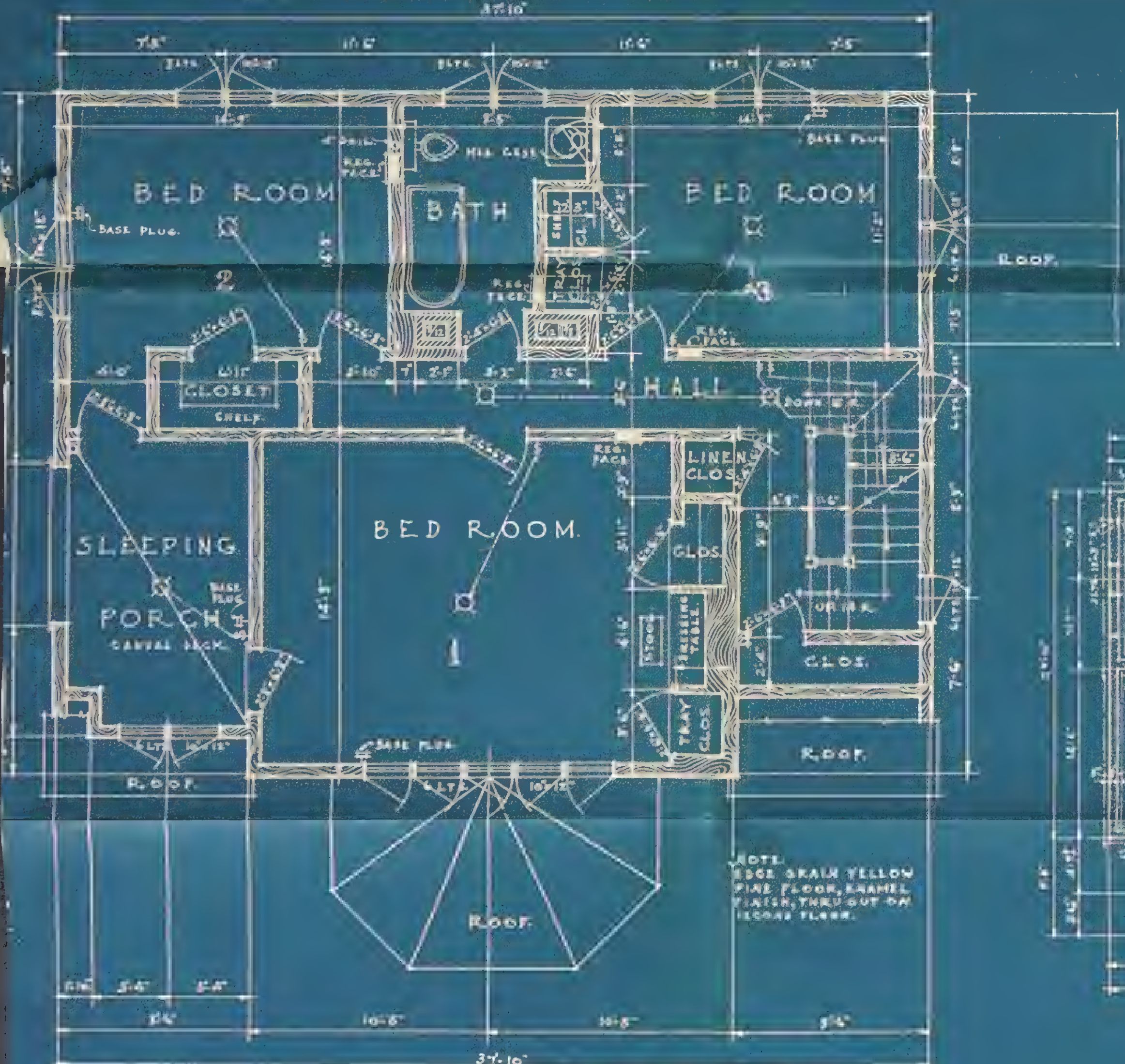
Six-Room House of English Type

TROWBRIDGE & ACKERMAN
ARCHITECTS

Originated for the Curtis Service and Reproduced by Special Permission

Scale: Elevations and basement, ⅛ inch equals 1 foot: first and second floor plans, ¼ inch equals 1 foot

See Photograph and Description in Reading Pages



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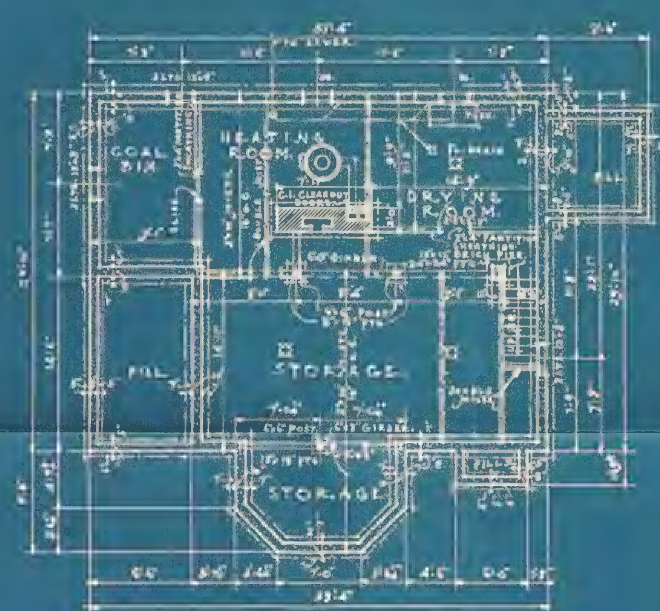

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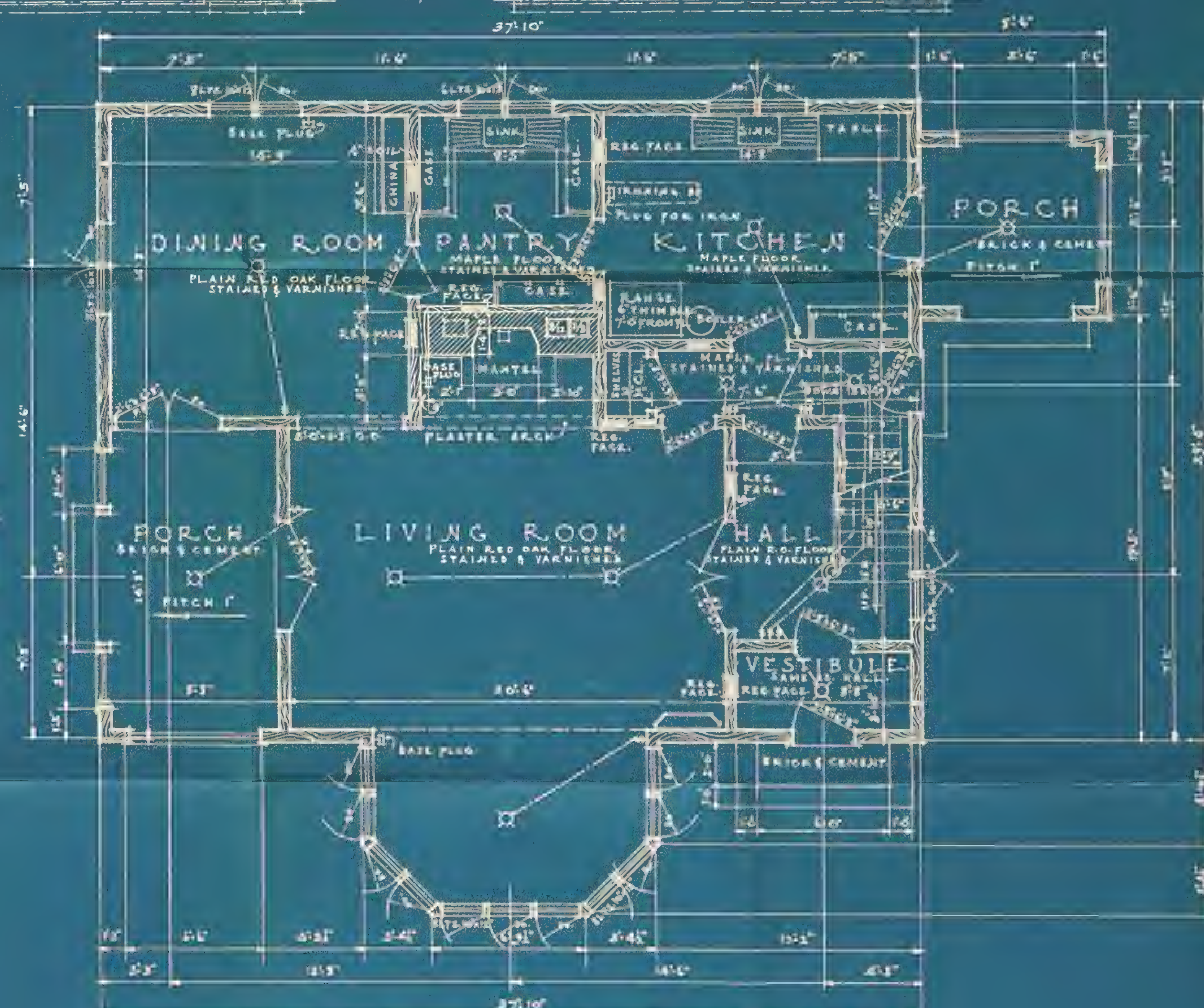


·FIRST · FLOOR · PLAN·

Six-Room House of English Type

Working Drawings of this House are Shown in Blueprint Detachable Insert in this Issue

WHILE the Colonial has been often referred to as the one distinctive American architectural type, and while the Western house has enjoyed an immense vogue during the last decade, the signs of the times point to an increasing popularity for the English type of house. As an example of that type adapted to modern requirements, we present the house on the opposite page this month.

The English house, as the term implies, is a native of England—a country noted for the beauty of its small house architecture. Modifications of this type adapted to local conditions are, however, also to be observed in Continental Europe and the Scandinavian countries. America, too, has made use of this attractive style ever since the founding of the colonies. Many of both our oldest and our newest houses, recognized as houses of good design, are houses of the English type.

Frequently the English type is recognized by exposed half timbers. But the houses of the later period show no such timbers, probably for the reason that modern house construction has eliminated them as structural parts of the house; and indeed, most of the half timbers one sees on present-day houses are purely ornaments—1x4's embedded in stucco or otherwise attached to the walls; they are not integral parts of the wall structure necessary for the support of the building.

The house shown manifests its English style by the steep roof, the casement sash, the short overhang of the roof at the eaves, and the narrow rake mold which forms the only projection of the roof beyond the walls on the gable ends. The cornice is boxed and is formed by a simple crown mold, a 1x10 plancier, and a cove molding. The house sits close to the ground, which, after a few shrubs have grown around the foundation, will give it the appearance of having sprung from the soil itself, and so will make it a part of its environment. One can well imagine the beauty of the design after Nature has added her touches and given the roof a texture that will make it one of the most attractive parts of the house; and the red brick laid on end with white mortar joints forming the border around the entrance platforms and the porch floors add another colorful touch.

This house is one of a large group of small houses designed for the Curtis Companies, Inc., of Clinton, Ia., by Trowbridge & Ackerman, architects, of New York City. The skillful handling of modern features, such as the porch, sun parlor and sleeping porch, in adapting them to an architectural type to which they were unknown, shows the work of master designers. Every detail of the house has been so carefully worked out that to change any one would hazard the beauty of the design and the practicability of the plan. Both plan and design have been worked out to take standard lengths and sizes of lumber and other materials and at the same time to permit as much floor space being incorporated as the cubical contents permit.

> ***NOTICE!***
>
> ***Taking this house and plan as a basis, suggestions will be submitted in ensuing issue of National Builder on the subjects of heating, plumbing, and similar details, for discussion, and to obtain a consensus of opinion on ideal conditions for various classes of interior equipment***

This house is best built facing the south, for the living room will then be on the south, and both living room and sun parlor will be easy to heat. The main chamber and sleeping porch will likewise face that direction, permitting the prevailing breezes from the south to keep this portion cool on summer nights. The kitchen will be on the north, where it, too, is best situated. If the plan is reversed and the house faced south, the dining room will then get the benefit of the early morning sun, giving sunshine and cheer at the breakfast hour. There is no objection, either, to facing the house east, but if a west front can be avoided, it would be well to do it, because a north exposure for the porch and sleeping porch is not advisable. For the same reason it would be best not to build the house facing north. Because the design is carefully studied from every facade, it will look well upon a corner lot, though it would enhance its neighbors if built on an inside lot of 55 or 60-foot frontage.

A detailed study of the merits of this design and plan begins with the first feature encountered—the front entrance. It is sheltered by a most attractive little hood that is a continuation of a portion of the main roof. The brackets and moldings for this hood are stock items, like all the other architectural interior and exterior woodwork. The door opens upon a vestibule, spacious enough for wraps, etc.

The hall is of liberal size and is one of the most useful sections of the house. It forms an avenue of direct communication between the kitchen, living room, front door and the stairway that will save innumerable steps. It keeps drafts out of the living room in winter because of its French doors. It provides a place to converse with strangers without inviting them into the living room, when to do so would be to disturb the family circle or guests. Yes, a hall is a practical consideration!

The living room has an inglenook attractively balanced by the large bay window, which is really a sun parlor, and which, because it is not cut off from the living room, is easy to heat in winter. The living room has direct access to the side porch and to the dining room and also to the entry into the kitchen.

Unlike many dining rooms, this one has a great deal of privacy.

The pantry is equipped with three fine dressers of standard designs, and with the two casement sash will be bright and easily ventilated.

The kitchen is big and roomy! Note the sink beneath the two casement sash; the dresser in one corner, and the table in another far away from the range. A built-in ironing board of stock make is an ever-ready household convenience for housewife and maid alike. A large rear porch is a notable consideration. Note the convenient location of the grade entrancee. One can enter the house directly from the outside without going through the kitchen, though the basement stairway is very handy from the kitchen, too.

The stairway for this house is manufactured as a complete unit, and like all the other woodwork for this home, exhibits the characteristics of the English interior. The foot of the stair is well lighted by the hall window, and a single casement at the landing makes the upstairs hall bright in the daytime and easily aired.

Three fine bedrooms with an abundance of closet space are provided on the second floor, with a bathroom conveniently situated near each of them. A closet for linen at the head of the stair contains a chest of trays; a closet for miscellaneous things at the end of the hall is a secret recess that will be found most convenient. Each bedroof has cross ventilation, with the exception of the large front chamber, which is directly connected with the sleeping porch. Note that one of the smaller bedrooms has access to the sleeping porch, too—a good arrangement for the parents when the children are young.

One desirable thing that the English type permits is an attic. This house has a fine one, which is lighted and ventilated by good-sized windows in the gables and to which there is easy access through the open stairway over the main stair. With such an attic this house will serve the needs of the small family that expects to grow big, because of the possibilities for future bedrooms on the third floor, or the attic can be fixed for servants' quarters.

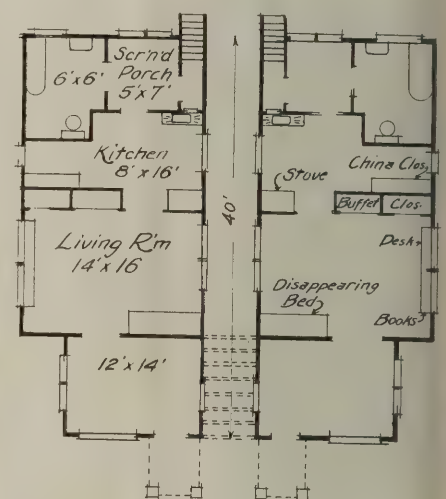
The builder upon whom his customers depend for architectural and building advice, will make no mistake in recommending a house of this type; it will be a lasting monument to his good taste and judgment.

One Way of Utilizing a 45-Foot Lot

By G. E. McDonald

THE three-room twin houses shown herewith were built by Contractor J. E. Graves, of Los Angeles, in spare time during the latter part of 1920, at a cost of about $4,500 for materials and labor, the larger proportionate cost being for plumbing. An outlying vacant lot was utilized, and Mr. Graves is himself now occupying the house on the left and has the other rented for $25 a month. He is about to build a sleeping porch on the rear of each house, the two to be joined by a vine-covered pergola, and a double garage will be erected on rear of lot, when the income from the property will be increased accordingly.

Three-room twin houses on a forty-five foot lot



The houses are necessarily narrow (16 feet) on a lot of this size, 45 ft.x131, but an effect of Spanish breadth and classiness is given by means of the combined width of the two front porches, the pergola beams joining the two houses, and the gentle slope of the gabled roof over the first room that extends back against a straight wall of ½-in.x4-in. novelty siding running across the combined width of the two houses and driveway and extending around the flat roof of main body of dwelling. The joining of the two houses in this way enables them to come under the city ordinance for semi-detached dwellings and yet gives separation and privacy to each family.

The foundation is of solid concrete, and the backward slope of the hill has allowed of a good-sized basement under the rear of each house. The floor joists are 2x6-in., and the ceiling joists and the rafters, as well as the studding in outside walls are 2x4-in., and the inside studding 2x3-in.

On the exterior walls, split wooden lath was used, bound by chicken wire, and over this a hard plaster, with an exterior finish of cement of grayish tint. Outer siding is painted white, and the roofs are of tar paper covered with crushed red tile to protect from the rays of the southern sun.

Hard wall plaster, sand finish, is used inside, kalsomined throughout. Floors are of hardwood. There is a sliding door between front room and living room, and all interior woodwork is finished in white enamel—except kitchen, which is in Oregon pine stained in natural color. There is a piano window in front room, also two similar windows over the desks and bookcases in living room. All windows are casement windows, except the front window which is fixed. There is a full-size disappearing wall-bed in living room, also two built-in desks, with shelf above and bookcases underneath. The living room, which is also used as dining room, has a built-in buffet, and clothes closet. There is a built-in cupboard in the kitchen, porcelain sink and drainboard, and in the screen porch is located the laundry tub and instantaneous water heater. Bathroom is equipped with pedestal lavatory, porcelain bathtub and toilet.

Hardware is of antique copper throughout, and special attention has been given to the solid construction and classy design of the front door, which in this case has the square lights of glass and oblong paneling which harmonizes so well with the porch's rose trellis and square outer pillars and the general broad effect of the group exterior.

Atlantic Heights Housing Project

ATLANTIC HEIGHTS forms a suburb of Portsmouth, N. H., which is chiefly remembered as the scene of the signing of the treaty ending the Russo-Japanese War. Portsmouth, however, has other claims to distinction in that it is one of our oldest towns—settled about 1630—and is the home of the Portland Navy Yard, established about 1800. The old U. S. S. Kearsarge was built here.

During the late war several additional shipyards were located near Portsmouth. To relieve the consequent house shortage the U. S. Shipping Board employed Kilham & Hopkins as architects for a new housing development at Atlantic Heights.

The project comprises some 300 houses, dormitories for 400 single workers and a cafeteria that will serve 800 men at one sitting. Three weeks after the architects were appointed the project was under way and less than two months later the dormitories were ready for occupancy.

As the architects also acted as town planners, several unusual features not commonly appreciated in town plans were introduced. For instance, the land is quite hilly with many outcropping ledges, and the streets were laid out to follow the lines of easy construction and natural drainage, but in cases where a very good-looking outcropping ledge occured, only the roadway was cut through the ledge, and the sidewalk was carried up over or around behind the ledge. Thus preserving these bits of natural scenery and at the same time reducing construction costs.

Most of the houses are of the four-room, semi-detached type, built of brick; some of the later houses, however, are of frame. No house is nearer than 16 feet to any other and all have furnaces, electric lights, and modern plumbing.

As practically all of the houses are small, the cornice lines were kept at the first story level, with high-pitched or gambrel roofs to get the necessary head-room in the second-story rooms. This produces the low appearance that is so important to the appearance of the houses of the cottage type. The style of the houses is Colonial with a special attempt toward harmony with the Colonial houses of the old City of Portsmouth.

In addition to the Government's minimum standards, the architects imposed a few of their own which they considered necessary for New England, if not elsewhere. These are in part that no living room should have a door opening directly into it from outdoors, and all houses should have an outside entrance to the cellar without going through the house. The kitchenette type was discarded in favor of the kitchen and dining room combination. All of the rooms in the project are fairly large, but it was kept in mind that most workmen like to move all of the furniture at one truck-load. Over-large rooms were therefore avoided as requiring too much furniture.

From experience gained on this project

Fig. 1—Note how the walk avoids the outcropping ledge, thus reducing costs as well as preserving a natural feature of the site

Fig. 2—A six-house row. One of the few row houses in the development

the architects also consider that the accommodations usually provided for kitchen utensils such as pots and kettles, are not sufficient. The small cabinets usually designed for this purpose are not adequate. Further, it is felt that a place for keeping the baby carriage in the house should be expressly designed. Too many designers ignore such items as being of minor consequence, while as a matter of fact they are of much importance in contributing to the contentment and satisfaction of the tenant.

The tendency of many workmen toward the keeping of boarders was recognized at Atlantic Heights by cutting doors in the party wall of many of the semi-detached houses. If boarders or roomers are to be kept, the tenant may rent two units, thus doubling the number of available rooms in his house.

Drawings of a typical four-room, semi-detached house are shown. There is a small entrance hall with stairs to the second floor, and a door opening into the parlor or living room. The kitchen and dining room are combined. The kitchen cabinet, range, water heater and sink are grouped at one end of the room. The sink is of soapstone as are the laundry tubs with which they are combined. A refrigerator drain is provided behind the rear door which opens onto a small stoop. There are two entrances to the basement; one from the kitchen, and the other from a bulkhead door on the exterior.

The second floor has two bedrooms and a bath, all opening into a small hall which contains a linen closet. Each bedroom has a closet and every room in the house has windows on two sides, thus assuring an abundance of light and ventilation.

Fig. 3—The brickwork is laid in Flemish and English bond, thus adding interest to the wall surfaces

Industrial Housing in Birmingham, Ala.

"The Tennessee Iron & Railroad Co. is always building houses for its employes," said a member of the Birmingham Chamber of Commerce to the representative of NATIONAL BUILDER. So the said representative went over to Ensley, a part of Birmingham, and saw some of the housing operations. He found a force of men engaged in demolishing a row of cottages that had become old, and a force of men with teams was at work grading the area and making it ready for the erection of more modern houses.

As he stood looking at the operations, a steel worker came along returning from the rolling mill. "What do I think of the company houses? Well, I'll tell you. I have worked for this company for 31 years and in the past have lived in some of the company houses. They are just twice as good as those owned privately, as a usual thing; and are just twice as well kept up. The rent for a five-room cottage is about $8 a month. For a privately owned cottage here the price is about double that. In Birmingham, private owners are charging $20 a month for a three-room cottage,

Fig. 4—The development is characterized by a pleasing irregularity in the placing of the houses

and the tenant has to pay for the water, which the company furnishes its tenants free. A lot of the tenants of the company have gardens, and the company plows the ground for them free. Also it sends around a garbage wagon every few days and keeps everything picked up clean. A lot of the men who own cottages, or rent privately owned cottages, will not pay to have a wagon haul away their ashes, tin cans and other things; and it is a shame the way they keep their lots looking. There is always a waiting list of about a hundred people who want to rent a company house. You should see the company's mining camp down at Lake View. You can't beat it."

Some Problems in Waterproofing Basements

In New Orleans one of the great problems in connection with house construction is how to keep water out of basements, as the city lies so low that the flow of water in the soil is naturally toward the basements and not from them. If water gets in, the only way to get rid of it is to pump it out. For this reason a great many of the residences in that city have no basements.

The representative of National Builder secured an interview with D. S. Melvin, who has been for 10 years making a specialty of rendering basements water tight. On some of the problems connected with this work, Mr. Melvin said:

"Within the last five years about 50 per cent of the modern houses erected in New Orleans have basements because people have come to realize that it is possible to keep out the water, even when the basement is below the water level in the soil. The basements now being dug vary from 3 feet 6 inches below street grade to as much as 20 feet. The average street grade here is about two feet below the Gulf. The water table is about 18 inches below the grade line of the sidewalk. The problem is a tremendous one to get the ordinary house cellar dug and made waterproof.

"Just now there is an immense bank building being erected. The main cellar is 13 feet deep, and under that is the oil tank, 9 feet more, for the use of the building. But in that case we are getting little water, because piling has been driven, and the pile driving has compacted the earth, and made it temporarily nearly waterproof. But my experience shows that this compactness will be neutralized in from a year to 18 months, in which time the water in the soil will make little fissures for itself and get in unless held back by artificial waterproofing.

"In the case of New Orleans the problem is complicated by the pressure of natural gas in the soil, which makes it necessary to heavily reinforce the concrete floor. Even then it will sometimes blow holes through the concrete before it can harden.

Figs. 5 and 6—The appearance of the frame houses is almost painfully neat

"In the past the greatest impediment to getting big basements waterproof was the fact that there was not enough steel in the walls to keep the walls perfectly rigid in spite of any settling. If the reinforcing is not sufficient to do that, settlement cracks will appear in the walls, and then all the waterproofing in the world will not keep out the water.

"In some of the biggest basements, from four to six inches of cinders are tamped down to tie the blue clay together, and a concrete floor a foot thick is poured over that, with steel reinforcing half an inch thick and 8 inches on centers, with not more than 20-foot spans. I tried a 45-foot span once and gas and water pressure bulged it up during the first night, breaking the 9-inch-deep steel reinforcement at right angles.

"The problem of getting and keeping tight basements in residences is harder to solve than in the big buildings, because the walls of dwelling houses are not reinforced, and settlement cracks are about sure to appear in time. The only way to accomplish the task so that the cellar will remain dry is to reinforce the bottom and walls so heavily that settlement of the structure will not cause cracks to develop."

Fig. 7—A four-room, semi-detached house of frame construction

Tests of Bishopric Stucco Base

In the report of Frederick W. Barrett, supervisor of buildings for the City of Hartford, Conn., regarding tests made of Bishopric stucco base, printed on page 49 of the April issue, an obvious error was made in referring to the material as wall board. The methods of testing this material are both interesting and instructive, and will be made the subject of consideration in our June issue. A handsome monograph is published by the Bishopric Co., exhibiting illustrations of tests.

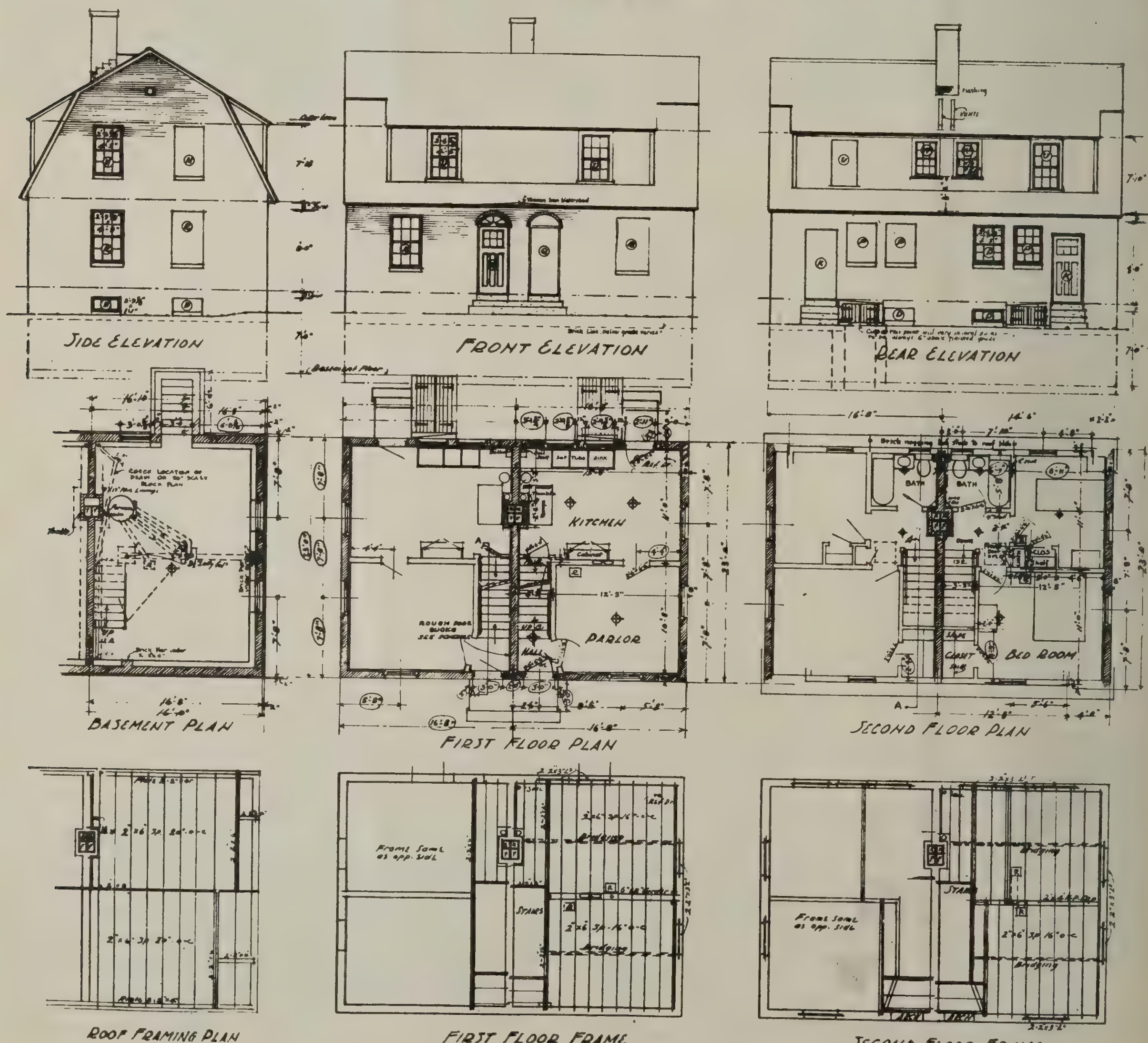


Fig. 8—Typical plan and elevation of a four-room, semi-detached house

The Money Value of Proper Color Selection---By A. H. Burt

What Color Shall We Paint the House? What Color Shall We Use for the Trim? The Answer is Not Alone in Personal Taste but in the Fact that a House May be Made to Look Larger or Smaller, Wider or Higher by the Colors Used and the Way they are Applied. This Article Explains How these Effects are Obtained

A PAINT MANUFACTURER once received a letter from a woman asking for recommendations for repainting a bicycle, so that it would look smaller. The office-boy opening the mail chuckled when he saw this inquiry for he thought he had "a good one for the boss to see." He was very much surprised, however, in the afternoon, when he saw the reply which was going out to the inquirer, giving very definite recommendations for securing the result which she desired.

During the War the average American citizen learned a whole lot that he never knew before about the power of paint to create an impression through the eye which is entirely deceptive. The great need for disguising objects, or camouflaging, as it is called, brought about by the war, has resulted in the recognition of the power of paints to create the impression that a rather tall, narrow house is wider than it looks, and that a broad low house is taller than it looks. The protective, preservative and beautifying powers of paint are quite generally recognized, but the subject of the use of color for the purposes aforementioned is not a familiar one to many.

Stories of what paint colors have accomplished for people understanding their use are quite common. One which the writer heard but a short time ago, was about a builder who operated on a modest scale, buying lots here and there, and building houses upon them, and then disposing of the houses at a profit. He had been quite successful in promptly selling a number of houses, some of them even before they were completed, and he was encouraged by this success to try a somewhat more elaborate type of house than he had been accustomed to build.

The house was completed and was placed on the market. While there were numerous prospects who viewed the property, he could not seem to close with any. All seemed to be well enough satisfied with the interior, but there was something about the exterior that none of them liked. Finally, in desperation, the builder sold the house at a sacrifice in order to get his money out of it. The man who purchased the house surprised him by immediately arranging for the house to be re-painted. The builder thought that this was strange because he had used the same color combination on other houses which he had built, and could not see why the buyer should apparently waste good money by re-painting a building which was not in need of paint.

A few days after the painting had been completed, he had occasion to pass the house again, and was startled by its changed appearance. It seemed as if the house had been changed architecturally. That was his first impression, but after noting the various details, he saw that nothing was changed except the colors of the paint and the manner in which these various colors were combined on the various surfaces.

This is but one example of many which could be cited, of the power of paint to recreate a building and increase its salability. Any builder erecting houses to sell, or for a client whom it is to his interest to please,

Plate 1—Example of the use of contrasting colors in small residential work. The darker colors would be used to better advantage if reversed on the second house to the right

can profitably devote some time to the study of the effect of color. The correct combination and use of colors will many times cause a prospective buyer to be so favorably impressed with a building that he will be willing to pay a little more money than he originally intended, because it suits him.

Generally speaking, there are three fundamental truths regarding the use of paint colors. These are: First, that light warm colors make surfaces appear larger. Second, that darker colors make surfaces appear smaller. The third is, that light grays or light greens do not alter the apparent size of a surface to any marked degree.

As a rule, light, warm colors, such as creams, yellows, and warm drabs, are more suitable for the small building, since such colors will make it appear larger. The darker warm colors, such as tobacco browns, brown drabs and golden browns, produce the best results on larger residences where it is necessary to employ colors which will not be affected by smoke and where the foliage is not so dense as to produce a dark effect.

When deciding upon the color treatment for a building, there are a number of things to be considered. These are:

1. What is the general style of the building?

2. Is it well surrounded by foliage?

3. Are there nearby buildings; if so, in what colors are they painted?

4. If the house stands alone, what is the nature of the surrounding country.

There are some styles of architecture which almost require a certain type of color treatment. For example, houses of the colonial type are usually painted in a light body color, with little or no contrast evident between the body and the trim. The sash can be in trim color or in black, the latter being desirable where there are no shutters and when the sash is not divided into small panes.

Where the house is well surrounded by foliage, light, warm colors like yellow, cream, ivory and warm lead, are desirable. White also is very good. Where the house is not surrounded by trees and shrubs, light grays and light lead colors are to be preferred.

Where there are nearby buildings, the color combinations of these buildings should always be taken into consideration, because the right selection of colors will make it possible for the buildings on either side to bring out the beauties of the one between and vice versa.

Paint of light color used on a small building surrounded by large buildings, which are painted in dark colors, will only make that building appear smaller by contrast. Under such conditions the small building appears best in grays or neutral colors, which harmonize with the colors used on the neighboring buildings. Large residences adjacent to smaller homes will appear better, and will cause the neighboring buildings to appear better if they are painted in greens or browns.

Natural surroundings influence the appearance of the building, so much so, that the landscape architect is often called upon to form the right setting for the home. Strong yellows and intense reds are not good unless green predominates in the surroundings, or is introduced by means of the roof color. The house which is isolated should be painted to make it a part of its surroundings.

Should a tall narrow house stand where there is little tall foliage, it may appear top-heavy. In this case all horizontal lines should be made as prominent as possible without destroying the unity of appearance. Gables should be in contrast with the body color, but should match the roof if practicable. Under no circumstances should the trim contrast strongly with the body color. Best results are secured by using a dark color for the upper part of the building, and a light color for the lower. Contractors and builders have made use of this fact in the building of houses on narrow lots, employing different kinds of building materials for the upper and lower portions, such as shingles for the upper portion and stucco for the lower. To the casual observer such houses appear broader, and this in turn affects the appearance of the lot itself, thus materially facilitating the sale of such a home.

Plate 2—With one exception, to be found in the half-timbered stucco and brick house, it is always well to have the upper body in a darker or duller color than the lower

Excellent examples of the use of contrasting body colors in small residential work appear in plates Nos. 1 and 2, although the darker colors could be used to better advantage if reversed on the second house to the right on plate No. 1, and the first house in foreground on plate No. 2. It is always well for the upper body to be in a darker or duller color than the lower, since the darker color on the lower body usually tends to detract from the appearance of strength and stability. There is one exception to this, which is found in the half-timbered stucco and brick house. The stucco of the upper part is lighter than the tone of the brick lower, but the vertical divisions of timber counteract the otherwise top-heavy appearance which a light upper produces.

A building can always be made to appear taller by trimming the body color with a lighter color or white, and selecting a color for the roof lighter in tone than the body color. Perpendicular lines tend to add to the appearance of height, while horizontal lines lend an appearance of width. If both perpendicular and horizontal lines are used on one surface, one counteracts the other, and do not tend to change the appearance of the surface in any way. Plate No. 3 shows two side-by-side dwellings which are good examples of the points the writer desires to bring out. If the house on the right had been designed with any horizontal trim, and that trim painted differently from the body, it would have seriously detracted from the appearance of the building by making it appear low and "squatty." An even worse effect would have been secured if the upper section of the house had been painted in a different color than the lower part. The house on the left is an excellent example of the use of perpendicular trim which very noticeably adds the appearance of height to the building. The first house on the left in plate No. 1 is finished without perpendicular trim, which makes possible the appearance of width which the architect undoubtedly desired to secure.

The treatment of gables must also receive consideration, as many modern residences are constructed with the gable as an important part of the building. If the gable is given prominence in the painting, a top-heavy appearance will result, as one might imagine when taking the house on the right-hand side in plate No. 3 for an example. Two treatments can be followed: The gable can either be painted like the body or finished like the roof. In some cases, one is the best; in other cases, the second method is to be preferred. Taking for an example the house just cited, it is evident that it would be a great mistake to finish the gables in anything but the body color.

At the present time there seems to be a tendency on the part of some to paint almost any type of a house in white, regardless of how it is located. Not infrequently, one sees a row of houses, all of different design but looking a great deal alike, due to the fact that they are all painted white. The beauty and purity of white can only be brought out through contrast, either with the green of trees and shrubs, or of buildings painted in other colors. Note how prettily the second house from the right in plate No. 2 stands out, being contrasted by houses painted in darker colors on either side. The white just seems to fit in with the architecture of this house.

Shutters which are so frequently used in residential work, add to the appearance of a house, and can be used to supply an additional note of color, as well as help to make the roof appear more a part of the house than it does when the roof color is entirely detached from the colors on the other parts of the house. Repeating the roof color in the shutters, is a great help in making all parts of the house form a satisfactory whole in the color scheme.

This covers all of the fundamental points in the selection of the best color treatment for a building with the exception of color combination. A discussion of this phase could easily develop into a lengthy, and highly technical affair. There are, however, three kinds of color combinations which will meet any requirements in exterior painting. The first is a combination made up of different values of one color or hue, such as a combination of light and dark greens. The second is a combination made up of related colors, such as a yellow and green combination, or a yellow and brown combination. The third is the color combination making use of contrasting colors, such as orange and blue, violet and yellow.

The first combination of colors produces a rather attractive and restful effect, but is not at all striking. The second combination invites the eye, and is not at all monotonous, and is generally speaking the most popular class of color combination as well as the one safest to use for a person not thoroughly familiar with color. With the third combination many striking effects can be secured, but this type of combination is dangerous to employ.

Plate 3—Illustrating the effect of trim

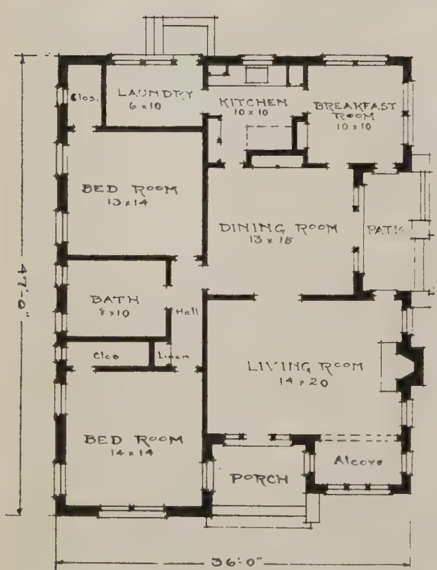
Hollow Tile for a Three-Story Building

A. L. R., Woonsocket, R. I., writes: "We are to build a 12-apartment house here in the early spring. We have been considering hollow tile for our exterior walls, under the stucco. We are in doubt whether this tile is strong enough for a building three stories high, without backing the same with a row of brick. Would you be so kind as to advise us in the matter?" *Answer*—Charles C. Crockett, chief engineer for the Hollow Building Tile Association, says in reply: "Inasmuch as some of the poorest grades of hollow tile manufactured in this country will offer a resistance of at least 700 pounds to the square inch gross area when placed in compression, it means that hollow tile can be used and has been done so very successfully, for load bearing walls up to a height of five stories. Even at this point the limit has not been reached. This is equally true of other types of masonry construction. The strength of any wall depends upon the strength of the weakest link and the weakest link in this case is the mortar joint. Hollow tile, in most instances, will develop more strength per square inch from a crushing standpoint than will any known mortar joint. Therefore, the strength of any hollow tile wall depends largely on the strength of the mortar joint used in that wall."

English Cottages in Los Angeles

By G. E. McDonald

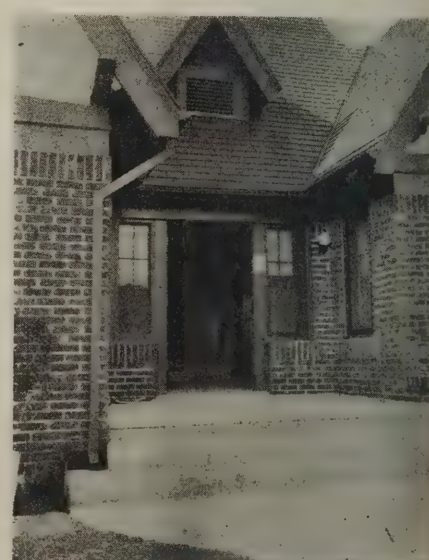
An English Cottage in Los Angeles. E. B. Rust, Architect



FLOOR PLAN

THE Edwards & Wildey Co., builders and realtors, Los Angeles, are completing the building of 60 high-class one-story houses of a distinctive Elizabethan, English cottage type on North Kenmore Avenue, Los Angeles, an exclusive residential section having Hollywood and the blue Santa Monica mountains to the northwest. This following the successful venture of erecting a simliar number of two-story residences on the next street east in the same tract a year ago, all of which attracted a most desirable class of buyers. Messrs. Edwards & Wildey have a temporary mill and workshops on a corner of the tract, where they dress and prepare their lumber and other materials used in the construction of these buildings. They are planning to open up, improve and build on the next block west in the near future, the same being now a vacant field.

The highest architectural talent obtain-



Entrance details

able has been employed in the designing of these homes. No two houses are alike. The builders have safeguarded the permanent artistic setting of their architectural gems by dedicating to the city a five-foot frontage on both sides of the street in this block, after planting same with an avenue of stately Cocoa Plumosa palms, which now comes under the care of the city and cannot be altered by individual property holders.

One of the cottages now being completed, an Elizabethan type of old English architecture, designed by Architect E. B. Rust, Black Building, Los Angeles, is shown herewith. As usual in the California summerland, special provision has been made for air and sunshine, and the dwelling has a stately dignity beyond that of any ordinary six-room cottage or bungalow.

Built of rough-faced brick and white mortar, it has a trim of similar brick laid

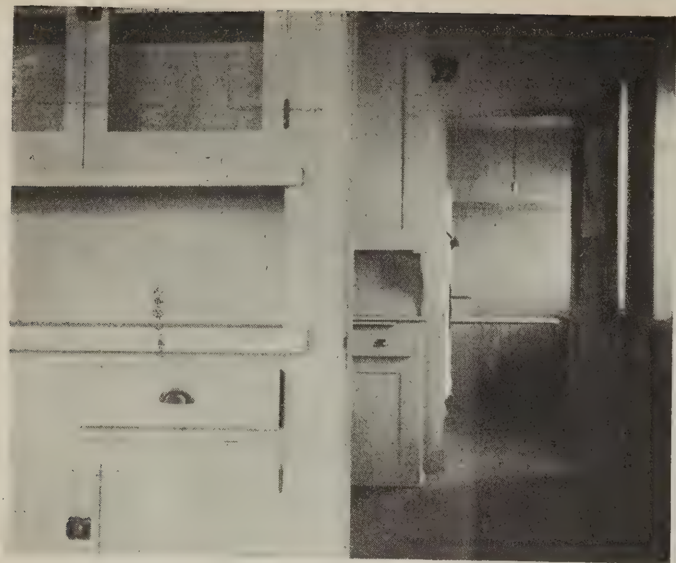
Another view of the English Cottage

French doors give an airiness to the interior arrangement

Built-in cupboards looking from breakfast room toward kitchen and screened-in porch

Built-in buffet with doric pillars and heavy mahogany counter shelf and ample cupboard and drawer capacity

Tiled kitchen sink and built-in features



Bathroom details. Note capacious built-in cabinets, and medicine cabinet and large shaving mirror

The back fencing, grading, planting of shrubs, the driveway and a well-appointed garage are all included

perpendicular in copings and window sills. The foundation, porch floors and steps are of cement, and the roof of creosoted shingles.

Floor joists are 2x6, with 14-in. centers, and the cross-beams are 4x4. Outside walls are 2x4 and inside walls of 2x3 studding, from 10 to 12 inches apart, well braced. Basement is entered through an outdoor bulkhead. There is an indirect lighting system throughout the house, and the central gas heating plant is in the basement—controlled from first floor. Floors are of 1½-inch clear oak.

Seasoned lumber and master cabinet work employed throughout the house. The moulding is specially effective, the French doors clinched the interest of the prospective buyer, and the built-in buffet with its doric pillars and heavy mahogany counter-shelf and ample drawer and cupboard capacity satisfied instantly. The breakfast room has built-in linen cabinet and china cupboard. The tiled bathroom has capacious built-in cabinets and has an extra light to the right of the mirror for shaving by.

There is a model kitchen, with built-in cooking cabinet, disappearing dough or bread board, and with a shelf projecting sufficiently to have the meat grinder clamped thereon. There are sizeable cupboards and smooth working doors and drawers on either side of the tiled sink, and it will be noted that in the case of the cupboards placed under the sink they are sufficiently out of the way to enable anyone working at the sink table to face forward, not sideways, as in the carpenter-made kitchen.

The laundry tubs and built-in ironing boards are in the screen porch, and the hot water heater also is located in the porch.

The woodwork is in old ivory throughout the house, two coats of flat rubbed down five times to an eggshell finish.

Safety as the Builder's Business

By Charles Cressey

DURING my student days there occurred a noteworthy judgment in which the builder was made directly responsible for the collapse of a beam, despite the fact that he had literally followed the design of the architect concerned. The eminent judge took the unexpected view that the chief business of the builder is to build safely, and it is for his assumed competency in this particular that he is entrusted with construction work. In the case referred to the builder admitted foreknowledge that the design was defective and that he had not called the architect's attention to the fact. Apart from the latter feature there is excellent logic and human interest in the view that safety is the first duty of a builder towards his client, no matter what question of divided or entire responsibility for failure may arise with the architect or engineer. Run to extremes it would appear that the builder must actually refuse to proceed with work defective in safety of design, and it is doubtful if the responsibility could be relieved should he proceed with suspected weak design even after protest, the presumption being that in proceeding, he accepts the design or its amendments as satisfactory to his technical knowledge of safety. This makes a pretty kettle of fish for Mr. Builder to fry, and taxes his skill in diplomacy apart from his skill in building science. However, in practice the professional man affected is usually anxious enough to take care of any slip in the work of his office, and the only instances I can remember to which the opinion of Friend Judge would apply are exactly ones to which the judgment should apply with vigorous force and effect, viz., where bad blood existed and for pure spleen the builder has carried out the precise reading of defective plans, proudly daring his "enemy" to take out the props. A few years ago a builder of my acquaintance "having had words" carefully propped a weak floor, and with equal care proceeded to plaster, paint and finish an expensive dining room, with the prop in place, calmly referring the amazed owner to the offending architect for explanation. Again in a Middle West city, the massive stone corbels overhanging an octagon corner were shored, the building completed, and the props handed over as a puzzle to the talented architect-author of technical books, whose absorption in mathematical data perhaps had caused him to overlook common sense back-anchorage to the stones in question. No doubt many corroborative cases will be recalled by readers, where the interests of the owner receive neither pity nor attention, much like the "poor little ram" in Mark Twain's version of the story of the sacrifice of Isaac.

That is the point at issue, viz., whose interest is the dominant one in a building enterprise—the unit interest of any party active in its construction, or the interest of final use and ownership? Except as paymaster (and a possible inconvenience if he fails to function), the owner is a less important factor in the minds of many building men than he should be, and it will do no harm to suggest that there may be a possible remedy should it be proven that there has not been *co-operative* action of all concerned, in the interest of the man who pays and who not only needs the building sound, but also needs it soon.

Dormer Windows

By John Y. Dunlop

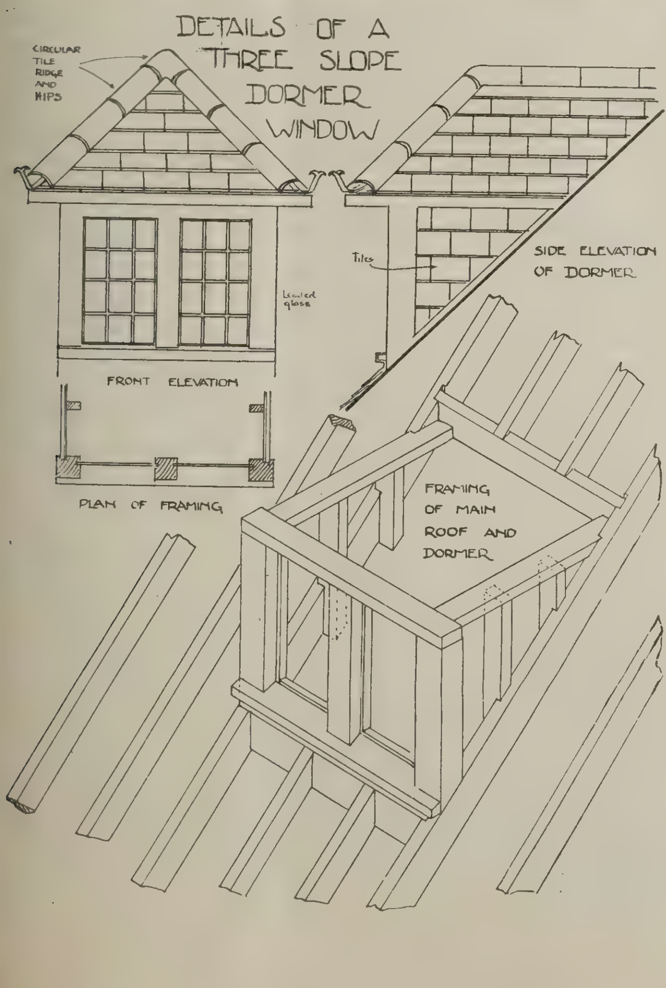
IN the old days oak framing was employed where possible and even in dormers the general framing was of timber, 5 to 6 inches square, mortised and tenoned into each other and pinned where necessary with oak pins. Curved braces were very often inserted in the framing, not only for strength, but also as an aid to the design. The timbers were often tarred in these old houses for the sake of preservation. If pine is used it may be similarly treated or the surface may be left as a natural face.

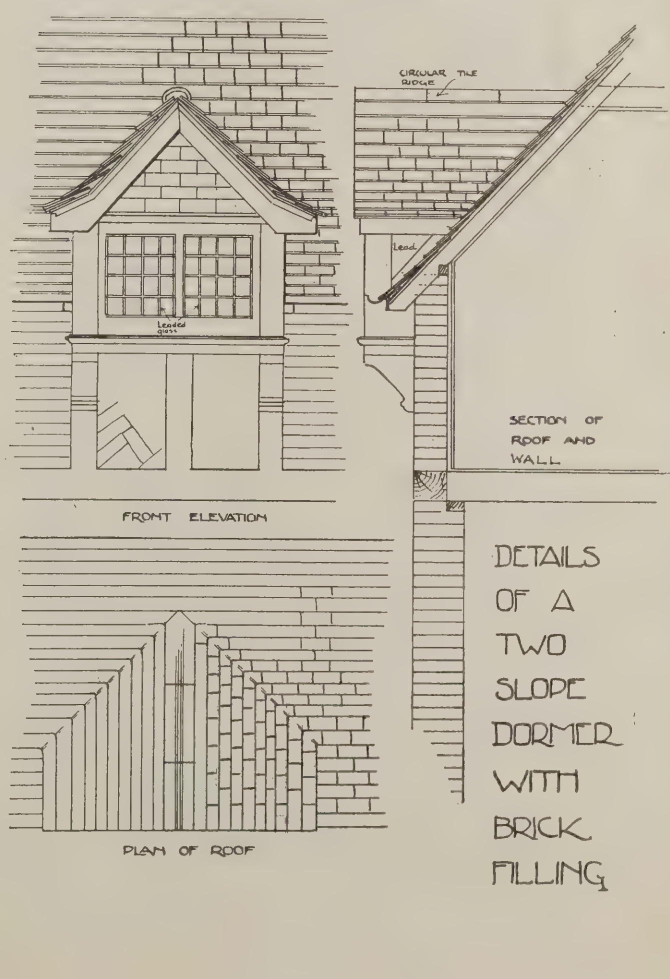
A quaint and picturesque effect may be obtained by allowing the dormer to project as in the example shown in Figure 1. The framing is cantilevered over the face of the well underneath and is often strengthened by curved brackets under the sill as shown in the sketch of this window. The corner posts are 6 inches square and the lintel under the brick gable filling is 6 inches wide by three inches thick. The header in this case is fitted in between the trimmer rafters, just below the dormer ridge board. Angle rafters are fitted between the trimmer rafters and the under side of the header.

Another form of dormer is the three slope dormer window shown in Figure 2. The position of the headers at the top and

Fig. 1—A dormer on an English building of ancient days

Fig. 2—Three-slope dormer window with tile roof and tile-covered ridge and hips





bottom of the dormer are shown in a sketch. Such headers are usually set in a vertical position so that the plumb and level cuts of these rafters may be readily made. Also, the lower edge being level, forms one of the ceiling beams of the dormer roof. The other ceiling beams are then checked down onto the plate. The corner posts of this dormer window are grooved on the back edge to receive the boarding and the tiles that cover the sides or cheeks also cover the flat part of it thus making the junction of the side of the dormer with the main roof water tight.

Flashing is used at the sill and sides, but no flashing is used on the roof as special tiles are made to fit into the internal angle of the two roofs at the flank. At the hips, the tiles are cut to the angle of the roof and the joint between the slopes is made good with half-round tiles bedded in cement. To prevent the hip tiles from sliding from their position on the roof, ornamented metal straps, which have their ends turned up at right angles to the slope, are screwed onto the lower end of the hips before the tiles are set in position.

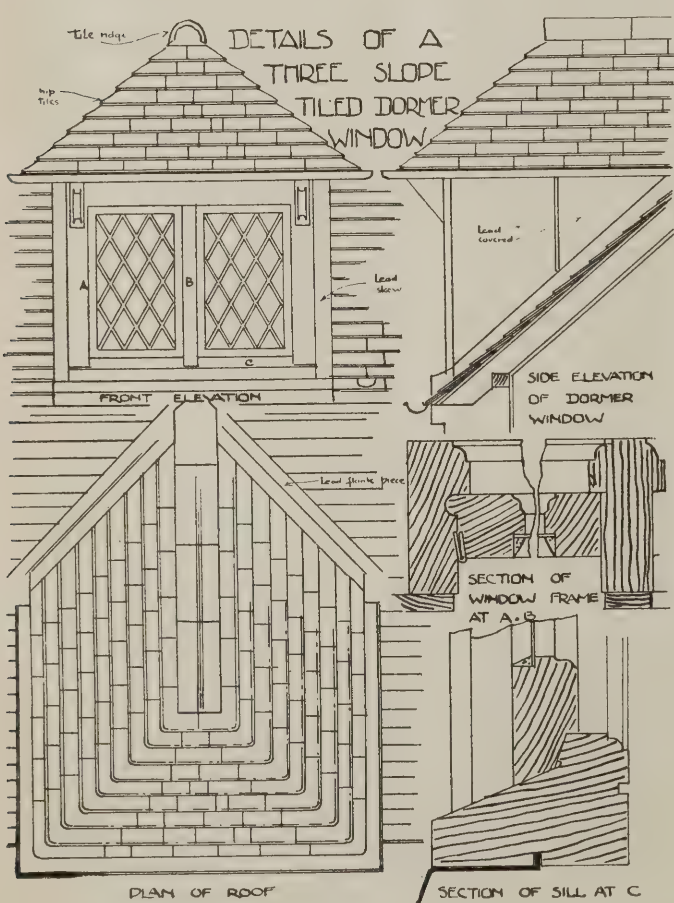
Another very interesting type of dormer with three slopes is shown in Figure 3. These windows are casements in which the sash are filled with leaded glass. The dormer is set out in line with the main walls of the house so that the dormer penetrates only the lower part of the roof and the sill of the casement frame is set directly on the top brick course of the wall.

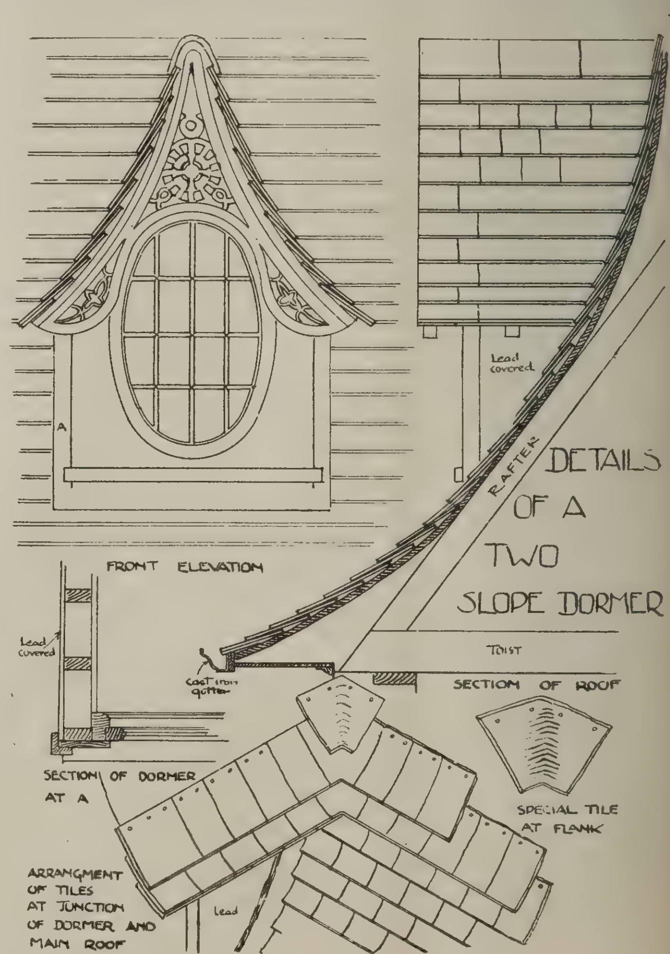
The right hand window in the halftone illustration shows the dormer dropped into the wall, thus making the triangular side or cheek much smaller in size.

In setting out dormers of this type the first thing to consider after the main roof timbers have been cut is the spacing of the trimmer rafters to receive the dormer. Then comes the fixing the position of the

Fig. 3—Quaint dormers are responsible for much of the charm of old work

Fig. 4—Two-slope dormer windows with elaborate fretwork barge board





header. A very good plan is to notch those two members together, allowing the header to be housed into the trimmer rafters for a distance of one-half an inch. The filling in rafters are then cut birdmouth over the header and well nailed.

The arrangement of the roof timbers is very much on the same lines as the last example only we have two brackets carrying the front projection of the roof. The sides or cheeks of the dormer are covered with lead.

There is no flashing under the sill in the right hand window, as the wood sill of the frame is bedded with mortar on top of the wall. In the window shown in the drawing the sill flashing is dressed over into the cast iron gutter.

Special hip tiles are used to cover the hips of the dormer roof while at the flanks the tiles are cut to the angle of the intersections and flashed. Very often the cut edges of such tiles are brought so closely together that the sheet metal valley becomes a sort of secret gutter. The danger with such an arrangement is that the flank gutter becomes too readily choked up with leaves and the usefulness of the method is thereby interfered with.

Dormers and features of a like nature are often formed more for ornament than use and I think this is very much the case with the dormer shown in Figure 4.

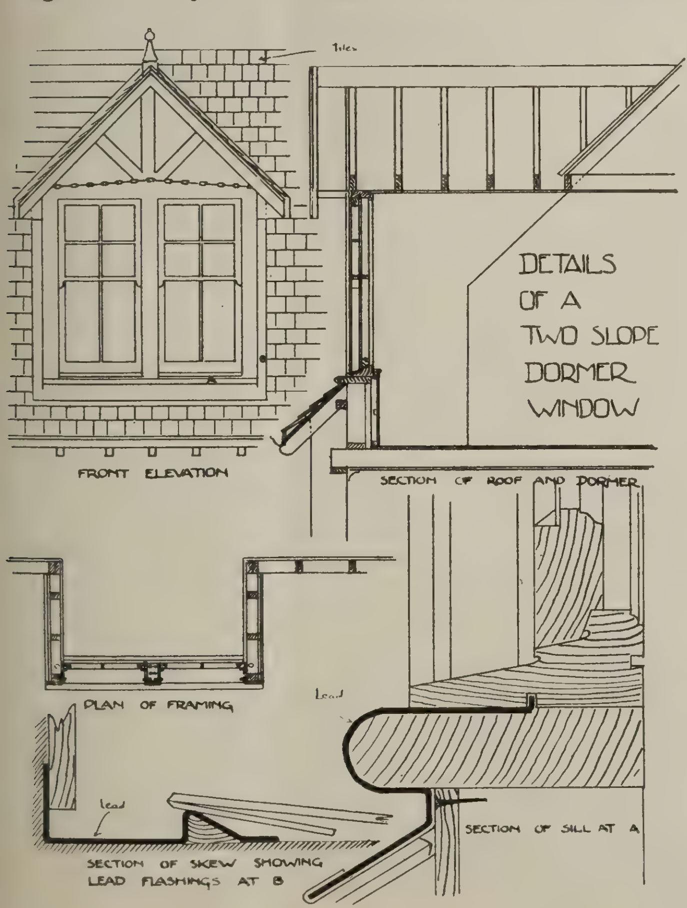
Here we have two dormers which have rather an elaborate specimen of a large board.

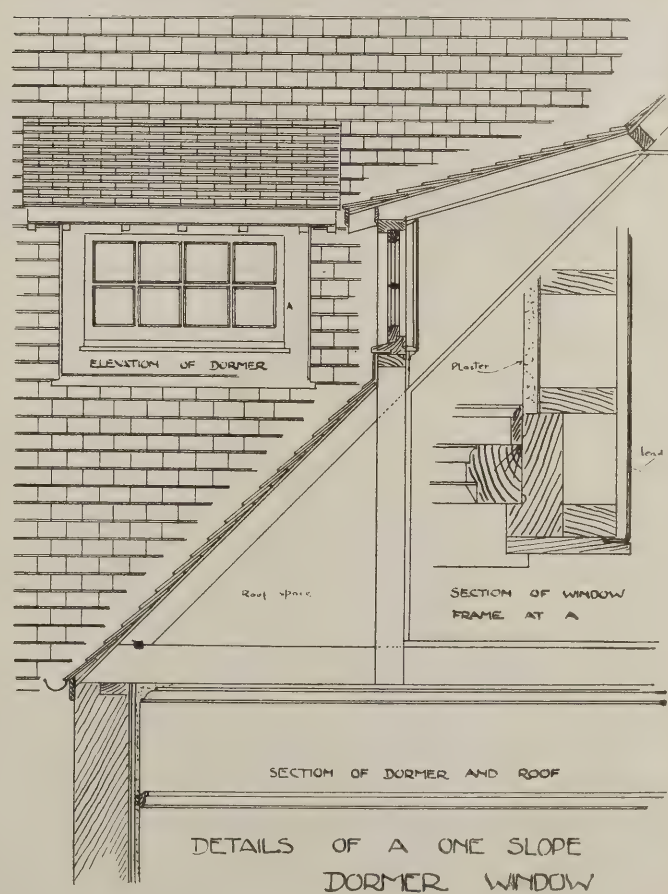
The main roof of this building is of the mansard type and the ridges of the dormers are about on a line with the junction of the two slopes. The lower division of the main roof is curved and the dormer roofs are of the same outline. Internally the ceiling of this window is also curved, following the outline of the top of the window.

The rafters of these little roofs would naturally be cut to a concave curve on the top edge. Where the dormer roof meets the main roof, a shape plate would be nailed on the main roof to receive the cripple rafters and also the ends of the roof boarding. The ridge piece and the plate on both sides should project past the face of the dormer to allow the bargeboard to be fixed to them.

Fig. 5—Two-slope dormer window of modern construction

Fig. 6—Modern one-slope dormer window





Internally the collar beams are fixed to the rafters and have shaped blocking to form the framing for the curved ceiling. A special blocking is used to form the junction of the dormer ceiling with the main ceilings. This would be drawn out full size in the same way as the shaped plate for the roof.

Flashing is required at the sill and up the sides of the dormers.

In this example the junction of the tile roof of the window and the main roof is made good with special tile as shown in the line drawing.

Figure 5 shows a two-slope dormer with timber and stucco sides and front which has been put up recently. Detail drawings are given of the various parts of the structure.

Another type of dormer which is very common is the one-slope or lift dormer type shown in Figure 6.

Roofs of windows in this class of work are very often built with a very small slope, but where the roof is to be covered with tiles, slates or shingles, the slope should be at least 30 degrees.

The greatest disadvantage of this type of dormer is that it is almost always impossible to form a level ceiling, as it is usually more practical for the ceiling to follow the line of the underside of the dormer rafters. However it is a very cheap and simple form of dormer window and for that reason is frequently used for small houses. As will be seen from the line drawing it can be easily constructed and when the roof slope is sufficient and the intersections and sill are properly flashed, it forms an absolutely tight and comfortable dormer.

Shingles and Shingling

Charles Anderson, Chicago, Ill., writes: Having read with considerable interest the different opinions as to the lasting qualities of shingles and the cause of shingles warping, as set forth in the November and December issues of National Builder, I have felt prompted to a still further discussion of that form of roof covering.

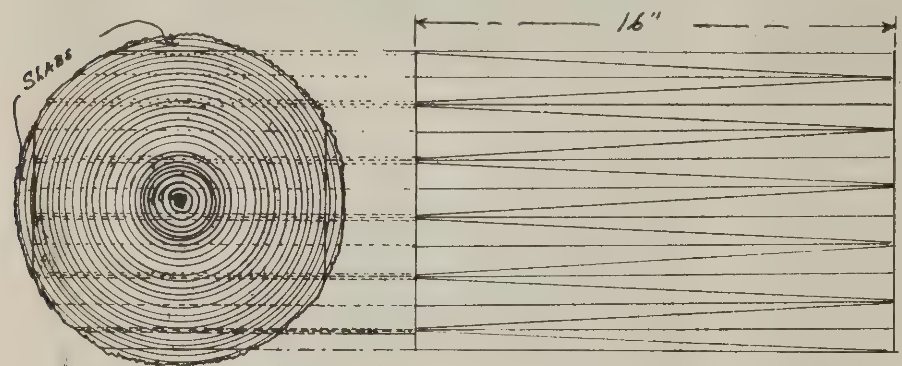
Many look upon the shingle as not worthy of much thought, and the laying of the same as not requiring much skill. This is not the case. As a matter of fact, a great deal of skill is required in the production and laying of shingles. Old-time builders know that the shingle roofs of today do not have the enduring qualities of those built in earlier times. Some 10 years ago I had occasion to remove an old shingle roof which had seen service for 30 years, and found the shingles still in a fair state of preservation. Recently I was called in to repair a shingle roof which had been in service for 10 years, and found it almost done for. What is the reason for this difference?

In my opinion the trouble lies partly in the production of the shingle and partly in the laying of it. When shingles first came into use as a roof covering they were made by the splitting process; only the very best of straight grained timber could be used, consequently the shingles were straight grained and would last indefinitely. Then came the shaved shingle, made with a large rotary knife. This shingle was cut thinner at one end than the other and did not differ much from the sawn shingles we have today. Straight grained wood was no longer a necessity, for the knife would cut across the grain, and the straight grained shingle passed out.

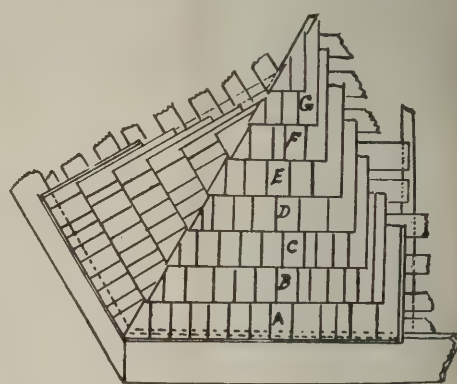
In the accompanying illustration, "A" is the end section of the log showing how the growth rings of the timber run round and round the log and from the grain of the wood. "B" shows the shingle block cut from the log to the length of the shingle. This block is cut into shingles as indicated by the lines drawn back and forth its length in "B", the two ends of the block being turned alternately toward the saw in order to conserve material in the shaping of the thick and thin ends of the shingle. The dotted lines projected from "A" to "B" show how the saw travels through the block from end to end, cutting in an oblique direction instead of directly with the grain. This oblique grain in the shingle is what Mr. Johnson showed us in the December issue of National Builder. Some old timber experts claim that shingles should always be cut so that the thick end will point toward the butt of the tree, but this would incur a great waste of material and the modern process gives us about as many shingles cut with the thick end toward the top of the tree as toward the butt.

Another point has to do with the method of drying the shingles. It is only in late years that we have begun to use kiln dried shingles. Before, they were bundled and piled in the yard to air season. It is my opinion that kiln drying is injurious to the wood fibres and shortens the life of the shingles.

As to the cause of shingles warping, we know that timber warps when it shrinks or swells more on one side than on the other. This is a natural law and next to impossible to overcome. As a thin shingle will dry through more quickly than a thick one, there is less danger of warping where thin shingles are used.



A B



C

The Science of Laying Shingles

There are many carpenters and builders who have never given any thought to the proper method of laying shingles, believing that all there is to it is to lay one shingle on top of the one below, nail them down well, and see that the joints do not come directly one over the other. In reality there is a science to it. Every little detail must be carefully watched, and the life of the roof can be easily doubled if the workman will use care and a little more time.

As to the proper method: Sketch C shows a portion of a hip roof carrying seven courses of shingles, *A-B-C-D-E-F-G*. Begin with the double course *A*, taking care that the joints are broken at least one inch, and nailing so that the butt of course *B* will cover the nail heads from half an inch to an inch. Follow with course *C* in the same manner, taking care that the joints in course *C* do not come directly over the joints in course *A*. It is true that course *B* has been placed to protect the joints in *A*, but in case a shingle in *B* should crack just over a joint in *A* there would be three joints in a line, and a leak would result. Continue this method of laying the courses all the way up.

If the shingles are dry, turn the hose on them well before you lay them. This makes them tougher in the handling and they will not split with the nails so easily. You can lay them close, edge to edge, when they are wet, but in laying dry shingles you should keep them one-eighth or one-fourth inch apart to allow for swelling. If this is not done, the first rain will make them swell and bulge, and a bulging shingle pulls hard against the nail and is almost sure to split. Shingles over eight inches wide should be split in two before laying. Use 4d. zinc or galvanized nails and only one to a shingle, set an inch or two from one edge. Do not drive the nail so as to sink the head into the wood. This causes the shingle to work up against it every time the wood swells. Make sure that no joints are permitted to come over a nail head, as the nail would soon rust out and leave a hole in the roof. Since the shingles are cut obliquely across the grain there really is a right and wrong side to the shingle, and care should be taken to place the right side uppermost so that the water will run over the grain and off rather than into it and down.

Building Costs and Estimates

The start

The finish

House built in one day by the Chicago Lumbermen's Association. Cost, exclusive of lot, $3,738.08

As a demonstration of rapid construction the Chicago Lumbermen's Association early in April gave a spectacular display of how a small house can be built in one day. The result is indicated in the accompanying photographs.

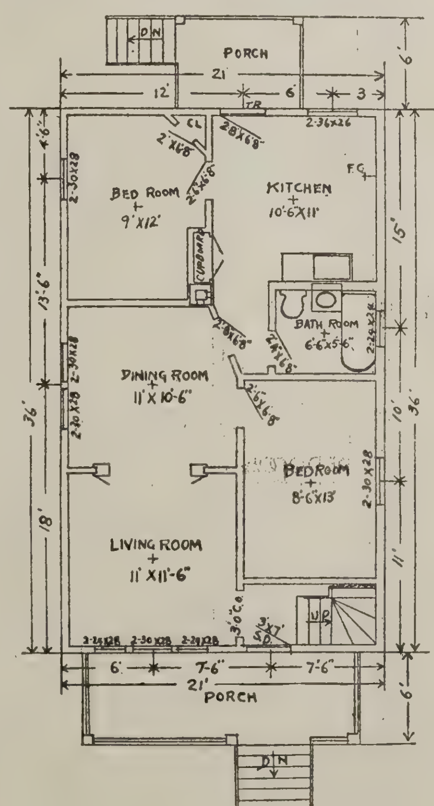
The interest of our readers, however, is in the cost as a basis of comparison. The price, including the lot, a $200 hot water heating system, and a cement basement plastered from floor to rafters, was $4,518.08.

It will be used for a month for demonstration purposes, and at the end of that time the association, according to N. C. Mather, president, will sell it for what it cost.

Detailed Cost List

Here is a detailed statement of the distribution of the cost:

Plans	$ 20.00
Survey	15.00
Permit	7.00
Excavating	80.00
Foundation and cement material, including sidewalk, area walls, stairs and basement floor	197.00
Chimney	34.00
Lumber and millwork	1,325.49
Plastering and lathing	308.00
Plumbing and sewerage	595.00
Electrical wiring and fixtures	108.00
Sheet metal	31.00
Hardware	80.00
Painting and decorating	175.00
Glazing	42.00
Window shades	22.00
Labor, other than included in above sub-contracts	498.50
Total	$3,538.08
Hot water heating system	200.00
	$3,738.08
Lot, 25x126—with all improvements	780.00
Grand Total	$4,518.08



"We built this house," Mr. Mather said, "to demonstrate to the public and to the bankers that the ordinary every-day fellow may have a home for less than anything between $6,000 and $10,000. The contractor who built this house says he will duplicate it, putting in the same high grade materials for the same figure.

"Our first estimate was that we could build such a house for $3,100, not including the price of the lot. What it finally came to without lot and the hot water plant was $3,538.08. That is what a man might put such a house on his own lot for, and heat it with stoves instead of hot water heat."

The house has hardwood floors throughout.

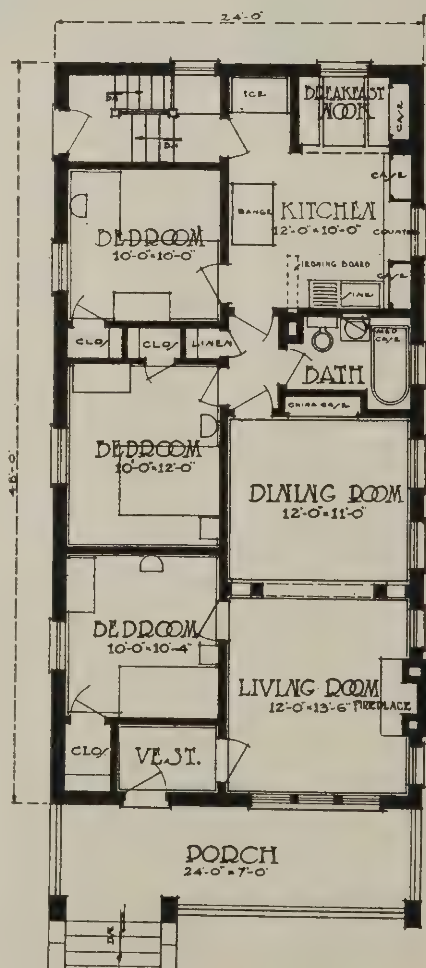
A Brick Bungalow

The Brick Manufacturers Association distributed at the Own Your Home Exposition circular matter illustrating and describing a brick bungalow, an illustration of which with a sketch plan is shown herewith. The figures then quoted were $5,956 for this house. Revised since the recent drop in prices, the estimate is $5,693, made up as follows:

Brick house submitted by Common Brick Manufacturers Association. Estimated cost, $5,693, Chicago prices

Cost of House Shown, Built of Solid Brick

1.	Excavating	$ 185.00
2.	Foundation and walls to first floor line, chimney and fireplace	833.00
3.	12-inch solid brick wall above first floor line, including furring on exterior walls, also porch walls and piers above grade	752.00
4.	Cellar floor and sidewalks	461.00
5.	Lumber, carpentry and millwork	1,335.00
6.	Finish hardware	75.00
7.	Sheet metal and roofing	175.00
8.	Lathing and plastering	352.00
9.	Heating	200.00
10.	Plumbing and gas fitting	700.00
11.	Exterior painting	50.00
12.	Interior painting	250.00
13.	Electric work	120.00
14.	Electric fixtures	80.00
15.	Shades	40.00
16.	Decorations	85.00
	Total amount of bid for solid brick house	$5,693.00



Help Wanted for Piqua, Ohio, to Have Building Show

Jos. S. Small, of the Superior Brick Co., Piqua, Ohio, announces that the Builders Exchange of that city is planning to give a Home Builders Exposition in the Chautauqua Building, which has a seating capacity of five thousand people and is situated in a beautiful park. The Builders Exchange wants every new and modern way of building and equipping a home with modern conveniences to be represented, and invites correspondence with suggestions to that end. At present there is no building going on and the co-operation of all interested is invited to aid in this effort to stimulate public interest and revive building in that vicinage.

Bird Houses

During the slack season many builders are hard put to keep busy. Many of them utilize time by building small articles in the shop during the season. The articles usually find a ready sale and altho the profits are seldom large, their manufacture will keep a man busy and thus serve to keep one's mind and hands occupied.

Bird houses

Bird houses are comparatively easy to build, but are a rather tedious proposition unless a woodworking machine is used to simplify and speed up the work. Most of the parts can be got out on such a machine with a great saving of time and trouble. Some knowledge of the habits of birds is required, as the size of openings, use of porches, height of the house above ground and so forth are governed by the kind of birds that it is desired to attract.

HE HAS A PULL!

I went to get a tooth extracted. I didn't take gas and the operation was all over inside of five minutes. The dentist charged me $3. I am a building mechanic and served seven years' apprenticeship. That is longer than a dentist takes to learn his business.—*Frank Barry, Chicago.*

Bankers and Building

What Bankers Are Doing to Promote the Building of New Homes—Methods of Appraisal and Interest Rates

IN response to a letter inquiring of bankers in various sections of the country what they are doing to promote building, their terms, and methods of appraising values, the following answers have been received:

One of the largest banking houses in the United States—S. W. Straus & Co.—in order to encourage building has reduced the amount of their minimum loan from $500,000 to $250,000 and are now engaged in an active advertising campaign to promote building as an aid in relieving the present house shortage. They have just closed negotiations with Mills and Sons, Realtors, Chicago, for the erection of 300 two-flat buildings on the northwest side of Chicago. Work has been started on the first group of 100 houses.

ALABAMA

An Alabama Banker: We are prepared to make loans on residential property up to 50% of the value at 8% interest, no commission or collection charge. There is a fair demand for loans on new residential property. We advertise in a limited way that we are prepared to make such loans. It would appear that materials with the exception of hardware have reached normal but we believe labor will drop.

An Alabama Building and Loan Ass'n Secretary: We make loans on from two-thirds to three-fourths of the present value of the property. We take into consideration the moral risk and whether or not the house is to be occupied by the owner or tenant. We loan more on homes. In arriving at the value of our security we have three experienced men appraise it. The cost is reasonable—taking altogether all cost, including interest and premium the average is about 10%, as we are unable to secure money in this locality for less than 8%. We consider the present activity in building work to be normal and we have been able to meet all demands for loans without having to borrow. We do not advertise for either investment or loans—it is all we can do to meet the demand without advertising. We believe labor will drop about 33% but material can be purchased for cash on about as low a basis as it is likely to come with the exception of brick which we believe will drop about 40%.

CALIFORNIA

A Berkeley, Calif., Banker: We are prepared to loan up to 50% on residential property and we now have a very active demand for such loans. Our loans bear 7% interest and we make no commission charge. We do not advertise and we take no active interest in promoting the building of new homes. We anticipate a reduction in labor bringing a reduction in material, this we believe will amount to about 20%.

ILLINOIS

A Chicago banker: We have plenty of money to loan for the building of new homes but we are not loaning money on inflated prices. Our mortgage purchasing clients however, insist on income producing property as security for any mortgages they buy—that limits us somewhat in the making of loans. To illustrate, certain of our clients would rather purchase a 6% mortgage based on a loan of 60% of the value of the property if it is income producing than a 7% mortgage based on only 50% of the value if it is non-income producing. In appraising the value of any property offered as security for a loan we employ two experts—one an experienced architect and the other an experienced builder. The present cost is used as a basis and an allowance is made for shrinkage in value which we feel is bound to come when prices drop—usually from ten to twenty-five per cent is deducted from the present cost and we then have what we consider will be the value five years from now or at the expiration of the loan. Of course this rule is not ironclad. For instance we may find that the builder has chosen a site which will greatly increase in value—or an unusually attractive design which can be built for far less than appearances would indicate—in that case any drop in price of material or labor will be more than offset by an increase in the value of the property. Our service charge amounts to about 3½% of the loan.

A Chicago Banker: In making a building loan one of the very first things we take into consideration is the architect—he may be a very good architect and still not know how to design houses economically. Then comes the contractor—we look him up—does he use modern equipment? labor and time-saving devices? Does he make his collections promptly, does he pay his bills promptly—has he a cost system? All of these things enter indirectly into an inflated cost of the house—and we don't loan money on inflated prices. Then comes the site. Is it a good site? Will it increase in value? This plays a very important part in our decision. The design—does it harmonize with the surroundings—or is it a fine old colonial home stuck in a row of flat buildings? All of these questions must be answered satisfactorily and then we are ready to make a loan up to 50% of the value of the property at 6% interest plus a commission charge of 3½%.

INDIANA

An Indiana Banker: We are prepared to make loans up to 50% of the valuation of the property on new residential work. We charge 7% interest on our loans but we do not make a commission or brokerage charge. There is a very limited demand just now for loans of this character. We do no advertising. We believe the price of both labor and material will drop.

IOWA

A Clinton, Iowa, Banker: Banks under the supervision of the Banking Department of this state are not allowed to make loans for a greater amount than one-half the actual value of the property securing same, and this value is arrived at by a personal investigation and a general knowledge of the prevailing prices of surrounding real estate. We are now getting 7% semi-annual interest on residence property. We make a small service charge. We are taking care of all worthy people with respect to loans on residence property but find a very light demand just now (April 6, 1921), and while we do a lot of advertising we are not particularly anxious to make loans owing to the lack of liquidation by the farmers for cattle and grain which is being held for higher prices. It is from this source the banks of Iowa receive their deposits. It is our opinion that prices of material and labor will drop for the reason that the general public are refusing to pay what they think are high prices. There is a general sentiment, which is the opposite of the wild and unnecessary buying of a year ago. It is impossible to predict what percentage these prices will drop. The rule of supply and demand is still operative and naturally if prices of labor and material drop to any great extent there will be a rush by waiting builders which will raise the prices of these commodities. What we need from every one, both rich and poor, is a little old-fashioned economy and prevention of waste.

MISSISSIPPI

A Jackson, Mississippi, Banker: We make a personal inspection of the property and loan up to 50% of the value. Our loans bear 8% interest but we make no commission charge. There is some activity in new residential work. We advertise that we are prepared to make loans on new homes and we are active in the encouragement of home building.

A Laurel, Mississippi, banker: There is a limited demand here for loans on new homes, but we are prepared to make such loans at 8% interest. We take care of the taxes and have the property appraised by one of our officers before we make a loan. We do not advertise nor are we active in any way in the encouragement of home building.

OHIO

An Alliance, Ohio, Banker: We make loans on from 50% to 60% of the valuation and appraisals are made upon the personal judgment of the committee on property. We charge no commission and our loans are made at 6%. There is very little activity shown in our section in applications for loans on new residential work. We believe prices of both labor and materials will drop.

OREGON

A Medford, Oregon, Banker: We make loans up to 40% of the valuation on new residential property. We charge 8% interest but make no commission or brokerage charge. There is very little activity in our section just now in new residential work. We do not advertise.

SOUTH DAKOTA

A Mitchell, South Dakota, Banker: We do not advertise and we are not in any way active in the encouragement of home building—but we are prepared to make loans up to 50% of the value of the property at 7% interest plus a 1% commission charge. There is very little activity at present (April 11th) and we look for labor to drop, but do not anticipate any change in the material market.

TENNESSEE

A Greeneville, Tennessee, Banker states that they loan up to 60% of the value of the property after they have checked the builders' estimates and that their loans bear 8% interest. "There is very little activity shown in our section just now—no new building work to speak of. We do not see much indications of lower prices in either labor or materials. No, we do not advertise that we are prepared to make loans nor are we in any way active in the encouragement of home building."

VERMONT

A Vermont Banker: We make loans up to 60% of the valuation of the property this is the legal limit and we arrive at the valuation through judgment estimates checked with tax appraisals. Our legal interest rate is 6%. There has been very little demand for 3 years. We do not advertise that we are prepared to make loans except through our general advertising. We do not look for a drop in prices until the labor question is settled.

$5,000,000,000 for Dwellings

This is the estimate based on a shortage of 1,000,000 houses in the report of the Senate Committee on Reconstruction.

Recommendations to Congress on Housing Legislation

That the Government is beginning to take an interest in the home builder is apparent. The Senate Committee on Reconstruction has recommended the passage by Congress of ten legislative measures, and among them are the following:

An amendment to the Transportation Act directing the Interstate Commerce Commission not to declare without hearings an emergency which will give preference of priority in transportation.

An amendment to the Federal Reserve Act to permit the Federal Reserve Board to direct the use of savings and time deposits of national banks for long-time loans, thus giving such deposits greater security and supplying a source of long-term money for home building.

A home loan bank bill to provide for district home loan banks which may sell, under federal supervision, bonds secured by the aggregated loans deposited by the member banks.

An amendment, limited to five years, to the Revenue Act of 1918 to provide for the exemption from excess profits on the sales of dwelling houses where such profits, plus an equal amount, are re-invested in dwelling house construction.

An amendment to the Revenue Act of 1918 to exempt from taxation interest on loans up to $4,000 on improved real estate used for dwelling purposes when such loans are held by an individual.

An amendment to the Revenue Act of 1918 limiting the taxation of profits from the sale of capital assets by providing for their taxation as of the years of accrual rather than as of the year of their sale.

An amendment to the Revenue Act of 1918 to limit the surtax upon saved income to an amount not in excess of 20 per cent of such income.

An amendment to the Revenue Act of 1918 increasing the limitation on deposits as to amount and time and authorizing the rate of interest to be changed from time to time and providing for compensation of postmasters for the extra duties.

Opinions of Bankers

On the proposal for the amendment to the Federal Reserve Act, a prominent Chicago banker made strong objection, saying:

"It is impracticable. The loan banks, which became members of the federal reserve system through patriotic motives, would withdraw if they felt that the uses to which the money would be put could be dictated by the Government. Who wants to have the Government in Washington handle one's business?"

Extension of the postal savings system was objected to because it is not the Government's business to become a banker. The limiting of surtaxes upon saved income was approved.

Investment bankers generally approved exempting from taxation interest derived from loans up to $40,000 on improved real estate.

Concrete Houses in England

One of the new villages which are being built in Yorkshire, England, under the National Housing scheme. Thousands of groups of houses of this type are springing up like mushrooms over England today, due to the financial help which is being given under the government housing scheme. A concrete double house of this type is costing £2,000 today against about £650 pre-war price

Various Houses

Fig. 1—A well designed house with shingled walls. Note the shingle treatment at the rake of the gables. The dormer is of the sunk type with a wide porch below

Fig. 2—Another house with shingled walls. The overhanging second story reduces the apparent height of the house and at the same time increases the second floor area

Fig. 3—A very attractive small house. The brick walls are laid in English bond, thus adding to the interest

Fig. 4—A bungalow type with brick walls, and stained shingles on the gables

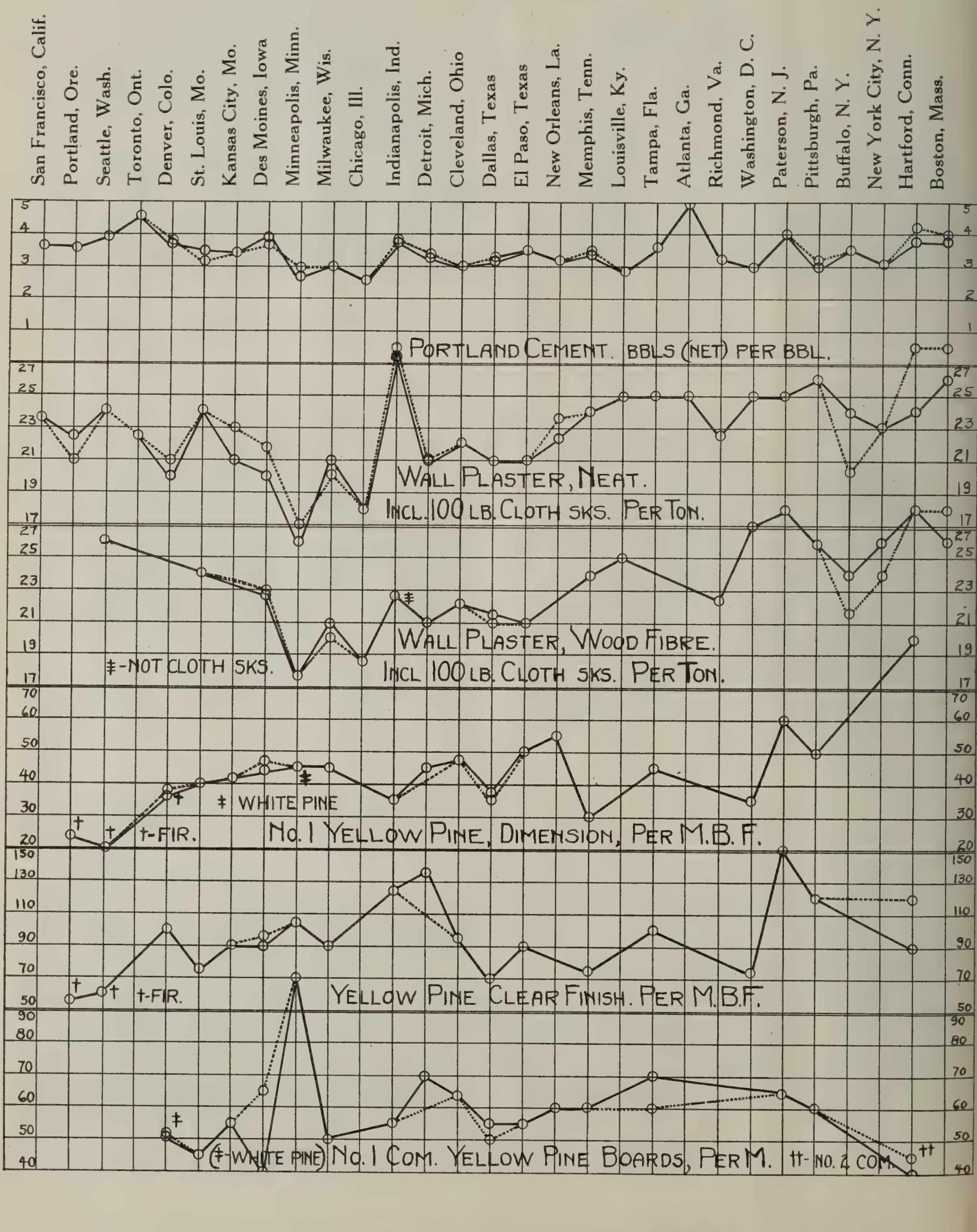
Fig. 5—A simple bungalow of frame construction with the wide porch contined under the main roof

Fig. 6—A bungalow with a tile roof and walls of hollow tile having a brick finish on the face

Building Material Prices

THE following charts represent graphically the current retail prices of building materials based on figures taken from various published sources as of April 15, quoting retail, delivered on the job prices, and their variation according to locality.

Twenty-nine representative cities covering the whole country are quoted from. Prices of material are shown in figures as



dollars at the right and left sides of the pages. A circle opposite any city represents a quotation, and the amount of the quotation is represented by the figure at the sides of the chart.

No circle, or plotted point, means no quotation from that city. For example: Denver, Colo., shows quotations of $3.25 this month and $2.75 last month on lime; no quotation on crushed stone; $16.00 last month and $14.00 this month on common brick, etc.

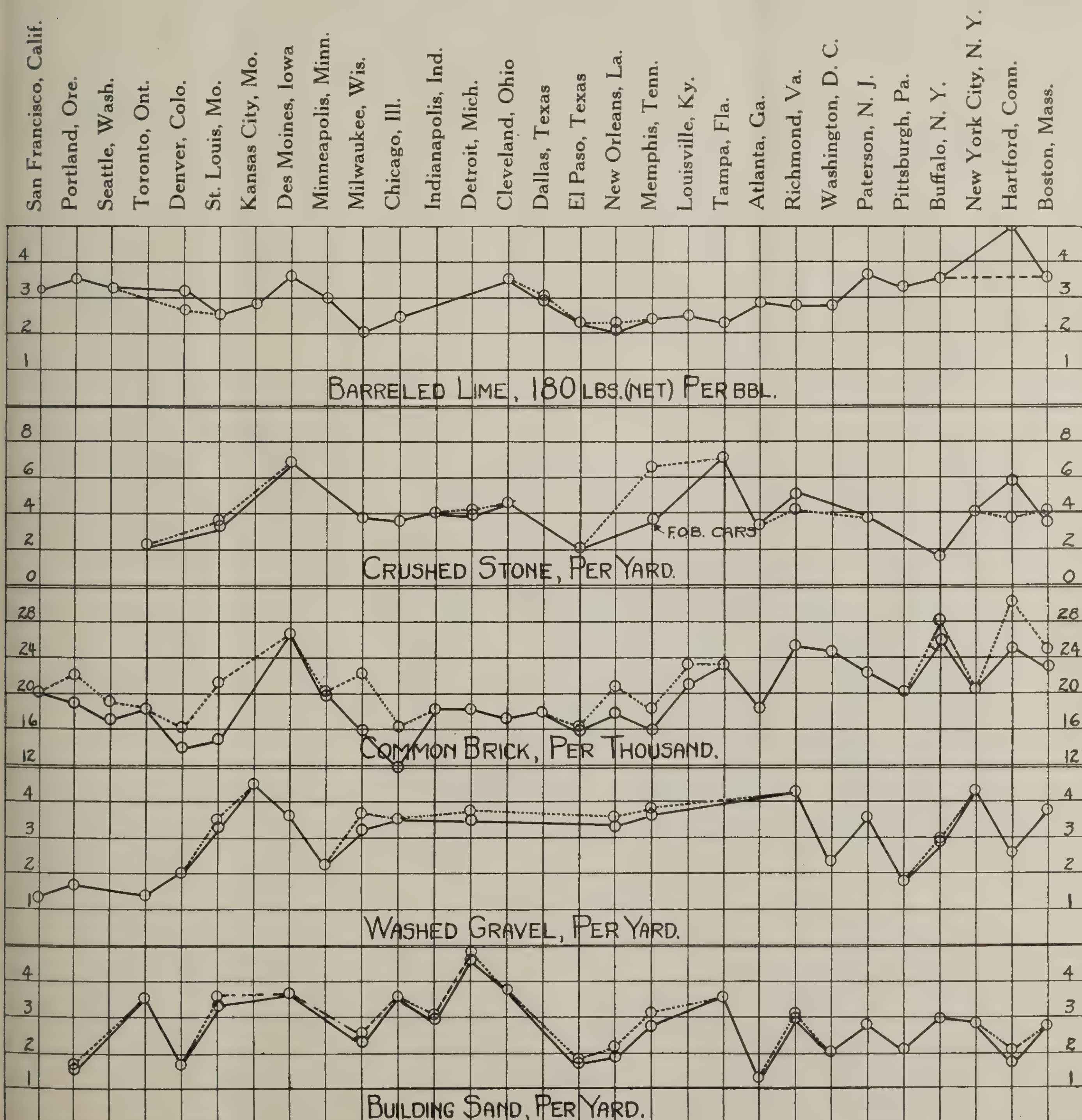
The broken, or dotted, line indicates last month's price quotations, and the full line the current prices.

In nearly all of the materials listed the price changes are of a downward trend. Note the changes in common brick; also the trend in sand, gravel, and neat wall plaster is mainly downward. The rest of the materials appear to fluctuate as much up as down.

The quotations in some respects are not complete, reliable reports from points included in the plan not having been received. These will be supplied as the charts are developed from month to month and advances or recessions shown.

Absolute accuracy is not possible under all the circumstances in the preparation of these charts. Their utility consists in their approximate accuracy in disclosing price tendencies and the relative prices in representative points in various sections of the country.

The co-operation of our readers is cordially invited in checking and correcting any inaccuracies in quotations from their localities. While the sources of information are sought from the best authorities—the most reliable is the man who buys.



Questions, Answers, Kinks and Discussions--L. V. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

The Class Will Now Come to Order

In the March issue F. Motherspaugh propounded a circle problem which we thought would create some interest. Just before press time a solution arrived from E. W. Cook which was placed in the April number. Shortly afterward John L. Ober, Savannah, sent in a solution and diagram, and followed it later by a strong exception to Mr. Cook's solution. Some other milder protests followed, among them one protest and two solutions by Carl A. Hellman of Washington, D. C. These are shown in the order stated.

To clear the ground a trifle let us say, first, that if the lines connecting the centers in the problem happen to cross the circles at their points of tangency Mr. Cook's solution is correct. Second, that, if the mutually tangent circle is given, the easiest method of finding the center is to form any triangle within its circumference, bisect two of the internal angles and take their intersection as the center.

(Note also if you slice a cone parallel to its surface or element you generate a parabola. If you slice at any angle closer to the center or axis of the cone you get an hyperbola. Since most mathematical cones are double, that is, two cones on opposite sides of a common vertex and on a single axis, the hyperbola is a double curve and has two foci. The parabola has only one.)

We will now remove the inner circle and send Mr. Ober and Mr. Hellman to the board to demonstrate.

J. L. Ober, Savannah, Georgia, takes exception to the solution to this problem given in the April issue of National Builder and offers the following one with this explanation: "The construction contained there (page 46, April issue of the National Builder) would be correct under only one condition and that one condition would be when the three given circles are so located that the point of tangency of the required circle will fall exactly on the point of intersection of the circumference of the circles and the line drawn from the center bisecting the angles of the triangle formed by connecting the centres of the three circles.

"In this case the method is a simple geometric construction of drawing a circle through three points. In attacking a problem of this sort, there is no known axiom by which one might assume these points of tangency, and therefore it is impossible for Mr. Cook to make such an assumption.

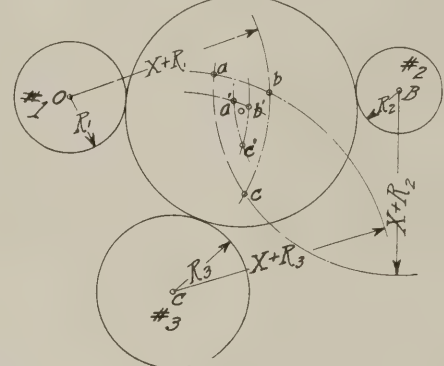


Fig. 1

"I have given a construction and also a proof for the solution of the above problem which will be true for any position of the three given circles providing they are not in a straight line. If you will note in this construction, I have made use of a simple problem in geometry of drawing a circle tangent to two circles. By taking each pair of circles in turn I find a line, any point on which will be tangent to the two circles. These three lines will intersect in a common point which will be the centre of the required circle."

C. A. Hellman of Washington, D. C., writes as follows: "I was interested in the circle problem propounded in the March number of National Builder and looked the matter up in several text books, intending to submit a solution. Lack of time prevented this, and now I find a 'solution' in the April number. Alas, it falls short of the mark as will be seen from the drawing below. The three given circles are *A*, *B* and *C*, and by applying the construction of the 'solution' to these circles we get the circle **K**, which should be, if the solution is correct, tangential to *A*, *B* and *C*. The discrepancy is obvious. The letters used correspond with those appearing in the printed 'solution.' The correct circle would be *K*', shown in dashed lines, and it is clear that the circle *K* obtained here does not even approximate in size or position to the true solution.

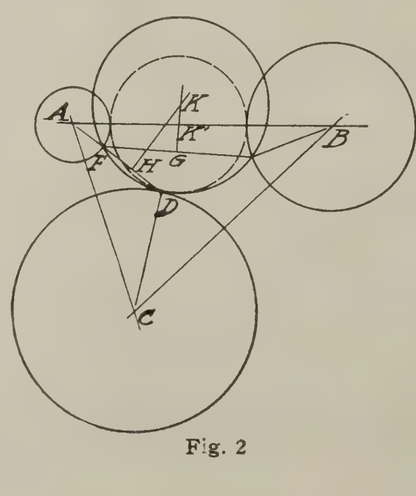


Fig. 2

"In explanation of the fallacy of this 'solution,' it may be stated that while the construction given *does* result in a circle passing through points *D*, *E* and *F*, it fails to fulfill the condition that said circle should also be tangential to the three given circles. By choosing a case where the angle *DFE* is approximately 60 degrees and where *FE* is approximately equal to *FD*, it is true that a circle will be obtained *apparently* tangential to *A*, *B* and *C* at *F*, *E* and *D* respectively, but the construction fails more and more glaringly as the circles *A*, *B* and *C* deviate from the particular case shown in the printed 'solution.' This is a good illustration of the danger of reasoning from a chance appearance of a figure as distinguished from a critical geometric study of it.

"The problem itself is ancient. Apollonius, who lived about 200 B. C., is credited with being the first to solve it, or rather to solve a more general problem of which the present one is merely a special case. I therefore claim no originality for the following solution, having merely simplified it slightly and left out some obvious steps.

"The construction is as follows, and it will be seen that it is by no means simple; the proof requires rather advanced geometry, probably out of place here, my sole object being to present a geometric construction which solves the problem.

Given: Circles *A*, *B* and *C*. To find: Centre of a circle *V* tangent to *A*, *B* and *C*. Decrease radius of each by the radius of the smallest, thus reducing circle *A* to

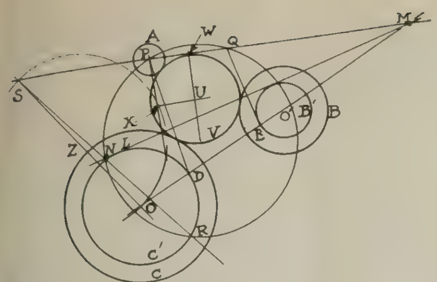


Fig. 3

a point P and reducing B and C to B' and C' respectively. Draw a line OO' through centres O and O' of circles C' and B' and draw a line LM tangent to C' and B' and meeting line OO' produced at a point M. Draw PM and PD. Draw EQ (from point E to line PM) making angle QEM equal to angle DPM. Draw a circle of any size cutting C' at some points N and R and passing through P and Q. (Obviously the centre of this circle lies on WU, the perpendicular bisector of PQ). Draw RN and produce it to meet PM produced at some point S. Draw SO and on SO as a diameter draw an arc of semi-circle OT, which will cut circle C' at T. Draw PT, and its perpendicular bisector XU. The point U at which this bisector XU meets the other bisector WU will be the required centre, and a circle V of proper radius drawn from this centre will be tangent to A, B and C. This solution is independent of the size and locations of A, B and C.

"While the above solution is accurate and theoretically correct, in practice I should prefer to find the centre U by the 'cut and try' method and in all but a few cases the result would be amply correct and far quicker than the geometrical construction. A friend of mine, formerly a professor of mathematics at a university, told me he once had a similar problem referred to him, the question to be determined being whether in an existing steam engine having three cylinders of different sizes there would be room to place a fourth cylinder of a known

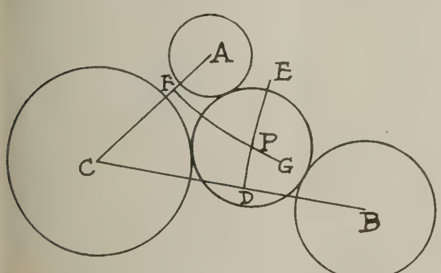


Fig. 4

size. He computed the answer to such accuracy that he was able to say that the given cylinder would just clear the available space by a few thousandths of an inch, and these results were verified upon arrival of the fourth cylinder.

"The simplest solution of the problem is perhaps the one here given. The given circles are A, B and C. Draw AC and BC, and at the central point D of the portion of CB outside the circle draw a hyperbola DE, with C and B as its foci; likewise draw the hyperbola FG from the corresponding point F on AC with A and C as its foci. The intersection P of these hyperbolas is the required centre of the circle tangent to A, B and C. This method is of theoretical interest only, as the hyperbolas are not readily drawn, that is, by the 'ruler and compass' allowed by Euclidean geometry. This solution depends upon the property of the hyperbolas that the difference of distance of any point on the curve from the two foci is always a constant, this difference in the case of hyperbola DE being the difference in radius of C and B, and in the hyperbola DE being the difference in radius of A and C. Hence any circle between C and B tangent to said circles C and B will have its centre on DE, and likewise any such circle tangent to A and C will have its centre on FG. The intersection of these two hyperbolas will therefore be the centre of a circle which is tangent to C and B as well as C and A. In other words, it will be tangent to A, B and C.

"Trusting that I have shed some light on the subject, I hereby abandon the matter to the tender mercies of such as care to wade through it."

Ellipses

Last month Mr. Fraser's ellipsograph was shown as an easy method for laying out this curve in any proportion. I had to come to bat with a quick solution the other day

Forming an elliptical brick arch

when the carpenter who was building a porch trellis for me said he had forgotten how to lay off the elliptical arch at the top. To make it impressive, I said: "The sum of the distances from any point on an ellipse to two points within the ellipse, called foci, is constant and equal to the long diameter of the ellipse." He marked off the span and the rise on the board, then with a piece of cord and a pencil I marked off the foci on the long diameter, using half the span as a radius and the top point of the rise as a center. Driving a nail at each of the two foci, we looped the cord from the nails around the pencil point at the top of the span, and as he held the cord snug to prevent slack I traced the ellipse from one side to the other. He laughed when I told him that a carpenter had shown me that method and several other geometric methods a good many years ago.

An Irregular Roof

W. C. A. S., Chicago, sends in another solution to the roof problem submitted by A. J. and discussed on page 52 of the October issue of NATIONAL BUILDER. "When A. J. tries to frame his roof as shown there, he will find himself in trouble as a uniform pitch cannot be obtained in the manner shown. The solution given herewith will do the trick. It can easily be seen that if he tries to use the former method his common rafters will be about four feet

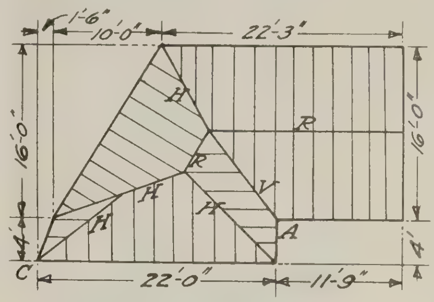


Fig. 5

above plate at point indicated at A in the accompanying sketch, if a half pitch is used. We must put in a valley, as at B, also another hip as at angle C. As the foot of hip at angle B sets on the level plate there is no other way to obtain a uniform pitch. The letters on the sketch signify as follows: R, ridge; H, hips; V, valley; the commons, jacks and cripples show for themselves."

Sill Construction

W. J. Beehn, Newfoundland, Pa., writes us as follows: In regard to Lindberg sill constructed (page 43 of the March issue) with the basement wall around the joist or between the joist and floor line, I would think the end of the joist would decay quicker as it is tightly enclosed and no air can strike it. However, it is not a good method to put basement walls around joist to floor line because the joist will shrink and the building will settle and the concrete will push the floor up. Especially where floor boards are laid parallel with wall. The same thing would happen should the sill decay. I speak from experience.

Ventilators

An anonymous kink is submitted with the request for readers' opinions.

In a small two-story house the chim-

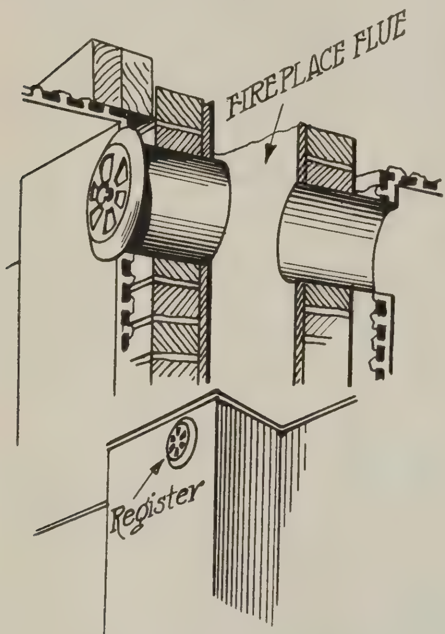


Fig. 6

new containing two flues, 8x12-in., runs up through a bedroom. Since the attic is too small to have much cooling effect during the hot weather, the builder has inserted thimbles on opposite sides of the chimney and into the fireplace flue. Their location is about 13 feet below the chimney cap. These thimbles open directly at the ceiling of two bedrooms and are sealed with circular registers. The idea is to draw off the hot stagnant air during the hot weather, thereby cooling the ceilings and making the rooms more comfortable.

Pendulum Saw Pays for Itself in Yards

A contractor who did considerable salvage work found that it was necessary for him to keep a sort of lumber yard separate in which could be kept the material worth saving. Periodically, this material would be sorted out and that which was not worth further attention was piled in the yard.

Then during slack hours and half hours this material was cut into stove and furnace lengths with a pendulum swinging saw, as shown in the photo.

The saw is connected with a motor and swings past the end of a bench which has been built for the purpose.

The outfit has proved more serviceable than a buzz saw outfit. The teeth are set very little, which lessens trouble in case a nail is struck.

Bench Dog for the Carpenter

B. W. C., Moncton, New Brunswick, says of the bench dog shown in Fig. 7: It is made from 3/16-in. sheet steel which is thinned down to ⅛-in. at the points. The head is 1¼ inches long, the body is 6 inches long and ½ inch wide and points *B* are 4 inches apart. To use it, place the board on the bench, with one end firm against the regular bench stop. Drive point *A* of the dog, which is sharp, into the other end, being careful to hold points *B*, *B* close to top of the bench; then drive points *B*, *B* into the bench top. This holds the board firmly in place, and it may then be sand-papered, mortised, planed, scraped, or whatever is

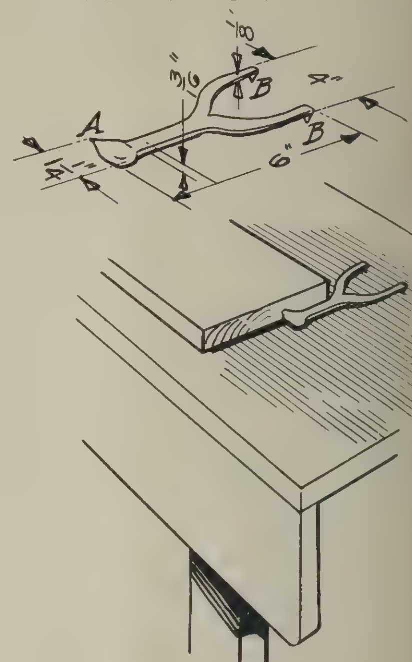


Fig. 7

necessary to be done. I have used this dog for years and no carpenter's kit is complete without one.

Pendulum saw pays for itself in the yard

A Butt Marker

A butt marker such as the one shown in Fig. 8 is quite a time saver. The operation is simple. Take a strip of wood or a piece of small moulding about three inches shorter than the door. Put a nail in the top, driving it in so as to let the head pro-

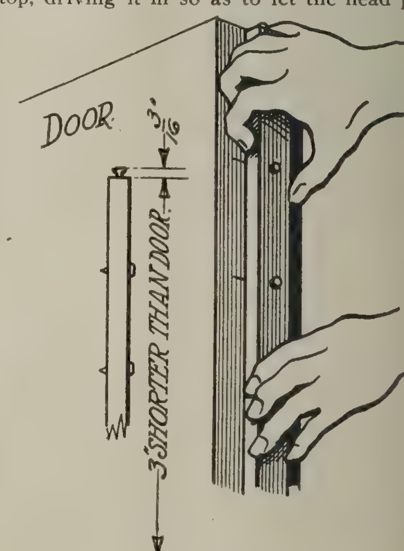


Fig. 8

ject the distance required for play on door head, about 3/16. Put four nails in the side of the strip so as to come exactly at the top and bottom of butts. File the nails projecting through the strip so as to have a cutting edge. Place on edge of door, with top of stock flush with the top of the door scratching with the nails projecting through the strip. For marking butts on jamb, place stick against jamb with nail on top of stick touching head of jamb and scratch same as door. This insures against mistakes on heights of butts.—*Fred L. Holt, Pearl River, N. Y.*

Nailing Spacer for Use on Wall Board

Walter Reeves, Kewanee, Ill., sends in the following kink, of which he says: I call it a nailing spacer for use on wall board, plaster board or where nailing is a prime factor for stability. It is a three-inch wheel (Fig. 9) divided into six equal parts on its circumference, brads being driven in at division points one-half inch from one

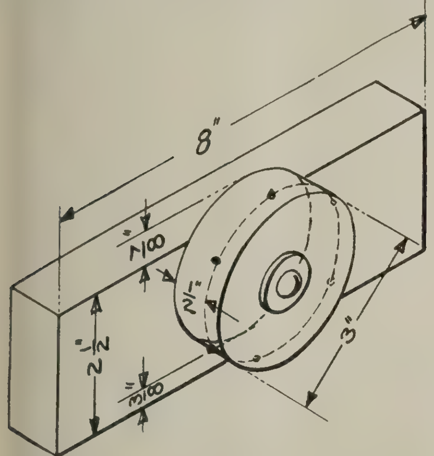


Fig. 9

edge. It is made of three-quarter inch material. It is attached as shown on sketch to a hand and guide block. That portion which is seven-eighths of an inch below the edge of the wheel is used to mark studding line between edges of board being nailed on; the three-eighths inch above the edge of the wheel is for edges and ends of wall board. To use with speed I mark edges and ends on the saw horses. Mark location, top and bottom of intermediate stud. Use a straight-edge on wall, only nailing on alternate dots, giving 3.146 inches between nails. I find that this gives a better and more uniform method of applying wall board than any other method that I have tried. If this sketch is one that will help some other co-worker I will be pleased, as I have been able to utilize other hints given from time to time in our worthy NATIONAL BUILDER.

To Paint on Copper

Copper does not take paint well and must be prepared for it. Make up and apply a solution of copper sulphate and nitric acid in water. This will slightly roughen the copper and so afford the paint a foothold. Some use acetone one part to benzol two parts.—*A. Ashmun Kelly.*

Shellac

A little gum camphor added to shellac (or to copal varnish) will make it more pliable or easier to spread.—*A. A. Kelly.*

Wrecking Construction and Clearing Building Sites

A contractor inquires where he can obtain a solution that will soften concrete or rock so that it may be scooped out economically. While concrete or rock can be dissolved by various agencies so far it is impossible to do so on a commercial scale. A chemical company in a Western city is reported to have sold stock in an enterprise to melt rock and cement with a solution sprayed through a hose. Statements were issued that the company had a contract for thousands of gallons to remove a mountain for a railway in Brazil. No stockholder has signed a complaint, though the district attorney is said to have been requested to inquire into the stability of the concern.

Let us hope that realization may come out of the most fantastic dreams of methods that will lessen human toil.

Following is a list of instances of various means used successfully in recent months in wrecking concrete, brick and in clearing building sites:

OXY-ACETYLENE USED IN BREAKING UP CONCRETE

In a building under construction in Cleveland, Ohio, considerable concrete work was put in through an architect's error. It was found necessary to remove the misplaced structure, and a crew of laborers assigned to the task attacked the concrete with sledges and drills. At the end of three days the progress made was so small that other and more rapid means of removal became imperative.

In the emergency a practical gas welder was called in to determine what could be done with the oxy-acetylene torch. A demonstration proved the feasibility of speeding up the work with the torch and the job was thereafter turned over to a local welding firm.

The method employed consisted of heating along the line of the desired fracture with an ordinary welding torch, using a long, bushy flame. The concrete was not raised to a great heat, as measured in terms of oxy-acetylene, but the heat was confined as much as possible along the proposed line of fracture. When so heated the concrete yielded to a heavy blow of the sledge, breaking off in the predetermined form and bulk.

This is not a new application of the oxy-acetylene torch, but, as it is a bit outside of its ordinary field, which is essentially the welding and cutting of metals, it is well to keep it in mind for emergency cases of the type noted. There are doubtless many other places where the torch might be advantageously applied in wrecking concrete, especially when for any reason the use of chipping or drilling is impracticable.

BLASTING ROCK IN BUILT-UP SECTIONS

I find that many contractors hesitate to use dynamite for blasting cellars in rock if other buildings are nearby. It is my opinion, based on long experience, that damage to buildings, and especially windows, is almost always caused by loading bore holes too heavily or by trying to break up too great an area of rock in a single blast.

Of course, the temptation is strong to put down a number of holes, connect up the charges in series, and fire simultaneously to get the cumulative effect resulting from that method of loading. Of course, that is the economical way, the time saving way, the way that should be adopted when the excavation is a safe distance away from other structures, but otherwise single-hole shots and small charges should be the rule.

At the Kent School, New Milford, Conn., the cellar was to be 36x26 ft. and 7 ft. deep. Rock extended 2 ft. above the ground; that is, 9 ft. of rock excavation. A 3-story glass-front building stood within 30 ft.

Several contractors refused the job because of the risks. By employing the following simple method, I got away with it without doing a cent's worth of damage:

Bore holes were drilled 18 in. deep and loaded with 1½ lbs. of 40 per cent ammonia dynamite. Charges were covered with four or five railroad ties chained together and fired a single hole at a time.

Only 70 lbs. of dynamite were used on the job, which was completed by three men in three weeks.—*James Veness, Connecticut.*

TAKING DOWN OLD STONE WALLS

It was October. An old house was to be torn down and a new one in its location was to be under roof before cold weather. The question with the contractor was how to get the old building down the quickest.

Six men, assisted by 25 sticks of dynamite, 75 blasting caps and 200 ft. of fuse had the stone walls in a pile in the cellar, and the foundation walls so loosened up that the stones could be lifted apart, in two hours. Two days later the debris had been carted away and the site was ready for the builders.

The dynamite had been loaded in bore holes about 4 ft. deep, spaced 4 ft. apart, against the foundation walls outside; in the four corners of the cellar under heavy mud-caps; and the four corners of the main floor, also under heavy mud-caps.

All charges were primed with electric blasting caps, and connected together in series and fired with a blasting machine. Of course, 25 sticks would not have turned the trick if it had been a large building with thick walls. The amount of dynamite to use on a job of this kind depends on thickness of walls and dimensions of building.

If the building is near other structures the loading would have to be different; that is, use light charges and loosen the masonry in small sections.

BREAKING UP CONCRETE INSIDE OF BUILDINGS

I have made a specialty of removing concrete walls, floors and foundations inside of buildings, using dynamite for the purpose.

The average general contractor is afraid to blast inside a building. It is probably just as well that he is if he hasn't an experienced blaster to do the work. But when properly done, a lot of time, labor and expense can be saved by blasting, for breaking concrete with sledges, drills and chisels is slow and costly work.

Possibly a description of a method I employed in blasting out a concrete wall under Foster's spring bed factory at Utica, N. Y., recently may prove of interest and value. The machinery was running and operatives at work all the time the blasting was in progress. An addition had been built to the factory 100 ft. by 80 ft. Shortly afterwards it became necessary to remove the old wall, which was in the basement of the new building.

The wall was two feet thick. I put a crew of four men to work with sledges and drills, making bore holes at points indicated by myself. The holes were 10 inches deep and four to six feet apart. Two or three ounces of dynamite was the load in each hole. Four holes were connected up in series and fired together with electric blasting caps.

The small shot gradually battered down the wall. Although necessarily slow, this process was much more rapid than would have been possible if we had attempted to break up the concrete with sledges. The labor cost was also smaller.—*George Sixour, New York.*

WRECKING A CONCRETE FOUNDATION

The International Agricultural Corporation, of Mulberry, Fla., control the largest phosphate fields in Florida, and their equipment runs into the millions.

They recently decided to enlarge their power plant, and in connection with this work put down some heavy concrete foundations for boilers and a 175-ft. stack. After the concrete had been allowed to set for about four weeks, and they were getting ready to build on same they found that the boiler foundations had soft spots in them and decided to tear out and re-build. The finding of soft spots in walls of boiler foundations made them suspicious of stack foundation, and it was also condemned.

The engineer on the job did not have much trouble in getting rid of the narrow boiler foundation walls, but when it came to the stack foundation he found that he had a different proposition.

This foundation was of solid concrete 7 ft. deep, and poured in three runs. The bottom was 22 ft. in diameter, second pouring 17½ ft., and third or top pouring 16 ft., monolithic type.

The engineer in charge at once thought of dynamite, but was afraid to trust the work of blasting out this foundation to any of the local blasters, as within 50 ft. of foundation was a million-dollar Diesel power plant and 15 ft. away a twenty-thousand-dollar Brown hoist, which could not be moved, as well as the new boilers and their fittings scattered all around.

He asked me to take charge of this work: I was requested to be very careful, not only to see that adjoining property was not injured, but the clay foundation must not be disturbed any more than possible by the blasting.

Holes were drilled 30 in. deep and 30 in. apart (staggered) for the first blast. This depth took holes just 2 in. below level of last pouring. I did this, depending on the weaker stratum between pourings helping to break concrete loose at that level (2 ft. 4 in.), which it did to an inch. These holes were loaded with one stick (half a pound) of 40 per cent straight dynamite and fired electrically. I used the straight dynamite on account of its quicker action so as to get this splitting between layers and between holes.

We obtained perfect results from this shot, the concrete breaking in blocks on the 2 ft. 4 in. level and between holes and was easily lifted out with the steam hoist.

The second holes were drilled 3 ft. apart and 3 ft. deep (staggered). We increased the depth of these holes so as to penetrate the first layer 6 or 8 in., to get a shattering effect on this bottom layer to as great a depth as possible without breaking through. The blast turned out just as I counted on, breaking the second layer nicely and shattering the bottom layer to about half its depth. After broken concrete was removed we put down just a few holes in last layer to put same in shape for handling.

Before each blast was fired the foundation was carefully covered with heavy timbers and these anchored with railroad ties to prevent any of the blasted material from getting away. We did not throw a piece of concrete out of the pit, and everything turned out fine.—*A. D. B.*

The "Home and Housing" idea in Chosen, Korea. The houses are built of stone, adobe and thatch. There is a liberal building code

Bricklaying

By Wm. Carver, Architect, and Andrew Pentland, Mason Contractor

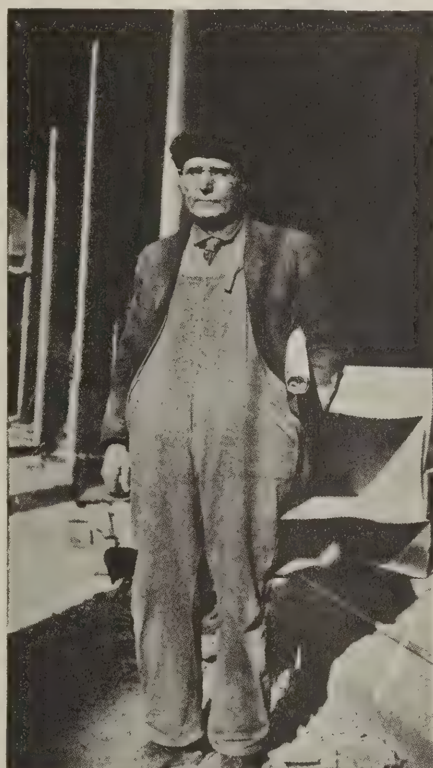
Views of a Master Bricklayer—Can a Bricklayer be Employed Throughout the Year —Opportunities in the Trade—Modifications of the Ideal Wall— Tests of Brick Construction

FRANK SCHREIBER has been laying and superintending brickwork for forty-one years, and this summer he's going to build himself an Ideal wall home, of the type described in the March NATIONAL BUILDER. This wall proved very interesting to Frank and the thirty bricklayers working under him on the new Masonic Hall in Cleveland, as it has to bricklayers and contractors generally all over the country. Frank and his men are glad that this low cost wall of brick is being brought to the attention of the building public, though it is not a new idea, for here and there is found a bricklayer or contractor who has employed this construction in one or more buildings in various parts of the country.

Mr. Schreiber learned his trade in Europe and thinks so well of the chance for success in his trade that he has trained his own three sons as bricklayers. He says that he always considered the trade as one of the best a boy could follow and the promotion of the Ideal wall is going to increase his chances by lowering the cost of brick construction and thus will tend to increase the demand for bricklayers, will give the men steadier work and open up more opportities for bricklayers to become general contractors. "Even in the past the average length of employment has been largely governed by the ability of the individual workman," he says. "A boy who conscientiously and painstakingly learns his trade and becomes a first class bricklayer can command pretty steady employment throughout the year. A poor mechanic is taken on when men are scarce and gets his time check when work slackens off." This is, of course, true also with every other kind of trade a boy could enter. The best men work to the top of the heap and are successful, while those who do not apply themselves remain somewhere down near the bottom.

Mr. Schreiber deplores the tendency of many contractors to sidestep taking on apprentices. He would think more of the movement to allow the individual contractor more apprentices if contractors were using the number allowed. The rules of the union at present specify each contractor may have two, but few take advantage even of this. Mr. Schreiber wants particuarly to urge every reader of the NATIONAL BUILDER who is a contractor employing brick masons, to take stock of the situation and as soon as work opens up to put on as many apprentices as he is allowed. The contractor will be the gainer in every way, both financially and in the knowledge that he is doing his part in passing down to posterity one of the most useful and practical of all the arts, the loss of which would leave the world appreciably poorer.

Mr. Schreiber also endorses what has been so frequently recommended in this department; that an apprentice be put to work at once on the wall. During his forty-one



Frank Schreiber, Master Bricklayer

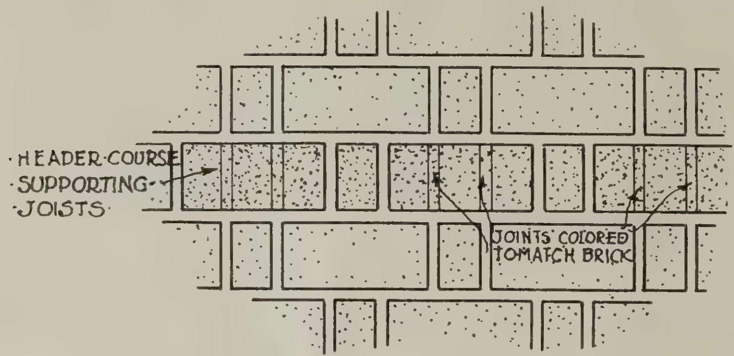
years of practical experience, he has taught many bricklayers their trade and the men he trains are in the A 1 class. Some contractors and foremen make a laborer of a boy for the first few months or even a year but Frank does not give any apprentice the job of wheeling mortar and brick. A bright boy, who might become a first class bricklayer, may not have the strength to do these heavy jobs, or even if he is physically capable, the prospect of putting in a long spell at that kind of work might disgust him and want to make him seek other and more agreeable employment. The very first day the boy comes on the job Frank gives him a trowel, puts him alongside a good man and turns him loose on backing up. Frank believes in being strict. He gives the boys hell, he says, but makes sure they are really learning; and in a very short time they are more than earning their salt.

"Far too frequently," Frank says, "the advantages of learning to read plans are not presented to the boy in the proper light. Not understanding what a great advantage this would be to him afterwards, not only in hastening his promotion, but also in making it possible to start in business for himself, he is inclined to waste his time in the evenings rather than do the proper amount of study."

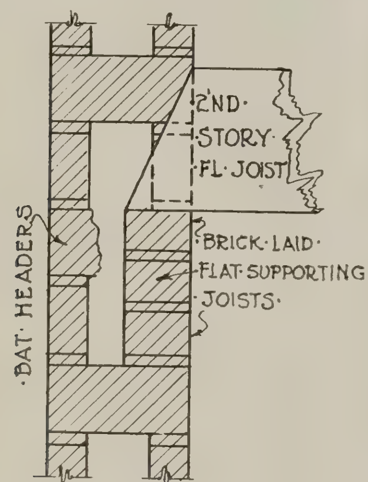
The following extract is from the working code and rules governing apprentices, issued by the Cleveland union. "The union would like to impress upon the apprentice or improver that it is to his interest and his craft to take up some technical education while learning his trade as he will find it very valuable in years to come in following the craft."

Speaking of the new home he intends building, Mr. Schreiber says that he will not follow the detail for supporting the floor joists shown in the March edition of the NATIONAL BUILDER. It will be remembered that this showed the joists resting on a solid course of headers, which raised the question of the appearance of this course from the outside. The possibility of producing the same header and stretcher effect of the other courses coloring some of the vertical mortar joints the same color as the brick was discussed (Fig. 2), but Mr. Schreiber feels that a better effect will be produced by laying the joists on a couple of flat courses laid in the backing (Fig. 3). The question of how to use the normal amount of bats in the wall was also discussed, and this will be done by substituting, for an occasional stretcher on the inside of the wall, three bats laid on edge (Fig. 4).

It is almost impossible for moisture to penetrate through the entire length of an eight-inch brick header under actual conditions in practice. Hard burned brick, such as are used for facing purposes, have low absorption, much lower, in fact, than the general run of masonry materials. A certain amount of moisture can, however, be conducted along a continuous mortar joint, either of cement or lime mortar. This is the reason for the general recommendation of the use of furring strips for all masonry walls, except the few types in which there is a break in the mortar joint in the direction of the thickness of the wall, combined with some provision for drying out the wall interior. Cavity walls of various kinds are in common use in England and have been found to fulfill the purpose in that climate of continuous driving rains. These walls are most generally built with specially long bonding bricks. Plaster is applied directly to the brick. Cavity or hollow brick walls eight inches thick, thus constructed, are dry and comfortable in all parts of the United States, experience shows, except in certain Northern sections, where there are long continued periods of intense cold, such as northern Minnesota, the Dakotas and Montana. In these districts either furring should be used or the wall made 12½ inches thick, with two cavities and two breaks in the mortar joint.



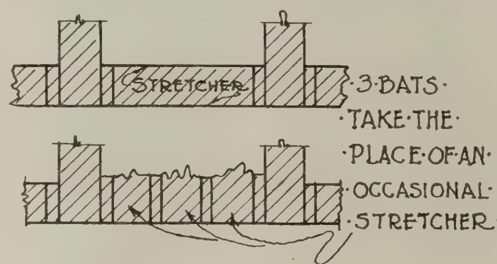
·FIG·2



·FIG·3·

Brick manufacturers are now recommending the elimination of furring with the eight inch Ideal wall, except in the localities mentioned.

That the laying of brick on edge may produce stronger brickwork per square inch of compressed area than when brick are laid flat, is the conclusion arrived at after studying the results of a number of tests. The Bureau of Standards conducted in 1918 a series of tests on large brick piers, using their ten million pound testing machine at Pittsburgh. The report (Technologic Paper No. 111) states that "failure by vertical cleavage is common to all concentrically loaded brick piers. . . . It follows, then, that any method of construction which would increase the depth of the bricks would increase the strength of the pier. . . . This may be done by (1) laying the bricks on edge instead of flat; (2) breaking joints every few courses instead of every course; (3) using bricks of more than ordinary thickness." Laying brick on edge is, of course, the most feasible of these three alternatives; breaking joints every few courses involving questions of appearance, and using thicker bricks being out of the question, since brick are now standardized. The report gives a table showing the percentage of gain in strength by this method of laying the bricks, from which the following is taken. Using the strength of a pier with brick laid flat, joints broken every sixth course as zero:



·FIG·4·

Method of laying bricks:

Brick on edge	Percentage gain in strength
Joints broken every course	43.8
Joints broken every third course	57.3

It is interesting to note that the piers tested, which were approximately 30 inches square and 10 feet high, were found to have an average ultimate compressive strength of over a million pounds, one specimen developing the enormous strength of 3,211,000 pounds; the specimen developing the least strength having a total resistance to crushing of 578,500 pounds. The actual tests were made with brick laid flat.

The conclusions thus arrived at tally with the results of tests made at Watertown Arsenal in 1907, where brick piers laid of brick on edge were actually tested.

The Bureau of Standards is now conducting tests to show the fire-resistive and compressive properties of Ideal and solid brick walls. The compressive tests are being made on panels nine feet high—a little over story height, panels being placed in the ten million pound crushing machine. Although brick has been used since time immemorial, it is interesting to note that this the first time eight inch and twelve inch walls have been scientifically tested. Their exact strength has been a matter of much speculation in the past, and the tests now being made will be of great value, not only to engineers but to practical builders.

In every kind of masonry wall the joints of at least the outside course must be filled with mortar to make the wall weather resistive, any complaints generally revealing the fact that poor grade workmanship is responsible. The accompanying photograph shows a careless style of workmanship—happily not often encountered—which will probably lead to trouble. In this case the workman has simply "buttered" the front edge of the outside brick, leaving the remainder of the joint open. If the horizontal joint above this course be "struck," the lower edge of the sloping surface may al-

Fig. 5—Carelessly laid wall

low water to drip clear inside the slight thickness of mortar thus buttered on and provide a clear passage to the inside of the wall. It is not often that such workmanship is encountered, however, and the services of a journeyman caught doing such work might with advantage be dispensed with.

Fig. 6—Proper way to fill a mortar board

Answers to Questions in the March Issue

1. The brick on the outside of a wall must be laid with care to preserve its proper appearance. It takes just as much time to lay a header as a stretcher, and the area of wall covered by a header is less than that covered by a stretcher.

2. Yes, but it is better practice to allow the mortar to stand for 24 hours before being used.

3. A brick window sill should always have a decided slope—more than the slight slope required for stone. The standard slope for a brick sill is 2½ inches to the foot. Never lay a brick sill flat, forming the slope with mortar. The mortar will crack and loosen in time and the sill may then drain water under the sill into the house.

4. Never more than eight feet.

Remaining questions will be answered next month. In the meantime, try your hand at answering them yourself and send them to the editor.

Also send in your questions and experiences to this department for discussion.

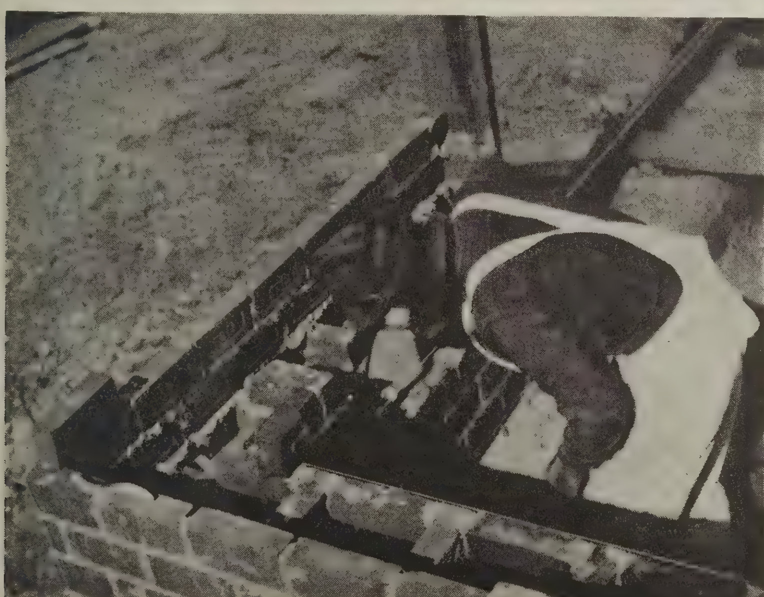


Fig. 7—Laying up Ideal all-rowlock wall

Old Brick House Quickly Demolished

It usually takes a crew of men several days to tear down an old brick house. The roof is first torn to pieces with wrecking bars; the bricks are then pried loose one or two at a time. Forty or fifty dollars is a low cost for a wrecking job of this kind, and it usually costs much more.

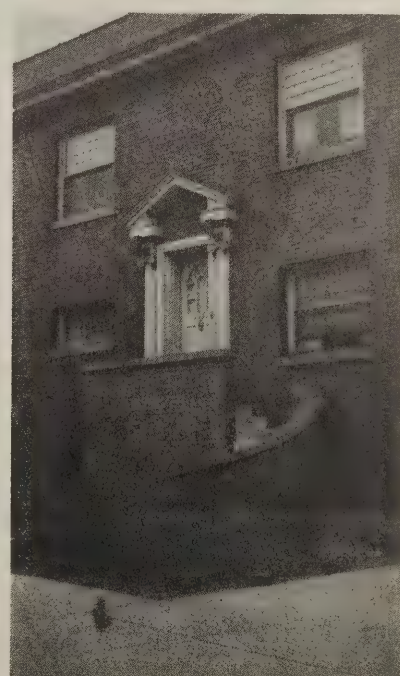
I recently wrecked a small brick house for E. Garner, Lothair, Md., at a total cost of $8.00 and the job was completed in two hours by two men. It was a 1½-story house of four rooms. Mr. Garner wanted to use the brick for chimneys. The roof was old and decayed; the lumber not worth salvaging.

This is how I did it: In nine holes in the wall where first floor joists had been, I placed one pound of 30 per cent ammonia dynamite, well packed in with moist clay. Holes were also made in the base of the chimney and at several places in the walls where the brick joined the stone foundation. A pound of the dynamite was also tamped in each of these holes. There were 15 holes in all evenly distributed on the four sides of the house; 15 pounds of dynamite was the total charge. An electric blasting cap was attached to each charge, and by means of the cap wires and copper connecting wire they were connected up in series to a blasting machine circuit and fired electrically.

The shot brought the walls down into the cellar, the broken roof on top. The old roof lumber was burned as it lay, leaving the bricks ready to be loaded on wagons and hauled to the new job.

Of course, this method is practicable only where the house to be destroyed is isolated more or less from other buildings. In this case very few pieces of brick were thrown far, but there is always the possibility that debris will fly several hundred feet and do some damage to roofs or windows of other buildings that may be within that range.—*Harry Gough, Maryland.*

Side Entrance on a Main Street

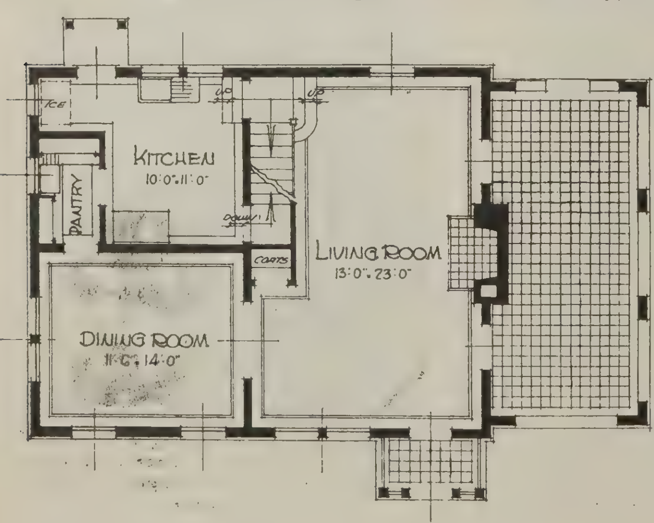


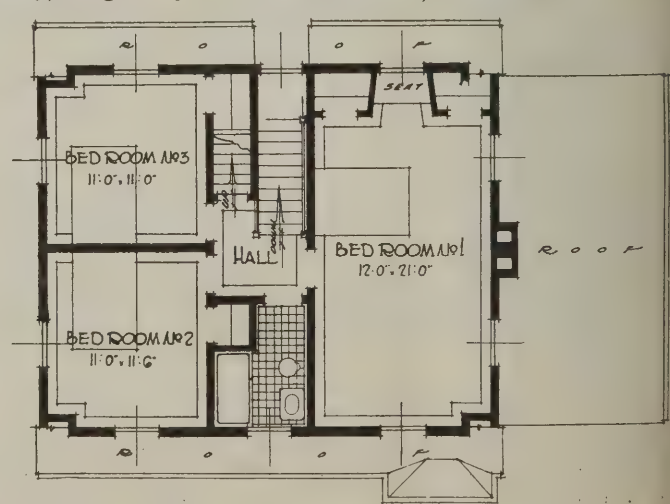
This method of obtaining a degree of privacy for a side entrance on a main street is used in a Chicago south side residence

A Small Colonial Cottage of the Dutch Type

THIS small cottage provides a comfortable home for the average family. The plan is rectangular in shape, all extensions and breaks being eliminated to reduce constructions costs. By a careful handling of the roof lines a low effect has been gained for the exterior and yet little room is lost on the second floor, and the third floor contains a maid's room and bath, the stairs coming up in a dormer on the rear. The lower roof pitch has a graceful curve at the eaves which are just above the first

This is the home of J. Halderman at Tenafly, New Jersey, designed by R. C. Hunter & Bro., Architects





…r windows. The upper pitch starts at …heads of the second floor windows and …airly steep, which gives room in the …d floor and provides a good expanse of …f which has much to do with the attract…ess of the house.

…he exterior walls are of shingles fin…ld white, the roof is shingle, stained …s green. Blinds and shutters are painted …le green and add much to the general …r scheme. The proportions of the win…s and the division of the panes are …thy of special note. The front walk is …row, laid with broken flag stone with …s between the joints and is much more …active than the usual glaring concrete …k would have been.

…ne enters the house through a small …ed vestibule—the usual hall was elimi…d and a larger living room made pos…e. This room has a large colonial fire…e with glazed doors on either side …ning on the living porch. On the op…ite side of the room is the stairway …ing to the second floor, with an entrance …n the kitchen to the stairway, a great …venience which in the small house …inates the necessity of a service stairs.

…he living porch was designed so as to …eadily enclosed with screens in the sum… and sash in the winter, providing a …sant room usable the entire year. Heat …lso provided for the winter months, and …le electric lighting makes the porch …rful and truly useful. The floor is of quarry tile.

…n the second floor are three family bed…ns with good closets, and one bath room. … bath room has a tile floor and wainscot… with built-in tube and shower.

…he ceiling in first and second stories are …t feet in height, which makes the rooms …ear larger and more home-like than …re a high ceiling is used. The interior … throughout the house is whitewood …hed with enamel, cream color in main …ms and bed rooms and French gray in …hen, pantry and servant's rooms on third …r. Bath rooms are finished white …ughout.

…he dining room has white paneled walls …n floor to ceiling, the living room has a …o with colonial wall paper above. The … rooms are treated in a simple manner … bright pattern wall papers in small …res. The doors are birch veneer, stained …vn mahogany and are equipped with dull …k iron colonial latches. The floors are …ak throughout the first story except in … kitchen and pantry, where cork tile was …l. This latter material seems most ideal …re a sanitary, resilient and good wear… floor is desired. The floors of the sec… and third stories are yellow pine.

…T HURTS LESS ELSEWHERE

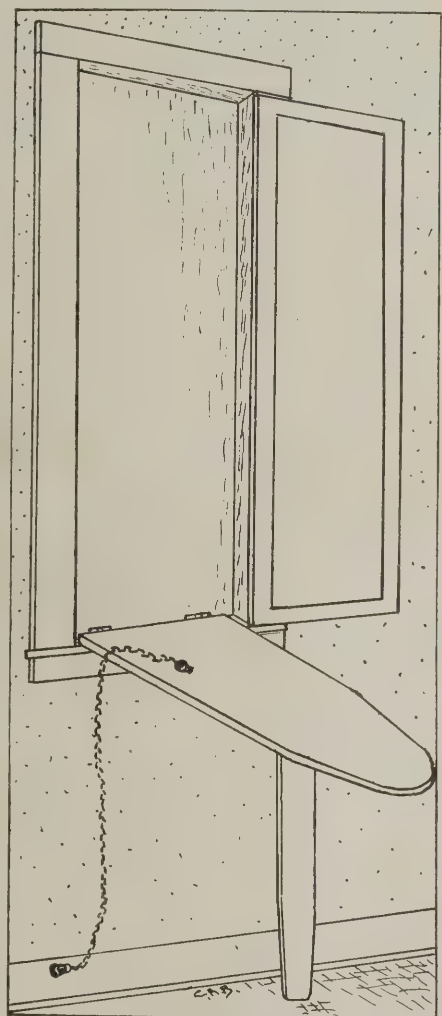
(From the Rockville, Ind., Tribune)

…ur board sidewalks are flying up and …ing pedestrians in the face and else…re.

A Simply Designed Built-in Ironing Board

By Charles Alma Byers

THE disappearing ironing board has come to be regarded as a very practical and desirable kitchen accessory. The feature is, of course, always built in, to comprise a sort of special wall cabinet, yet it is somewhat variously designed. The one shown by the accompanying drawing, is extremely simple, thus being unusually easy to build, but it, nevertheless, is of a kind that invariably gives complete satisfaction.



A simply designed disappearing ironing-board

The cabinet is recessed into the wall between a pair of studs, and has a net inside depth of three inches, while, in respect to the other inside measurements, it is fifteen inches wide by four feet nine inches from top to bottom. It, therefore, permits the use of an ironing board four and a half feet long by fourteen inches broad, at the wide end. The board, at the broad end, is fastened with a pair of hinges to the back inside wall of the cabinet, at or near the bottom, and is supported at the other end, when in use, by a single leg, an inch thick by about four inches wides, which is hinged to the under-side of the board, about eighteen inches from the end. Lifting up on the outer end, the board is folded against the back of the cabinet, the leg at the same time swinging flatwise against the under side of the board—when the door of the cabinet may be closed, the ironing board thus being completely concealed.

The cabinet will usually be placed so that its bottom is about twenty-nine inches from the floor. Thus, if the board is hinged at the lowest possible elevation, the ironing surface, when the thickness of the board is included, will be thirty inches high. It, however, may be raised to any height proportionate to the height of the user simply by raising the hinges. The length of the leg will, of course, be regulated accordingly. The electric plug for the iron's cord may be located either in the top of the cabinet, inside, or in the baseboard underneath the cabinet.

While the foregoing presents a fair representation of a built-in ironing board it is obvious that a stock ironing board such as shown below has so many points of superiority that its up-to-dateness will shade the one described above. It needs no prop, is adjustable to any height, is rigid, and has room below for irons or any other articles required in that department of household work. More and more stock articles of improved design are coming into the market and as the big idea in all commercial enterprizes is the saving of time and money and providing a better article, success comes to him who is able to balance the appearance of being busy about details and trying to do everything in his own shop, against the saving of time in a careful consideration of stock equipments.

A stock ironing and sleeve board

Degrees by the Steel Square

By John Upton

IN SOME SECTIONS of the country, framing is laid out and cuts made by degrees, and while the ordinary mechanic may not need to use these measurements every day, it will be well for him to be somewhat familiar with the subject, so that in case he needs to do this work, he will have some idea how to proceed. For instance, suppose you had a blueprint of

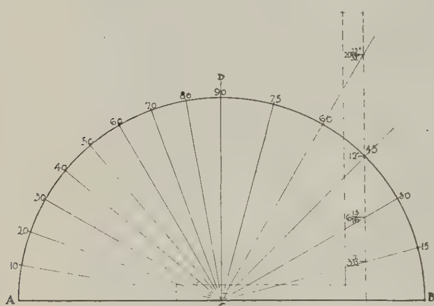


Fig. 1

a gambrel roof, marked 60 and 30 degrees pitch, would you know just how to mark the rafters with the square?

A circle is divided into 360 degrees, and the right angle or the steel square is one-fourth of this or 90 degrees. We are all familiar with the right angle, though per-

DEGREE	FIGURE	DEGREE	FIGURE
5	1 1/16	35	8 13/32
10	2 1/8	40	10 1/16
15	3 7/32	45	12
20	4 3/8	50	14 5/16
25	5 19/32	55	17 1/8
30	6 15/16	60	20 25/32

FOR PITCHES ABOVE 60° IT IS NECESSARY TO REPLACE THE NUMBER 12 BY SMALLER FIGURES, AS BELOW.

DEGREE	INSTEAD OF 12 USE:	OTHER FIGURE
65	6	12 7/8
70	6	16 1/2
75	6	22 13/32
80	3	17
85	2	22 7/8

Table I. Showing figure to use with 12 to obtain a pitch given in degrees

haps we did not call it an angle of 90 degrees. Only a little less common is the angle of 45 degrees, or miter cut, marked by using 12 and 12 on both tongue and blade of the square.

Degrees are measured with a protractor; you may have one and may understand its use, but even so I want you to make one on a large scale with your square and compass. On a smooth board or paper, draw a line, A B, about 30 inches long, and at the center draw a line C D, at right angles to this, as shown in Fig. 1.

With one leg of a compass at this center, C, draw a half circle, which will represent 180 degrees, or 90 in each quarter circle. With dividers, mark one-half of this curved line into nine equal spaces, each containing 10 degrees.

Divide the other side of the curve into two parts, either with the dividers or with the square, as in marking a miter, or angle of 45 degrees. Next divide each of these latter spaces into three parts and mark the points for 15, 30, 60 and 75 degrees.

Lay the square on the drawing with the 12 at the center point, and note that a line from the center drawn through the 45 degree point will strike the 12 on the blade. A line through the 30 degree point strikes at C & 15-16, and so on; now place the square on the other side of the drawing and note that the lines forming the 10 degree divisions also cut the square at the points indicated in Table I. This establishes the correctness of the table. It should be stated, however, that the table is not absolutely accurate, but the error is less than one-sixty-fourth of an inch in any case. This is too small a quantity to have any influence in framing even for the very best work.

One way to find the 60-degree point is shown in Fig. 2. Take the compass as it was set to draw the half circle, and with one leg at the end, B, swing it so as to cut the curved line as at E. Then, to find the 30-degree point, place one leg of the compass at the top or 90-degree point, D, and cut the curved line as before, this time at F.

A line from the center, C, of the circle up to the 60-degree point, E, and one from the end, B, of the half circle, up to the same point will together with the base line, C B, give a triangle with equal sides, equilateral.

With the compass set as before, mark from the 60 point, on the extended 60-degree line, E G, and also at the side, E H, and draw the other two equal-sided triangles, as shown in Fig. 2. You may wonder what this is for.

Well, you have the layout for a rafter of 60 degrees, and by looking at the figure you will see that the length of such a rafter is twice its run, since the length is two of the equal sides of a triangle, while the run is one of them. Turn the figure on its side and see that for a 30-degree rafter the length is twice the rise.

If you need to use odd degrees, such as 28 or 42, you may divide the 10-degree space in which they lie, into 10 parts with the dividers. Of course, the man who does much work in degrees will have a

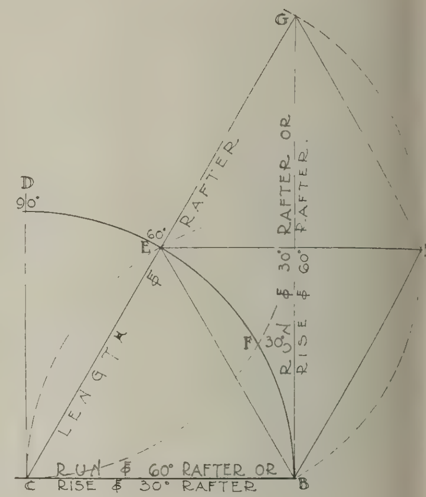


Fig. 2

PITCH	ANGLE	PITCH	ANGLE
1/12	9° 28'	5/12	39° 48'
1/8	14° 2'	1/2	45°
1/6	18° 26'	7/12	49° 24'
5/24	22° 37'	5/8	51° 21'
1/4	26° 34'	3/4	56° 19'
7/24	30° 15'	5/6	59° 2'
1/3	33° 41'	7/8	60° 17'
3/8	36° 52'	1	63° 26'

Table II. Showing degrees and minutes corresponding to different roof pitches

protractor and other instruments, but th point is that you need not get bothere with an ordinary problem as long as yo have square and compass, if you will mas ter the principles given in this article.

Table II shows pitches and correspond ing degrees and is useful for reference.

Kiln Drying Found to Kil Wood Borers in Lumber

Kiln drying is fatal to some if not all th wood-boring grubs, the Forest Service Lal oratory of the United States Department o Agriculture at Madison, Wis., has discov ered. This fact is of considerable impo tance to users of ash, hickory and man other woods which are attacked by insect Manufacturers using ash lumber, for in stance, are much annoyed by the injur worked by the red-headed ash borer. A seasoning has no effect on the activities c these grubs, but according to tests mad by the laboratory on wood infested wit them, any kiln-drying process which can b considered practical for seasoning ash c any thickness will put an end to the borer

The Foreman Talks---About Foremen

By Edward H. Crussell

The New Foreman Comes to the Old Foreman for Advice and Gets an Earful. It will Profit all Readers to "Listen In"

IT WAS Saturday evening on a day in early summer, and our old friend the foreman, relaxed in shirt-sleeves and slippers, was taking his ease on the top step of his front porch. His house stood on a side street out in the suburbs, the cool of the evening was pleasant and, except for an occasional outburst from a near-by lot, where a juvenile baseball game was in progress, peace and quiet enveloped the neighborhood.

This envelope of peace and quiet was presently rent asunder by the excited putt! putt! putt! of a motorcycle, which slowed at the corner, turned into the street and drew up at the curb in front of the foreman's resting place.

"Well, well, well!" ejaculated the foreman, as he shook hands with the well-knit young fellow who had dismounted from the machine. "Look who's here. Sit down and rest your face and hands, and tell the old man how the world's using you."

Dave Flint seated himself on the step below the foreman and proceeded to make himself comfortable. He had worked under the foreman at different times in the past, and the latter knew him as a steady and competent workman—the sort he could always make room for. He supposed that Dave's present visit was for the purpose of asking for a job, and thinking to break the ice for him, began questioning him as to where he was at present working.

"Oh, I've got a pretty good job now," said Dave. "Foreman for Ellis & Ellis. Building a block of dwelling houses up in the North End."

The foreman congratulatel him. "Ellis & Ellis are a good firm to work for," said he, "you ought to do well with them."

After this there was a pause for a while, the foreman wondering as to his visitor's object, and the visitor pondering upon the best method of broaching that object.

Presently he began: "It was about this job of foreman that I wanted to talk to you. I was just made foreman a week ago, and this last week has been the longest I've ever put in. I'll bet I've aged ten years. I'm in trouble, of one sort or another, from the time I get on the job in the morning until I blow the whistle to quit at night; and there isn't a man in the gang as anxious to hear that whistle as I am to blow it. I don't know what you'll think of me for coming to you with this sort of baby talk, but I've had nothing to do but think about it all afternoon, and it's beginning to get on my nerves.

"Then again, I believe it to be wise policy to ask advice of those who know, and out of all the men I've worked for, you seem to have this job of foreman down the best of the lot. Moreover, you are about the only one that I feel I could talk to in this manner without having it published all over town that I had taken a job as foreman and then fell down on it."

The foreman smiled encouragement. "What seems to be the chief trouble?" he asked. "Have you run into some snag about the work, is the boss finding fault with you, or are you in trouble with your men?"

"Do what's right and don't worry," is the advice of the sage old foreman. With this idea developed in the minds of foremen, builders, workmen, employers, dealers, manufacturers, where would there be any labor problem?"

"The trouble is with the men," was the reply. "I don't have to toot my own horn to you, and I believe you'll admit that when it comes to handling snags in the carpenter's business I stand at least as good as the average. As for the boss, he hasn't said anything; he just takes things out in looking glum. But the men! You never saw such a change in a gang in your life. I've worked with this firm nearly a year and was hail fellow with all of them until I got this bit of a boost; now there isn't one of them will bid me good morning. No matter what I do, everybody carries a grouch, nobody works at more than half speed, and everyone grumbles and kicks about the work he is placed at. Early in the week, two of the best men started an argument because I wanted to separate them and place them at different jobs, and when I insisted, they picked up their tools and quit. I'm pretty sure they carried some sort of a tale about me to the boss, although he hasn't mentioned it.

"Why is it, that no matter how fair and square I try to be, my men always kick and growl? And why is it you don't have this sort of trouble with the men under you? I used to think it would be a fine thing to be a foreman, but if I could wake up Monday morning and find that this past week had been nothing but a bad dream; find myself back in the gang with nothing to bother about except my own small share of the work, nobody to please but the foreman, and not much caring whether he was pleased or not; I'd be so tickled, I expect I'd weep tears of joy, just like they do in the movies."

The foreman smiled again. "If that's all you need to make you happy," said he, "surely the thing is easily settled; why don't you quit? Or if you don't want to quit, why not fall sick until the boss puts someone else in your place?"

Dave got to his feet and started to pull on his gloves; "Thank you for nothing," said he, "I expect I do sound a good deal like a quitter, the way I've been whining around here the last few minutes, but it's not quite that bad yet. I thought, from what I knew of you, that you would be willing to do something to help a fellow out. I'm sorry to have wasted so much of your time; I —"

"Sit down. Sit down!" commanded the foreman, grabbing him by the coat-tail and pulling him backward. "I shall begin to believe what you said about that job getting on your nerves, if you keep on in this way. You mustn't mind the old man's fun, it isn't often he gets a chance to exercise it. And now let's see if he can do something to help. Did you ask for this job of foreman, or was it wished on you?"

"I asked for it," admitted the other ruefully. "As a matter of fact, I as good as demanded it. Gee! what a fool."

"Yes," agreed the foreman. "That makes it worse. That's one good reason why you can't quit. But cheer up, things are never as bad as they seem. The only real difference is, if the job had been forced on you, you would be able to say that the situation was not of your making, and would be able to tackle its solution with greater confidence; whereas now you feel that you alone are to blame and are doing a lot of needless worrying in consequence. As a matter of fact, the only real trouble between you and the job is too much youth on your part, and you'll grow out of that soon enough, goodness knows."

He paused for a moment or two, to let this sink in, and then continued: "One very important thing you have already learned, and that is the foreman's job is not the easy sort of a cinch that most people think it is. The higher you get in any trade, or profession, the more head work there is to do and the more things there are to worry about. This has been said in many different ways, many times before, and has as often been disregarded.

"There is one thing about the higher-up job that only those who have experienced it are able to realize. You say that you are more anxious for quitting time to come than are any of your men, but I expect it would be difficult to make some of them believe that. They figure that you do next to nothing all day long and consequently have no reason to be tired. Experience has not yet shown them that the sort of weariness that a man gets from planing a board, or swinging a hammer, is the sort that is most easily remedied. As soon as we stop the planing or nailing, we begin to get rested. On the other hand, the weariness that comes from much thinking and worrying over mental problems, cannot be remedied by sitting in an easy chair, or stretching out on a sofa, and quite often it is impossible to rest the mind because we cannot force it to cease thinking and worrying over some puzzling problem.

Dave nodded his head in assent, and the foreman continued; "The first thing for you, or any other young fellow in your position, to realize, is that foremanship is a trade (or, if you like, a profession), and that before a man can expect to become a successful foreman he must learn this extra trade.

"Too many young fellows assume that because they are skillful and competent workmen, they have all the qualifications of foremen. Nothing could be much further from the truth, but the idea has obtained such a hold that it is almost impossible to make some people let go of it. The fallacy of the idea is shown by a careful consideration of the difference in the work required of the workman and the real foreman. The workman saws, planes, chisels, nails, turns out a finished job, or part of a finished job, under the direction of some one else. As you expressed it a moment ago, he has to bother about nothing but his own share of the work, and as long as that is handled satisfactorily doesn't need to care whether the rest of the job is done correctly or not. His work is the product of his own two hands; hands over which he has positive and absolute control. As long as they have the necessary skill to enable him to pose as a skilled workman, he has no further worries.

"We come now to the foreman. Hhe doesn't have to do any of the actual work himself; his is a more difficult performance. He has to get the work done, and correctly done, by others. Instead of being responsible for one small part of the work, he is responsible for the whole of it. His work, instead of being the product of his own two hands (hands over which he has positive control) is the work of a dozen or more pairs of hands. Hands of every varying degree of skill, from fairly good to absolutely rotten. Hands over which he has no control, except by word of mouth, but for whose every mistake he must shoulder the blame. Can anyone, after even such a brief analysis as this, be so foolish as to assert that skill in handling tools is all that is needed for the successful handling of men?"

"But surely," interrupted the other, "you'll have to admit that personal skill, or perhaps I should say manual skill, is a very necessary part of the competent foreman's equipment?"

"There was a time," replied the foreman, "when I would have said that it was the most necessary part, but now I know better. Some of the poorest foremen I've known, were poor foremen mainly because of their skill as workmen. Their skill was so great, and they were so proud of it, that they had to do every important part of the work themselves. They had to fit and hang the front door; put up the stairs; put in the china closets, etc., etc., and etc., while half a dozen men were wasting their time because of lack of supervision. One of the hardest things for the skilled workman to learn in his new trade of foreman is to keep his own hands off the work, and at the same time compel the hands under his direction to do it a little better than they have ever done it before.

"But don't get me wrong in this; don't go away with the idea that I think manual skill and craftsmanship are unnecessary in a foreman. I think that, where a choice is to be made between the two, executive ability should be chosen before actual skill in the use of tools, but the ideal foreman is, of course, the one who is able to do any part of the work himself, and who is able, without doing any part of it himself, to get others to do it for him.

"Coming down to personalities," continued the foreman, "would you class me as a foreman who had manual skill, or not? You may feel free to give a perfectly frank answer, because you cannot alter the facts of the case, you will be merely stating your opinion."

"Giving a plain answer to a plain question," said the other, "in spite of the way you've been talking, I'd say you were one of the most skillful workmen I've ever met."

"What makes you think so? Where did you ever see any of my work?"

Dave pondered this for a moment and then, "It's a funny thing," said he, "but I'm blest if I can remember ever seeing you do as much as drive a nail. At the same time I know you are skillful, and I expect I gather that knowledge from the fact that you are always ready with a solution for every problem that arises, either in your own work, or in the work of others."

"I might be able to do all of that without having much manual skill," said the foreman. "But we won't argue the matter further; I think I've accomplished my purpose, which was to take your mind off your immediate troubles, and also get you into a position where you would be ready to admit that manual skill was not all that was needed to make a successful foreman.

"And now, we've been talking generalties, while you are confronted with a condition. It may help you some to remember that when you were an apprentice many, many, simple things gave you trouble; things that you now do almost automatically, without giving them any thought at all. As you get this new trade of foreman learned the same thing will happen again. In the meantime quit your worrying. If there is any worrying to be done, let the other fellow do it. You do what you think is right, according to the light that is given you, and then 'Let nature take its course.'

"A fellow who is taken from the ranks and made foreman has a pretty hard row to hoe anyway. There is usually someone who is jealous because he was not made foreman, and who will go out of his way to prove that the new foreman was a poor choice. Disregard him if possible, but if it comes to a showdown, use a firm hand. Don't let anybody get your goat, and don't let anyone run a bluff on you. You haven't anything to lose but a job, and according to your own statement, you don't care much for the job anyway.

"You don't have to worry about the men carrying tales to the contractor. If he's the right sort, he'll pay no attention to them; if he isn't the right sort, the sooner you're separated the better.

"I said use a firm hand, but that doesn't mean act the autocrat. As a matter of fact the firm hand should be held in the background for emergencies. Let your men understand that you know your job, and theirs. That you are absolutely square, but that you are the foreman and are going to remain foreman until the head of affairs says different. Don't lose your temper, don't get excited, and above all, don't yell. Men are a good deal like horses in some respects, you can't get either speed or work out of a horse if you yell at him and get him excited. There are a lot of executives who do not display half as much tact, patience, or plain common sense in handling men, as they would display in handling animals.

"When giving directions or explanations, remember that words are mighty poor things with which to convey ideas. Be sure you are understood before leaving the subject, and if the workman comes back for further instruction, give it to him; that's what you are there for. Avoid all trivial orders, and all fussiness. Train your men to use their own initiative. Maintain courtesy at all times, give orders that are clear and understandable, and then: See that they are obeyed.

"Keep your job and your men well in hand by planning the work ahead. Know where every man is and have a job suitable to his ability ready for him the moment he is through. Look cheerful always; whether you feel like it or not. Always realize the possibility of error, in yourself as well as in another; if a man has a grievance, listen to him patiently. Adjust the matter, if he is right; explain it thoroughly if he is wrong, and then: refuse to argue.

"Keep in mind the golden rule; treat your men in the way you would wish to be treated if one of them was foreman in your place, and in a little while you will have gathered together a gang of men of which you may well feel all the pride of a creator in a successful piece of work. A gang of men who will swear by you and your ideas in all things pertaining to building, and by whom you will also be ready to swear, instead of at. And one thing above all: remember that your success as a foreman depends not so much upon what *you do*, as upon what you are able to get your men to do for you."

"One thousand thanks," said Dave, cheerfully, as he got up to go. "I won't be able to remember and put in practice all you've told me, but what I do remember will help; particularly that idea about doing what's right and then letting the other fellow do the worrying."

"Good-bye, son," said the old foreman; "come again, soon."

Contracting and Jobbing

By Charles Anderson

CONTRACTING is divided into three classes: General contracting, sub-contracting, and jobbing contracting. Each is separate and distinct from the others. The general contractor takes the whole job from the excavating to the finished job. He may employ all the other trades and furnish all equipment; supervising the whole work. A great many, however, sublet the different trades to the respective sub-contractors. General contractors are usually men of wide experience. Their system and methods are of relative interest only in this discussion, so I shall confine myself to the methods of the sub-contractor and jobbing contractor.

The Sub-Contractor

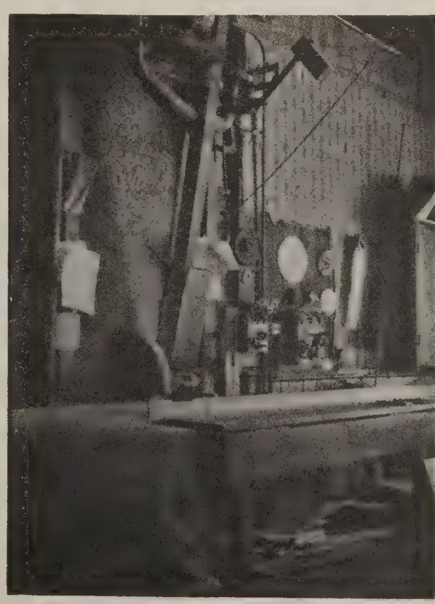
The sub-contractor usually specializes in his own trade exclusively, i.e., the Mason, the Carpenter, the Plasterer, the Plumber, the Painter, etc. Each contracts for his own work either direct from the owner or from the general contractor, and holds himself responsible only for his own work, the architect making separate specifications for each trade. There is no argument as to just what each must perform.

The Jobbing Contractor

The jobbing contractor has the most difficult place to fill of the two, as in most cases there are no plans or specifications for him to figure on unless he prepares them himself. As he must deal with a greater number of customers in order to do a paying volume of business, he has a great deal more work in keeping account of his affairs.

He must possess an adaptability that the contractor on new work does not require. It is very important that he have a knowledge of drafting so that he may be able to make plans and details for the many small jobs that he must handle, showing in each case just what he proposes to do for the customer. This is necessary for his own protection as will be explained later.

Planer and jointer in jobbing shop



Swing saw in jobbing shop

Contractors' Equipment

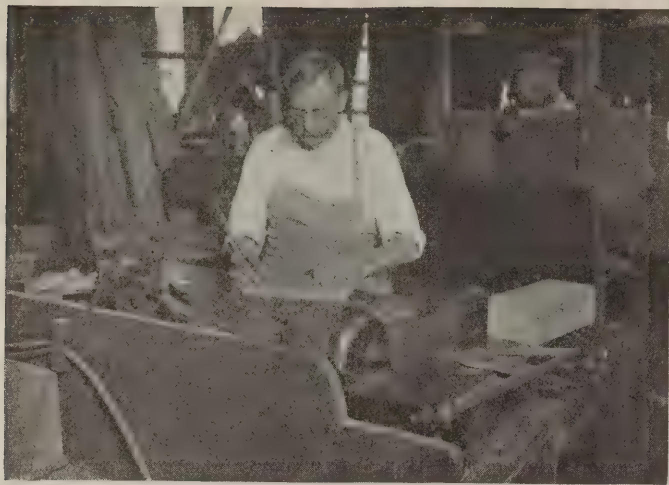
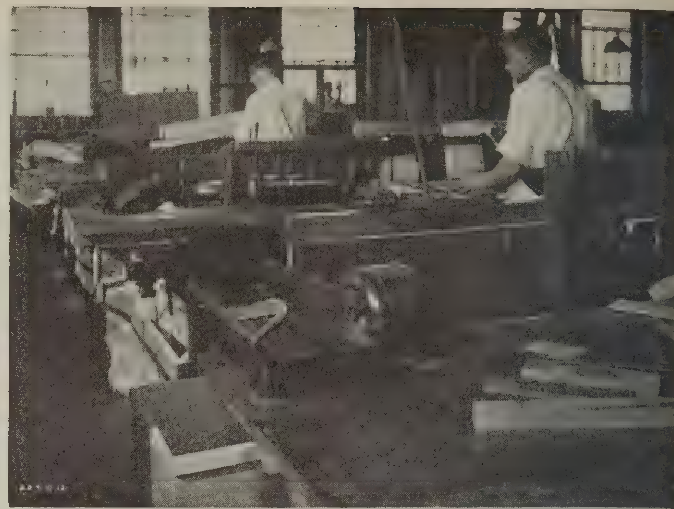
In the January issue of National Builder will be found a very comprehensive article covering the equipment for the general contractor. The equipment that would be necessary for a jobbing contractor who maintains a shop and hires a crew of workmen would also fill the bill for the carpenter sub-contractor.

The first necessity is a shop at least 30 x 60 ft., located where the contractor can have either gas or electric power, with additional shedroom to store from two to five thousand feet of lumber.

There should be sufficient work benches to accommodate from two to four men; a circular or swing saw; or better still a planer and jointer, of which there are a number of combination machines in the market, one of which will fill the bill very well. A various assortment of ladders from 10 to 40 feet long; step ladders of different heights, scaffold brackets, jack screws, crow bars, grindstone, clamps of different lengths, ropes and pulleys, post hole diggers, spades, shovels, sledge hammers, iron mitre box, and the jobber will find it very useful to have an anvil, and a good strong iron vice; either an iron drill or a good breast drill with different sized drills; saw filing clamp, long cross cut saw, and last but not least, some means of conveyance, at least a one-ton truck. All of the above would cost, exclusive of the building for shop, in the neighborhood of $2,500. While all of the above will be found quite necessary, many have started with only a few of these and acquired them as business developed.

Making and Taking Contracts

Making a contract is without doubt one of the most important consideration of the contractor. When you find yourself bound up with a contract that is all one-sided as many have—in fact many have been put out of business in this way—when you make a contract see that there are no con-

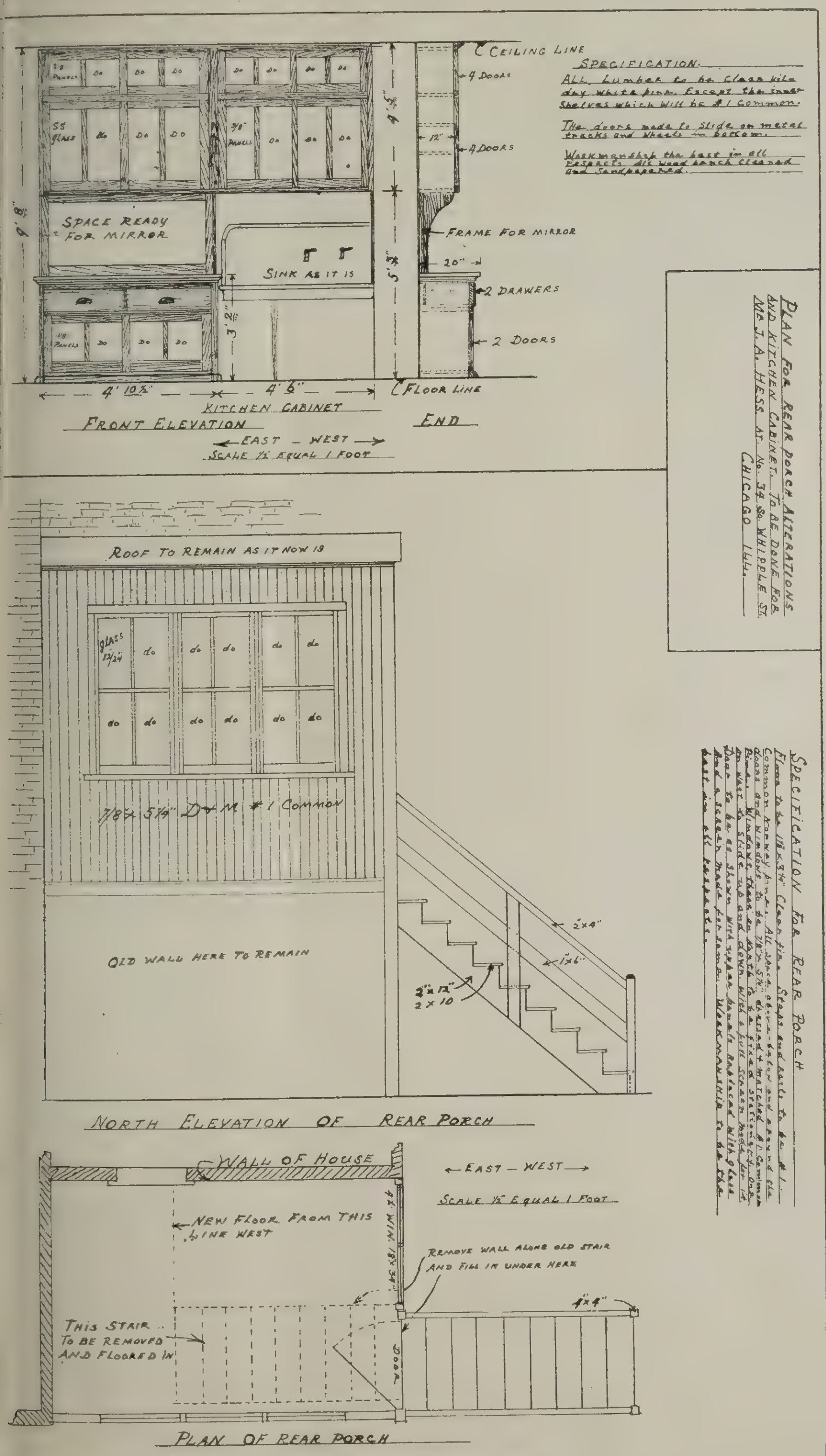



A modern planer and jointer as used in well appointed shops. The back adjusts by gauge to any angle. Note the automatic safety guard


The same planer and jointer in compact quarters. It is as efficient and adaptable for use in the shop or taken out on the job if necessary. It operates from an ordinary light circuit


A saw of small size but great efficiency. There is a straight saw equipped with a gauge to cut at any pitch and one equipped to tilt the blade to any angle. On the job one of these saws cut all the woodwork for the bridge illustrated above lions that you cannot carry out before a sign your name to it.

See that it clearly states just what you expected to do and specifies how you to receive your money. See that it is loaded with a lot of indemnity clauses It may cause you any amount of trouble fulfill. Where there is an architect there usually a uniform contract form used; even then it is well to see to it that ne of these unreasonable clauses are written in. The one thought the writer desires to convey here is, how to make your contract on jobs where there is no architect. These are the ones the jobbing contractor must do himself. It is very unwise to make oral contracts. Though it is a fact that an oral contract is legal, the trouble is, in case of dispute it is hard to prove in court just what the contract really was. The general public is so unacquainted with the various terms used in building that there is almost sure to be some misunderstanding with an oral contract, whereas a written instrument is the evidence itself. When your customer has misunderstood what you told him, in order to satisfy him you will have to do much extra work, which you get nothing for, in order to hold his good will and that of his friends; but when it is in black and white it is easy to show him that you have done as you agreed, and the matter is easily adjusted.



A jobbing carpenter's sketch in proposal for a built-in cabinet and a porch

The best method is where at all possible make a plan or detail drawing showing the work to be done. This means that the jobbing contractor should have a knowledge of drafting as before stated. This also has a two-fold value: it not only safeguards you from being asked to do work you did not agree to do, but it helps you to get the work at a better price as it stimulates greater confidence in your ability. Drafting is like any other work, in order to do it you must have the proper instruments, which are as follows: A 16x24 inch drawing board, a 24-in. T-square, a 45-degree and a 30 and 60-degree triangle, and a moderate-priced drafting kit, all of which can be obtained for about $20. These will be found to fill the bill very well. If you do not understand their use, buy a volume on architectural drawing of which there are a number to be had, or better yet take a short course in drafting. You will be surprised how easy you will pick it up when you already have the knowledge of reading plans.

One other item of advice I wish to mention here, never deliver your drawing to your customer until he has decided to accept and sign your contract, as some will take your drawing to your competitor, and in many cases he will under-bid you and do the work after you have gone to the trouble of making the plan. I adopted this method: I first make my pencil drawing and then figure out what I can do the job for. Then I show the prospective customer the drawing and tell him what it will cost him. I then tell him that if he decides for me to go on with the work I will trace the drawing and give him a blueprint copy with the contract. I explain to him that this shows clearly what I have offered to do for him and that it eliminates all chance for any misunderstanding between us. I have found this plan to work most excellently and in nearly every case I get the job without any opposition.

The drawing shown herewith of the rear porch alteration and the kitchen cabinet with the specification written on same, together with the letter of the proposition with the space on the bottom for the customer to sign the acceptance, constitutes a legal and binding contract. This system can be used for small or large jobs. When writing your offer it should be written in duplicate so that each party to the contract can have a copy. As every job is different to some extent, no uniform proposal can be used. You must write each to suit the circumstances of the case. The plan in this case shows pretty clearly what is to be done, so we do not require a lengthy proposal; but in cases where you have no plan or details in conjunction it is necessary to write a clear, explicit specification along with your proposal.

PROPOSAL AND CONTRACT

Chicago, Jan. 20th, 1921.

Mr. J. F. Hess,
34 So. Whipple Street,
Chicago, Ill.

Dear Sir:

I offer to make alterations to your rear porch and build the kitchen cabinet, same to be done according to the plans made by myself, of which a blueprint copy is furnished herewith and becomes a part of this contract. I will further make the alerations to the pantry, removing the wall under stairs, supporting same with beams; also do any trimming that may be necessary to make the job complete. No floor has been figured as necessary.

All materials, labor and equipment to be furnished by me as specified on plan. All work to be done in a mechanical manner and job left complete *EXCEPT PAINTING* for the sum of $268 (two hundred sixty-eight dollars), to be paid as follows: $125 (one hundred twenty-five dollars) in February, 1921; $100 (one hundred dollars) March 10th, 1921; the balance $43 (forty-three dollars April 1st, 1921.

It is further understood, that, if any of the materials to be torn out can be used again, you are to be given credit for whatever the same amount of new materials would cost. The above figures are for immediate accetpance.

Very truly yours,
Charles Anderson.

I accept the above offer and instruct you to proceed with the work at once so as to have same completed by March 1st, 1921.

(Signed) Jos. F. Hess.

Dated Jan. 22d, 1921.

Novel Method of Stopping Overflow of Cesspool

On the grounds of the suburban residence of a Mr. Winterson near Annapolis, Md., was a cesspool, 8x8x8 ft., that frequently filled to the top and overflowed, saturating contiguous ground on one side.

It was walled up with dry placed stone to within 2 ft. of the surface of the ground. It was located at the head of a slope; 100 ft. down the hill the surface of the ground was lower than the bottom of the cesspool.

It was decided to try stopping the overflow by making the soil more open or absorbent. This was accomplished by a method new to this locality. I will describe it.

A row of 2-in. bore holes, 12 in number and 10 ft. deep and 6 ft. apart, was put down leading away from the cesspool in the direction of the low ground.

Each hole was loaded with a pound of 40 per cent ammonia dynamite, thoroughly tamped; holes connected up in series and fired with electric blasting caps.

The theory was that the blasts would break up the hard soil, make it more absorbent and that the liquids in the cesspool would sink into the ground rapidly enough to avoid any overflow at the top.

The work was done in February. Two days afterwards the level of the fluid mass in the pool had gone down 4 ft., and notwithstanding it has been in continuous use since, it has not rise above that level t date—October 15.

The total cost of the job was $24.50. Tw men did the work in four hours.—*Wi Foote, Maryland.*

Care and Preservation of Equipment and Tools

The building industry will be stimulated and advanced largely by builders and opera tives themselves in exercising those economies which reduce costs and improve th product. In no department is this more required than in the care and upkeep o equipment and tools. Suggestions are therefore welcomed from manufacturers fo approved methods of adding to the life of all descriptions of builders' equipment Acknowledgment is made for the appended suggestions to the T. L. Smith Co. Milwaukee; Austin Manufacturing Co., Chicago; New Way Manufacturing Co., Eau Claire, Wis., regarding concrete mixers. To the Crescent Machinery Co., Leetonia Ohio, regarding woodworking machinery, etc.; the Smith & Hemenway Co., Irvington N. J., on the care of tools, and the Selden Truck Corporation, Rochester, N. Y., or the care of auto trucks. The co-operation of all are invited to make this departmen of the widest constructive value in the cause of thrift and building progress.

THERE is no machinery manufactured which receives more abuse, harder usage and less attention than contractors' equipment.

CONCRETE MACHINERY

Take the concrete mixer for example: How many mixer operators ever think about cleaning out the mixer drum. A few, but not many—and just think it only takes a pail or two of water and a few shovels full of rock or gravel at noon time or in the evening when stopping work—a few revolutions of the drum and it is clean; and just a little attention will keep the gears free from concrete. One manufacturer suggests: For those mixers which operate with chains there is a simple formula for inexpensive chain lubrication. Take equal parts of light oil and kerosene; mix this with one-twentieth (1/20) of its weight in powdered graphite. It must be powdered graphite, not flaked. Apply this liberally to the chain and sprockets over which it runs. Some contractors contend that lubricating a chain merely collects the concrete dust, which wears hard on metal, and for this reason they leave their chains unlubricated. That is true, but only partly so, because pure dry cement dust wears much harder on metal than dust mixed with grease and oil and inasmuch as dust cannot be eliminated entirely there is only one remedy, and that is to lessen its effect as much as possible. Another good formula and cheaper is to oil the chain thoroughly with light oil and then rub ordinary soap over the chain."

Wheelbarrows, too, might run smoother if treated to a few drops of oil occasionally and a little water, together with a shovel full of rocks, will clean out the bowl when you are through with it.

AUTO TRUCKS

One truck manufacturer states: "The source of one of our greatest difficulties is the low-grade gasoline which all users ar compelled to buy at the present time. Th failure to completely vaporize this gasolin results in a certain amount of it remaining in the cylinders and seeping past the piston into the crankcase. The lubricating valu of the oil is gradually reduced by this seepage and when the user fails to change this oil frequently, serious damage is done to the motor. It is believed that the principa troubles encountered in the operation of a motor truck are due to the fact that proper lubrication is not provided. Realizing this fact, the engineers responsible for the design and construction of the better grade of trucks have, after careful experiments, made lubrication of some of the parts as nearly automatic as far as it is possible to do. As an illustration, the high pressure grease system is used on the universal joints, spring and shackle bolts, steering knuckles; and for the radius rods, eye bolts, break equalizer shafts and rocker shaft, which are generally quite inaccessible, oilless bushings are used, thereby protecting the truck from the negligence of the user.

It is strongly recommended that all owners of motor trucks adopt the National Standard Truck Cost System, for by so doing performance is more readily checked and inspectors are given a better idea of where to find the trouble, which must be eliminated before a satisfactory operation can be procured from any unit.

WOODWORKING MACHINERY

One manufacturer of woodworking machinery states: Every care has been taken in designing and constructing our woodworker to insure the proper operation of the machine, but a reasonable amount of care should be exercised on the part of the operators to see that the machine is kept in proper adjustment. Bolts and nuts should be kept tightened and the machine should not be allowed to get loose so that the various parts will rattle when it is operated and we therefore offer the following suggestions:

Band Saw

A band saw blade should be tensioned only tight as necessary for doing the work properly. When the saw is too slack it will not pass down through the work straight. This will be noticeable when making short turns. When too tight it throws an unnecessary weight onto the bearings, causing excessive wear and using more power than necessary.

A little experience will enable the operator to correctly judge a proper tension. The effort of the operator should be to run the saw as slack as possible, with just enough tension to do good work. If the saw wants to lead to one side while in the cut, the fault is in the saw not being dressed properly. See that the saw is set as much on the one side as the other. See that the filing is square across the blade and not at an angle. See that the teeth are all sharp. If the saw has come in contact with metal so as to dull all the teeth on one side, it will not cut straight until properly dressed and sharpened again. Too wide a set will tend to make rough work—too narrow a set will not allow the saw to clear on short turns. For average work the saw needs but very little set, and the teeth must be filed straight across.

The side plates should be adjusted up neatly to the side of the saw, but not so tight as to cause friction. When too tight will ruin saw and when too loose the saw cannot be guided accurately enough for good work. When running empty the back edge of the saw should bear just lightly against the guide.

Putting on a New Saw

When putting a new saw on a new machine, the guides should be pushed back clear of the saw. The wheels should be in correct line with each other and in the same plane. Put the saw on and give it a moderate tension. Spin the wheels by hand to see if the saw runs to the middle of the wheels, or nearly so. It is not necessary or practical to try to get the saw to run to the exact center of both wheels, as different saws run a little different on the same machine. If the saw runs too far back to the back edge of the wheels, then incline the upper wheel forward; and if the saw runs too far forward, then incline the upper wheel backward. When the saw is adjusted to run about right, then bring the guides up to saw carefully and the machine is ready for work.

If necessary, the upper wheel may be inclined backward just a very little after the guides are set, so as to make the back edge of the saw bear against the guide lightly when running empty.

Never use a saw when it is dull and the work has to be forced against it with considerable pressure to make it cut. More good saws are broken and condemned for this cause than any other. When a saw is being used while dull, the necessary force of the work against the saw to make it cut throws an enormous strain onto the blade edgewise while running at high speed. A saw has lots of elasticity flat wise because it is made thin for that purpose; but if its elasticity is tested too severely edgewise, it is sure to break. Before breaking it will usually show small cracks at the throats of the teeth. When a saw is properly managed it ought to last for a long time, but when improperly managed the best saw made may break after short service. With long continued use a saw will become crystallized from its continuous bending action flatwise over the face of the wheels, but this crystallizing action is greatly hastened when a saw is being used too dull, thereby giving it also a bending action edgewise from the force of the work edgewise against the saw. New saws are not expensive and it is more economical to put on a new one than to spend a lot of time mending one that has lost its toughness.

Guards

To reduce the chances of accident, every possible safeguard should be used in connection with the operation of any woodworking machine. See that the guards are kept on the machine and insist on their being used.

Lubrication

Use an oil that has good lubricating qualities and yet one that will flow through the oil holes and get down to the bearings where it is needed.

Power

Be sure you have plenty of power for the proper operation of your machines. Don't put a 10-horsepower load on a 3-horsepower machine.

Belts

Keep them tight; use plenty of good dressing on the belts.

Jointer

It is important that the bearings of the head be kept well lubricated. When using the jointer keep the reservoirs full of oil.

Shaper

Care should be exercised in the use of the shaper to see that no one attempts to raise or lower the spindle when the machine is not in operation. The shaper spindle should always be revolving when it is raised and lowered. Failure to take heed of this suggestion will result in the shaper belt becoming stretched and render it useless for driving the machine properly.

Saw Table

Be careful to see that the saw table driving clutch is properly oiled.

Borer

Keep the belt tight and the bearings well oiled.

How to Use a Hack Saw

Another manufacturer states: The one thing that makes for good cutting is the choice of a hack saw blade of the proper kind for the work. For cutting cold rolled, solid stock, machine and light structural steels, 14 teeth to the inch is recommended, and 18 teeth to the inch for general all-around work. For sheet metal work and pipe over 18 gauge, 24 teeth to the inch should be used. The 32 teeth to the inch blade is adapted to either thin sheet metal or turbine under 18 gauge in thickness. It is safe to say the 18 teeth to the inch blade is the desirable one for all general purposes.

The best results are obtained from 50 to 60 strokes a minute, pressing lightly on the forward stroke and heavily on the return. *Don't* start a new saw in an old cut, because the set is wider on the new saw and the new saw blade will stick.

The Glass-Cutter

Dip the wheel in kerosene or turpentine. Place the cutter between the first and second fingers. Start the wheel on far side of sheet of glass from you ⅛ in. from the far edge. Hold cutter erect so that wheel will revolve easily and will make a straight, even stroke. Press hard enough to make a fine hair-line on the glass. If you press too hard the glass will flake; this is wrong. Draw the wheel entirely across the glass (allowing your cutting wheel to drop off the pane). To break the glass, hold the pane firmly between the first finger and thumb with both hands; a slight bend will break the glass.

Tinners' Snips

Always make straight up and down cuts; never twist snips sidewise, as this practice will have a tendency to dull the cutting blades. Keep the joint and cutting edge well oiled—and never use the cutting edges for wire cutters.

Before putting tools away there is much to be gained by oiling. Most any kind of oil will do. Nothing dulls the temper of tools more than rust, and by using a little foresight much may be gained. You owe it to yourself to give tools reasonably good care; they will live up to the claims of the manufacturers.

Blaw-Knox Co. Extends Branch Service—The Blaw-Knox Co., of Blawnox (Pittsburgh), Pa., with branch offices in the largest cities from coast to coast, is now entrenching itself in the South. Having but recently established a district sales office in Birmingham, Ala., the company on April 1st opened up a new sales territory in the Southwest, with headquarters in Kansas City, Mo. In addition, the Blaw-Knox Co. has sales offices in New York, Chicago, Detroit, Boston, Baltimore, San Francisco, and Sheffield, Eng. The Kansas City office, which is located in the Interstate Building, is in charge of R. B. Randall, formerly connected with the company's Chicago office, who will be known as Manager of the Southwestern Territory.

The Ice-Box "Stakes Out Its Claim"

By Avis Gordon Vestal

Kitchen Arrangements Must be Studied from a Woman's Viewpoint. In this Article the Author Gives a Housekeeper's Suggestions

LET the ice-box "stake out its claim" for kitchen space before the other permanent features "gobble up" all the best locations and crowd it out into the cold—I should say, into the heat! I speak from the point of view of the housewife, who

Fig. 1—Built-in refrigerator. It occupies a 10-inch alcove and projects back into a small vestibule. Three shelves above the ice box. It can be iced from the vestibule, which can be locked independently of the rest of the house

must *use* the domestic workshop you architects and carpenters design and build. It is not enough that the refrigerator be a good cold-conserver and large enough for future growth of the family appetites. A food-cooler is visited so very many times a day during the preparation and clearing away of a meal that its location relative to the habitual labors of the cook and its proximity to her other working equipment should be carefully considered. At least 95 per cent of us are servantless and are wishful to save both "T's": Temper and Time.

Lucky is the housewife who is to have an efficient kitchen of 1921 vintage, for it can be made right from the beginning. However, the housing shortage is forcing many city tenants to mobilize their resources and buy old houses if they cannot afford new ones. Their next step is likely to be a "hurry-up" call to a builder to revise the residence for the convenience of the wife. In both new and old houses the clever designer has a chance to help by finding a better or best place for "Friend 'Frig.'"

What space-rights has an ice-box that is to be a boon and not a "pestiferous" nuisance? If placed entirely within the kitchen, it requires "cold chunks" twelve months a year. If the iceman is late—a frequent fault—the one woman who has been working at home all day must give up her afternoon shopping or call or club and remain at her post to receive the overdue "chilly stuff." To be sure, she might trust human nature and leave the house alone and unlocked, bnt daily stories of robberies make her timid. Even should the "frigidade" arrive during her working

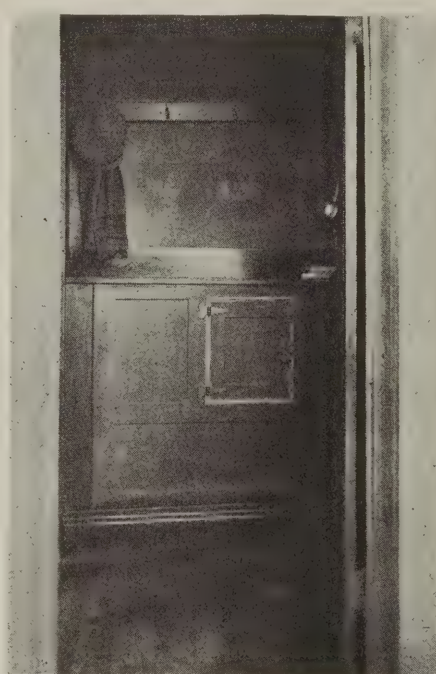


Fig. 2—Rear of built-in refrigerator in vestibule. See sketch plan of vestibule arrangement

hours, she may be called up from the laundry or down from the sewing room or away from the telephone to unlock the kitchen door. Nor are these all of her grievances. Her pet antipathy is a trail of mud and water marring a freshly-mopped floor.

The ice dealer's opinion may be of interest. I interviewed him on the subject of the kitchen-contained refrigerator. "I'm 'agin it,'" he said; "every two weeks or so, all summer long, I'm hunting up new icemen. The women scold so about the mud they track in and look so sour when the men are late that the fellows quit me and take pleasanter jobs. It isn't the hard work they mind, but the everlasting 'calling down.'"

Conditions to be approximated for the placing of the cooler are:

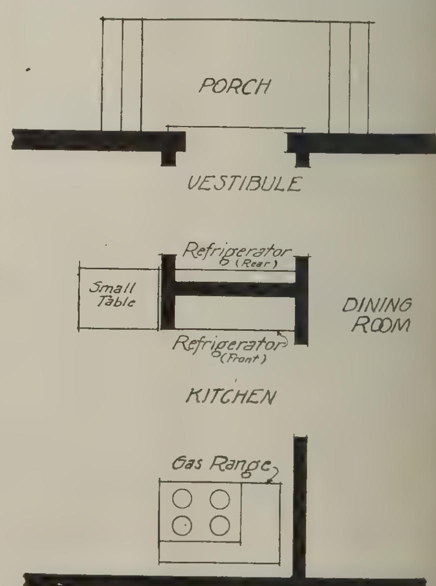
1. It should be close to the food preparation center, whether table, cabinet, or counter, to save the steps and time of the cook. If it can also approach the dining room, so much the better.

2. It should be accessible to the ice supply without entrance to the kitchen. Three places answering this requirement are: an outside house wall, a rear vestibule, a dumb-waiter descent to the basement or event to a walled pit beneath the cellar floor.

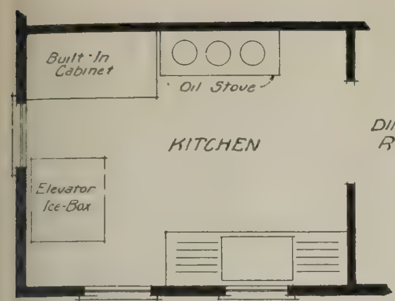
3. It should be insulated as far as possible from the heat of the kitchen and the warmth of the sun.

4. It should be possible to allow cool air from outside to cool the food during about half the year.

5. A drain pipe should be provided leading out of doors or dripping above the cellar floor strainer, or attached to the plumbing waste pipes with an intervening trap to prevent entrance of sewer gas. In some cases extra provision is required to keep insects from entering the drain tube or the imperfect joining of the pipe to the floor.



Sketch A—Showing arrangement of vestibule and refrigerator, etc.



Sketch B—Kitchen plan for an elevator ice box that is iced in basement

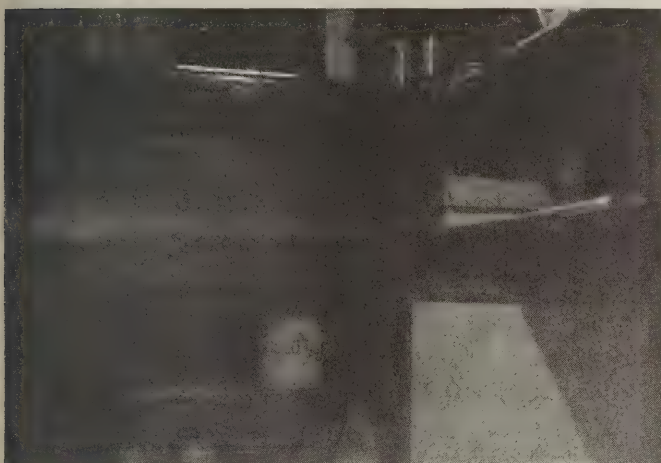


Fig. 3—An example of what not to do. Lack of room caused the refrigerator to be placed at the end of a 9-foot pantry—too far from the work table, blockading the window and to main plumbing pipes; also making a corner inaccessible for cleaning. See sketches C and D

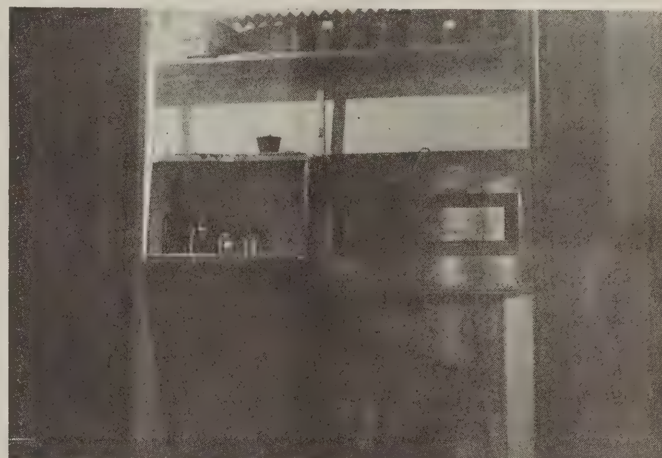
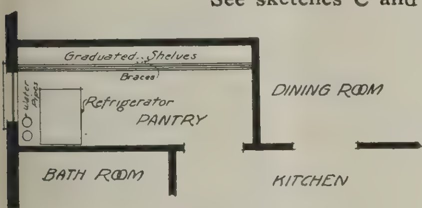
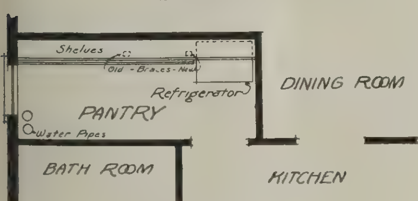


Fig. 4—Better Fig. 3. The ends of two shelves were cut away and new braces set in. New drain cut in floor and old one closed. Refrigerator now faces pantry door and is accessible from the cook's mixing table. See sketches C and D



Sketch C



Sketch D

6. There should be no places about the ice-box, its accessories, or waste space behind or beneath that cannot be easily reached for cleaning.

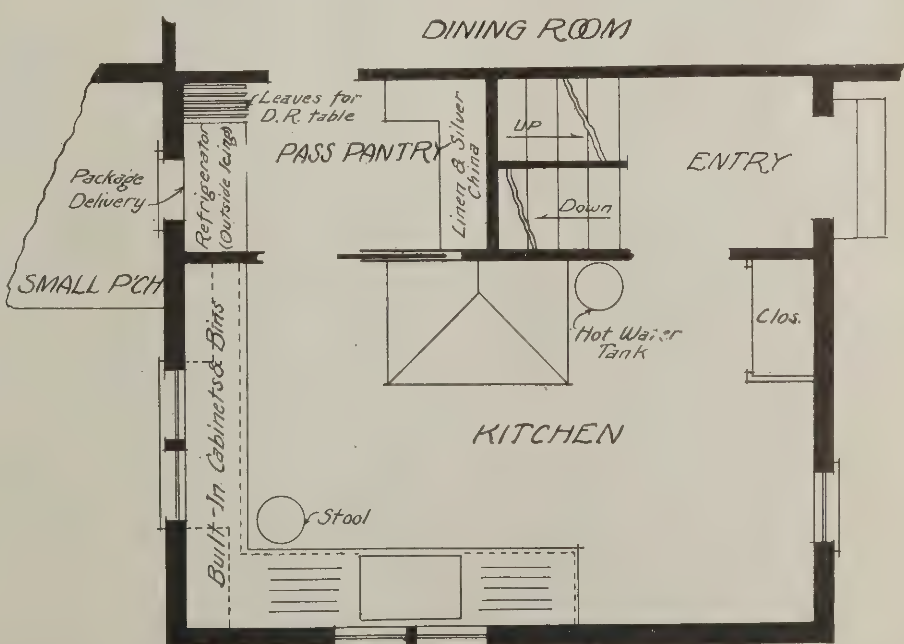
There are many ways to solve all or a part of these placing problems in the new or old house, governed by the cash available and by the relationship of the kitchen to the dining room, pantry, porch or basement. The "ell" kitchen with three outside walls, presents possibilities not to be had in the corner room and still less in the cook-shop having but one outer wall.

An Iowa college professor had an unusual idea worked into the outside-icing refrigerator in his new home. The box was set several feet above the floor and recessed into an alcove. His wife could remove foods without the usual stooping. A short flight of steps outside led the iceman to the ice door.

A Chicago clubwoman designed a very practical corner. She had a small vestibule walled up in a corner of the kitchen nearest the dining room and serving as the outlet for both rooms. After a long search she found a refrigerator that could be placed in the vestibule with its front extending a little into the kitchen to permit a set of three open shelves 10 inches deep, above it. (See photographs 1 and 2, and sketch *A.*)

In New York a domestic engineer chose an isolated country home for the sake of her children. Her kitchen was re-built to order and contains an elevator ice-box within hand-reach of her cabinet. This descends through a trap door and can be iced from the basement, and in the housekeeper's absence, if necessary, as only the basement door need be left unlocked—see sketch "*B.*" It can also be used without ice.

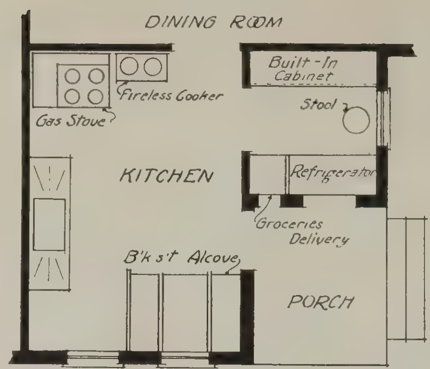
Like this friend, we have left a large city and its convenient apartment and have bought an old house for the sake of its large play-yard. Our suburban cottage was built before the thought of a housekeeper's comfort and convenience had been conceived. Two later owners have attempted to modernize it, but much remains for us to have done. The old kitchen has no place for a refrigerator, but a drain was provided at the far end of a long and narrow pantry. The spot was insulated from kitchen warmth but too distant from the work table and too hard to clean behind. It also



Sketch E—Suggests location for refrigerator convenient to kitchen working center and dining table

blockaded the easy raising of the window and hindered our reach of cut-off valves in the water pipes rising through the pantry to the storage tanks on the second floor. We are planning an entirely new kitchen but must use the old one for a while, hence we sought a make-shift improvement for the placing of the ice-box. The new room will, of course, have an alcove or vestibule for a built-in ice-box with outside icing door. Meanwhile, we had the ends of two pantry shelves cut away, new braces set in, and the box moved up to a point opposite the pantry door and far more accessible. (See photographs 3 and 4, and sketches *C* and *D*.)

Several sketches of kitchen corners are added to this collection to suggest other possible locations in friendly proximity to the eating center, the cooking center, and an outside icing point. (Sketches *E* and *F*).



Sketch F—Alcove for refrigerator and built-in cabinet

Sketch *E* suggests a location for the refrigerator adjacent both to the kitchen working center and to the dining table. Outside icing is provided, and just above this outside refrigerator door, which is not shown in the drawing, is a door for groceries and package delivery. Storage for china, linen and silver is provided in the pass pantry above and below the serving counter, while in the kitchen proper the long work counter has shelving space on either side of the windows, with bins underneath.

Sketch *F* shows an alcove for the refrigerator and built-in cabinet. Here food may be prepared with a minimum of step-taking. Outside icing and a package delivery are provided.

A Small Bank Building

THE profession of banking is noted for its conservatism. This quality alone, however seldom results in a conspicuous degree of success, but must be modified or tempered by a keen sense of values. In other words, a really successful banker is usually one who does not rely on snap judgment, but makes a thorough study of conditions beneath the surface before coming to a decision.

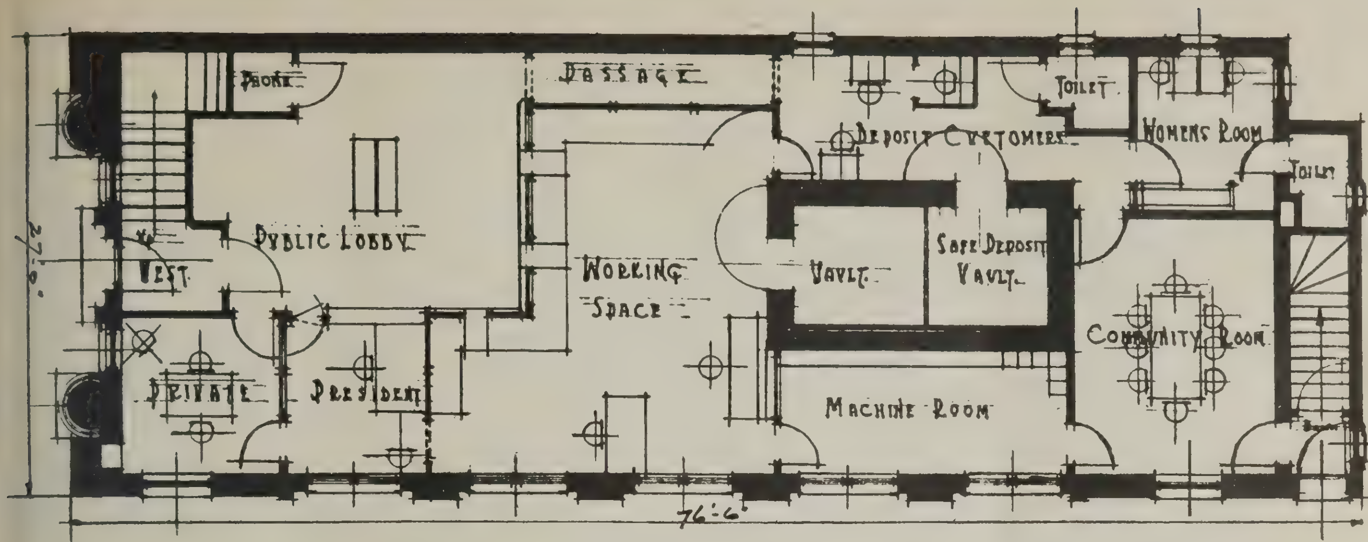
Therefore, considerable significance may be attached to the nation-wide movement which is resulting in the replacement of the more or less shoddy type of bank building by new structures of excellent design. If bankers have been brought to see the dollars and cents value of a well-planned and attractive building the future of architecture is to that extent assured.

In fact, it is perhaps not too much to hope that the near future will see bankers extending their influence in this direction, making good planning and design one of the chief requisites in favor of granting loans for the erection of buildings.

Aside from this feature, however, the erection of an attractive bank building almost invariably results in raising the standards of design throughout an entire community. The completion of such a building is usually immediately followed by increased activity in new buildings of every sort and by much remodeling and improvement of old store fronts and houses.

The First National Bank of Alta, Iowa, designed and built by A. Moorman & Co., is a good example of the type of bank building that is steadily replacing the obsolete types of other days. Although confined to a rather narrow lot, the building is dignified and attractive, and the plan is well suited to its purpose. The exterior is of limestone, with an entrance of cypress, stained a dark bronze tone. The use of wood at this point reduces cost and adds character to the building.


First National Bank, Alta, Iowa. A. Moorman & Co., Architects and Builders



The entrance to the public lobby is through a vestibule which contains a stair to the second floor. The second story is suitable for offices. The lobby contains a 'phone booth for public use and is separated from the president's outer office by a low rail. This office, together with a private one, comprises the president's suite. An open passage leads from the lobby to a customers' room adjacent to the safe deposit vault. The customers' room opens into the women's room. Both of these rooms are provided with toilets. A community room serves the purpose of a directors' room and also is available for meetings of the executives of the various local organizations. This consideration is usually highly appreciated by rural organizations, few of which maintain offices for the transaction of executive business. A direct entrance leads from the exterior to the community room. This entrance is contained in a low extension at the rear of the main building and contains a stair to the basement.

How Saving Leads to New Jobs

By Arthur F. McCarty

THERE is at least one place in the country where the present situation as regards unemployment is developing into the direct cause of new jobs, anomalous as that may seem. In other words, the lack of jobs is creating new jobs, or, at least, creating a situation that will almost certainly produce new jobs. The place where this phenomenon is being observed is Kansas City, and, in a nutshell, the thing is stated thus: The increase in unemployment has led to an increase in savings with the associations and banks; that makes funds available for loans to home builders; the building of the homes provides new jobs. No doubt the same phenomenon may be observed in other communities.

R. O. Douglas, of the Jackson County Savings & Loan Association, of Kansas City, says that all savings associations and banks of that district are receiving unprecedented receipts in savings accounts. It is presumed that unemployment has brought a realization of the wisdom of saving to people who are employed and able to put away part of their earnings against the time when they, too, might be thrown out of work; then, added to that feature, there is the concerted effort now being made by most sensible employers to get their workers to start savings accounts. At any rate the increase in volume of money flowing into these institutions is such as to materially affect the situation in real estate loans, for these are the fountains from which flow the funds available for that class of investment security. As is well known, home building is at a standstill because of the scarcity of financing funds alone—not because the homes are not needed, for they are—and thus we have a sort of chain-increase of unemployment, followed by increase of savings deposits, followed by increase in loans for home building, followed by the increase in employment due to building the homes.

A. P. Nichols, president of the Anchor Savings & Loan Association of the same city, says he has been much impressed by this condition. A railroad official whose company employs about 1,200 men in Kansas City was approached by Mr. Nichols, who expressed his appreciation of the arguments for thrift that had brought 20 new savings accounts from that force of men in the past 30 days, to which the railroad official replied:

"I am not satisfied with the returns thus far; we should have seen enough men to procure 450 new accounts. I am not working for the association. I am working for my railroad, and I know what it means to service when the men get to saving their money."

He went on to say that in retrenching recently the company had found it necessary to let out about 300 men. It was found that almost every one of those men had nothing whatever saved to tide him over a period of idleness while shifting to new employment or awaiting the return of his old job. It was that state of affairs that led that official to start his thrift campaign among his men, and he added that unless the association succeeded in getting the 450 new accounts from among his force he would get the men to start an association among themselves.

The shortage of homes still exists everywhere, and if general building could be started there would be almost enough employment created to care for the whole situation, through the natural shifting of men that would follow. Of course not every man who is thrown out of work can qualify as a building artisan, but many who are building artisans are working at other tasks which they would leave at once to take up their own line of work, thus leaving places open for the first named worker.

Thus, as the home building work awaits only financing, and as the savings banks and associations are the principal sources of money for such financing, the increase in savings may easily constitute the turning point from unemployment to full employment. If so, it is but one more potent argument for thrift added to the hundreds of unanswerable ones we already have.

A Portable Mixing Plant

WHEN constructing the 6½ miles of 12-duct subway between Union and Passaic, N. J., and the 2¼ miles of 24-duct subway between Jersey City and Newark, N. J., the New York Telephone Co. were confronted with problems which compelled some radical changes in equipment.

The construction of the subways was of multiple duct tile with a concrete foundation and concrete top protection, and all manholes were built entirely of concrete.

The road on the Union-Passaic job being very narrow and lined with swamps on both sides, the mixing of this concrete would have necessitated the building of platforms in the swamps for the mixer and material about 500 feet apart and at a very high cost.

This concrete mixing plant mounted on an automobile truck was their answer.

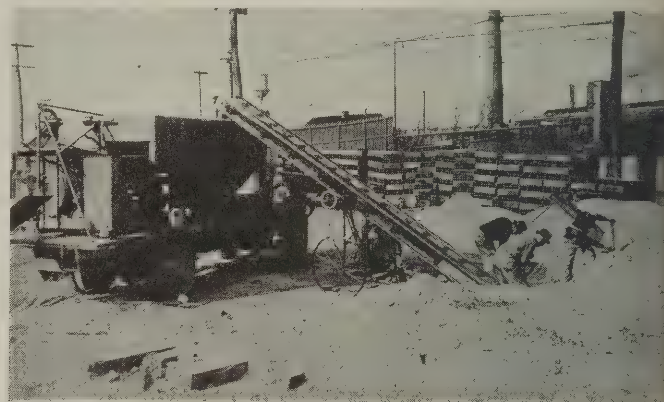
The outfit consists of a power batch concrete mixer mounted on a seven-ton Packard motor truck, which was also equipped with two gravity hoppers, one for sand and the other for stone, in addition to a tank for water.

The materials for the concrete were gathered at a convenient place on the job and the sand and stone loaded into the hoppers by a Portable Machinery Co. Scoop Conveyor as shown in one of the illustrations. Bags of cement were also put on board and, fully loaded, the outfit carried material sufficient for five yards of concrete.

The power mixer was fed by a laborer on the truck shoveling sand and stone from openings at the bottom of the gravity hoppers. The concrete was poured directly into the truck or manhole excavations by means of a spout. The truck driver, with a little practice, found it possible to regulate the forward movement of the truck to give the required thickness to the concrete in the track so that little hand spreading was necessary.

The saving by his equipment on this job was very great.

On the Jersey City-Newark job, although it was possible to mix the concrete in the usual way at stations along the trench, the use of the automobile mixer was found to be about 25 per cent cheaper than the fixed concrete mixing stations and the dumping of concrete into the trench and manhole excavations from wheelbarrows.



Quick Disposal of Trees on Building Sites

When a contractor is not justified in using a steam shovel on an excavation job he likes to adopt the next best method—plows and team scrapers; but trees on the site prevent it. I frequently see contractors clearing building sites of trees in the slowest and most expensive way—chopping down the trees, then grubbing out the stumps.

Recently I showed the Rosemary Manufacturing Co., Rosemary, N. C., a much quicker and cheaper method. There were nine pines, averaging 15 inches in diameter, on a plot on which they intended to build. With a helper I had them off the building site and the ground ready for the plows and scrapers in 10 hours and at a cost of $16.

I put down bore holes on opposite sides of each tree, loaded a pound of 40 per cent ammonia dynamite in each hole, connected up the charges with copper wire and fired with electric blasting caps and a blasting machine.

A rope was tied 20 feet up each tree, with which we pulled the tree down just where we wanted it to fall. There were buildings close by and it was necessary to control this.

A mistake some contractors make when they use dynamite is in cutting down the tree and blasting the stump; that is, I mean, when buildings are near. Pieces of stump are very likely to fly through the air and may damage contiguous buildings, but it is very seldom that any pieces big enough to do any harm ever are thrown off a standing tree, and the rope makes it possible to lay a tree where it is wanted, whereas the fall of a stump cannot well be controlled.—*Hannibal Shearin.*

Lumber Sizes

Commenting on lumber sizes, Jesse A. Collyer, Sr., of Ossining, N. Y., states: "You order a 1-in.x8-in., for instance, and when you receive it you get as small as ⅝-in.x7¼-in. Builders must add five per cent for this item alone. Square edge material should be full size. We are willing to pay a little more for it to save labor on the job of ripping, planing, etc."

Investigation by the NATIONAL BUILDER discloses the fact that the National Lumber Manufacturing Association has been working on a plan to standardize lumber sizes and that, at the last convention of this association, a plan was submitted whereby this might be accomplished. This plan was received favorably by the member associations and taken under advisement. The plan has since been adopted by two of the members and it is expected that the others will soon follow suit.

This plan, however, does not attempt to realize, the full size dimension lumber hopes, of some contractors and builders. This has been tried so often without success that they have practically abandoned the idea, but it does attempt to bring all of the various mills manufacturing lumber under one set of standard sizes, regardless of the kind of lumber manufactured.

The present standards for 1-in.x8-in. S2S vary from 13/16-in.x7½-in. to 25/32-in.x 7½-in. The Association Chart will make 13/16-in.x7½-in. the standard for this size.

The general sentiment among architects and builders, the Association finds, is not so much in favor of full size lumber as it is standard size lumber for all kinds and grades.

Colored Wall Plaster*

Pleasing Effects from Colored Fiber Obtained in Experiments of the United States Bureau of Standards

By Warren E. Emley and Charlotte F. Faxon
U. S. Bureau of Standards

THE NATURAL COLOR of a wall plaster is white, or nearly so. For many years it has been customary to accept this white color as inevitable.

The quality of a plaster is indicated by its natural color in a way which is strikingly analogous to the method used for classifying diamonds. The best plasters are slightly tinted with blue; pure white plasters are of excellent quality, and the poorest grades have a buff or reddish tinge. This fact has led the plasterer and the building contractor to look with favor upon a white or bluish-white plaster because these colors are usually accompanied by excellence in quality.

On utilitarian grounds, plaster has established its position in the building industry. Its fire resistance, its heat insulating, and its acoustical properties are of primary importance. The appearance of the plaster, while admittedly and rightfully of secondary importance, is receiving more and more attention from progressive architects and builders.

The white color of plaster is sometimes objectionable in that it does not fit in with the artistic scheme which the architect is trying to evolve. It is true that the plaster may be covered with kalsomine or wall paper, but it seems to be worth while to attempt to make the plaster of the desired color in the first place.

Several attempts have been made to produce colored plaster, but the method has not proven sufficiently satisfactory to warrant its general adoption. It involves the use of a mineral pigment, which is mixed with the plastering materials. A buff or red can be obtained with oxides of iron; a gray with lampblack. It has been found extremely difficult to mix the pigment with the plaster in such a way that two batches have exactly the same tint. Deep shades of color require the addition of so much pigment that the strength of the plaster is impaired. A plaster made by this method has a dead color, which is desirable when the plaster is considered as a background for other decorations, but which has little artistic value of itself.

Colored Concrete Parallel

Some years ago, J. J. Earley developed on a commercial scale the manufacture of colored concretes by the exposed aggregate method. Many examples of the beauty of such concretes and of the flexibility of the process can now be seen in buildings, walls, and pavements of Washington. Instead of the usual crushed stone or gravel which is used as an aggregate in concrete, he uses crushed stone which is prepared from naturally colored rocks, carefully selected and mixed to produce the desired artistic effect. After the concrete has set, the surface is removed and the colored aggregate thereby exposed. At Mr. Earley's suggestion this same principle has been applied to the manufacture of a colored wall plaster.

The first step was the selection of the proper aggregate. Fortunately, this offered no difficulty. There has been on the market for many years a material known as "gypsum wood-fibred plaster." This consists of approximately 85 per cent of calcined gypsum (plaster of Paris), 14 per cent of some material such as lime or clay added to give it the necessary plasticity, and one per cent by weight of wood fiber. It is one of the many commercial forms of wall plaster, and its position in the trade is so well established that tentative specifications for it have been adopted by the American Society for Testing Materials.

This plaster is usually designed to be used without sand, the wood fiber being considered as an aggregate. The fiber is quite similar to the ground wood used in making newspaper, except that the staple is a little longer.

Dyed Fiber

The proposed process consists briefly of dyeing the fiber the desired color with aniline dyes, mixing it with the other ingredients, applying the plaster to the wall in the usual way, and then, after the plaster has set, removing its surface in such a way as to expose the colored fiber.

The first difficulty encountered arose from the lack of literature describing the behavior of aniline dyes on wood. Most of our experimental work was devoted to this phase of the subject—the testing of a large number of dyes. These tests were conducted by exposing half of a sample of dyed wood fiber mixed with the other ingredients of a colored plaster to direct sunlight for six weeks. The other half of the same specimen of plaster was kept covered. If, at the end of six weeks, one could not distinguish between the two halves of the sample, the dye was pronounced satisfactorily fast to light. Fastness to water is not essential; in fact, it is usually desirable that the dye shall "bleed" a little. The color runs into the plaster surrounding the fiber, thereby making the fiber appear to be larger than it is and making it possible to obtain the desired effect with the use of less fiber than would be possible if the dye were fast to water.

It was found that wood fiber acts quite similarly to jute in taking up dyes. Any one of the classes of dyes can be used—silk, wool, cotton, or direct. A dye which is fast to light on the fiber on which it is intended to be used will usually be fast to light on wood fiber. If the dye is fast to water, it can sometimes be made to bleed slightly by drying the dyed fiber, without washing it. As a general rule, a small amount of alum added to the dye bath answers the purpose of a mordant. The heterogeneous character of the wood prevents the dye from being absorbed evenly. As will be shown in the following discussion, this is an advantage rather than a detriment, so that no leveling agent is necessary.

General Scheme

A general method of procedure may be illustrated as follows: In an indefinite quantity of water, dissolve an amount of dye equal to three per cent of the weight of the fiber. Heat the solution nearly to boiling and add the fiber. Add about two per cent of alum (aluminum sulphate) based on the weight of the fiber. Digest hot for about one hour and let it cool. Remove the fiber and dry it (usually without washing) in a drying oven. These directions are to be taken in a very general sense. Changes in them, to suit the different dyes, will be suggested by the directions given by the dye manufacturers, by standard textbooks, and by experience.

The kinds of dyes which may be used are illustrated by the following list of a few of the many dyes we have found satisfactory: Alizarine cyanine green G extra, alizarine cyanine yellow, alizarine cyanine irisol, crocein scarlet 3 B, rhodamine B extra, sulphur blue, diamine brown, diamine rose, naphthol orange, beta naphthol yellow, flavopurpurine, alizarine tartrazine, chloramine brown. Obviously any desired color can be obtained.

It is to be understood that these colors have proven fast to light when tested by

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*Reprint of Bulletin 181, U. S. Bureau of Standards, Washington, D. C.

the laboratory method described above. Before attempting any commercial application, it would, of course, be wise to determine the permanency of the dyes which it is proposed to use. This information may be obtainable from the dye manufacturers, or it may be necessary to learn from experience. Attention is called to the fact that the color need not be perfectly fast to light to give satisfactory service. If a wall is evenly exposed, so that all parts of it fade at the same rate, the fading is not a serious defect. There is also the probability that the walls will be re-decorated every few years to suit the tastes of new occupants of the building.

There are a great many pure chemical compounds which have definite colors in and of themselves. A massive piece of such a compound will appear in its true color, irrespective of the viewpoint of the observer. However, most of the materials with which we are familiar are not simple substances, but are mixtures of several ingredients. This is particularly true of wall plaster. If the different ingredients have different colors, as is usually the case, then the color of the mixture will depend upon the relative amounts of the ingredients, the relative sizes and positions of the particles, and the viewpoint of the observer. A plaster which appears gray on casual observation may, on close inspection, be found to consist of a number of black specks embedded in a white matrix. If the black specks are large enough to be easily visible, then the plaster is no longer gray, but is a mottled black and white. It will be noted that the term "easily visible" defines the position of the observer. The mottled effect, which is pleasing to the eye, is obtained only when the black particles are uniformly distributed; if they are collected in large aggregates, the effect is blotchy and displeasing.

Mixing Colors

While fibers of one color only can be used, better effects can be obtained by the use of two or more different colors. In this way, the predominating color can be made more agreeable and satisfying by the use of supporting colors. Spots of the principal color should be distributed uniformly (but not in regular pattern) throughout the matrix. They should be large enough so that their identity can be distinguished without effect. Each spot should be set off by surrounding it with a number of small spots of one or more secondary colors. These should be so small that they cannot be distinguished except by close inspection. The effect of the whole can be improved by giving the surface a rough texture.

Of course, due care must be taken that only those colors are used together which harmonize well with each other.

Plasters colored by this method will have "life." By this it is meant that the color of the plaster is more or less dependent upon the position of the observer; the color changes as he moves. Suppose, as the simplest case, that a plaster contains fibers of two principal, but no secondary colors. When viewed from one direction, it is probable that one color would be reflected much more than the other and would become dominant. Viewed from another angle, the reverse might be the case. Close inspection would reveal the two colors equally. At a sufficient distance, the reflected colored lights would be superimposed, giving rise to an entirely different color, or even to gray if the original colors are complementary.

A similar live effect can be produced by a rough surface. The protuberances cast shadows on the depressions, and thus produce light and dark tints. The intensity and the apparent magnitude of these shadows depend upon the position of the observer, and seem to vary as he moves. The life of such a surface, and its pleasing effect, is dependent upon its texture.

The above statements form a brief outline of the principles underlying the manufacture of this type of colored plaster. It will be noted that the effect desired may be described as a "uniform lack of uniformity." It is desirable that the wood fiber shall not take up the dye evenly. The principal color can be made predominant either by using a large quantity of fiber or else by using a dye which will "bleed." For the secondary colors the fiber should be quite small and the dye fast to water, or, if the dye will bleed, the fiber may be replaced by sawdust.

Ready-Mixed Colored Plaster

The desired proportions of the different colored fibers are mixed with the calcined gypsum and other ingredients to form a gypsum wood-fibered plaster of the usual composition. This is shipped dry, mixed with lime putty and water, and applied in the usual way. Up to this point the only novelty in the manufacture of a colored plaster lies in the use of a dyed wood fiber instead of the naturally colored material. Of course care must be exercised in the selection of colors which will blend harmoniously, and in the admixture of the proper proportions of primary and secondary colors.

The desired texture of the finished surface may call for a variation in the quantity of fiber used. It will be recalled that commercial wood-fibered plaster contains about 1 per cent of fiber by weight. This is equivalent to about 15 per cent by volume. About 1 part of fiber to 1 of plaster, by volume, is the maximum amount which can be used if the surface is to be troweled smooth. If, however, a rough surface is desired, the quantity of fiber may be increased; 2 parts of fiber to 1 of plaster can be used by patting it into place.

A rough texture is produced by brushing the plaster just as it sets. This removes the gypsum from the surface and exposes the colored fibers. Differences in the quantity of fiber and in the method of brushing permit the production of a great variety of textures. We have developed three types of texture which are illustrative of variations obtainable. The "smooth finish" is obtained by the use of a plaster containing 0.3 to 1 part by volume of fiber to 1 part of plaster. The plaster is troweled to a smooth surface in the usual way. Since this surface is not brushed, and the fiber is not exposed, it is necessary to use dyes which will bleed rather profusely. Otherwise the color will not be sufficiently pronounced. Just before the plaster has set, it may be brushed with a fiber scrubbing brush, taking care that the marks made by the brush are all either horizontal or vertical. This produces an "organdie" finish. For the "tapestry" finish, we use 2 parts of fiber to 1 of plaster. This is patted into place but cannot be troweled. Just before the plaster sets it is stippled with a wire brush. The resultant surface is very rough and bears some resemblance to tapestry.

Removing Efflorescence

It was found that a slight efflorescence appeared during the drying of the plaster, which marred the brilliance of the colors. This was overcome by washing the plaster with soap and water. The soap can be applied just before the plaster is finally troweled down, or the plaster may be allowed to harden and dry before scrubbing it. A thick solution of strong laundry soap in hot water is recommended. Apparently the soap enters into chemical reaction with the lime in the plaster, forming a calcium resinate or similar gelatinous compound, which effectually closes the pores of the plaster and prevents further efflorescence.

This method of scrubbing the plaster with soap and water affords a housewife a means of brightening the walls whenever necessary.

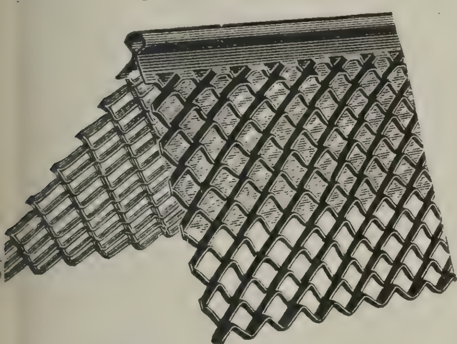
No matter how pleasing the appearance of a wall may be, it is probable that a change in the decorative scheme will some time be desired. When this occurs, it is only necessary to remember that a colored wall plaster is essentially the same as any other wall plaster. It may be covered with another coat of plaster, either colored or white, or it may be painted or papered in the usual way.

In conclusion, it may be stated that a method has been developed for producing a colored wall plaster of any desired color or texture. Effects can be produced with this plaster which are not attainable with either paint or wall paper. A wall finished in this plaster can be washed when the colors become dull or soiled, or it can be redecorated in the same way as any other plastered wall.

Announcements and Publications

The Cornell Wood Products Co. announce the completion of the latest addition to their original plant at Cornell, Wis., in January, and it is now in full operation. With this addition The Cornell Co. has been able to increase production about 80 per cent.

Metal Lath Expansion Corner Bead is a new development by the Milwaukee Corrugating Co. by which the diamond mesh of the web provides a truss from end to



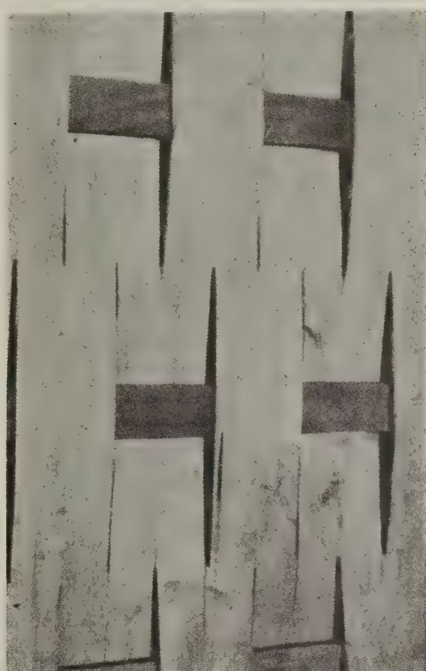
Expansion corner bead

end of the bead, affording increased strength and reinforcing the corner strongly, so that any shock experienced by the nose of the bead is transmitted through the walls without injury to the corner.

Winthrop Tapered Asphalt Shingles—"The Big Butt Shingle"—Announcement is made that the company controlling the patents of these goods and the companies manufacturing under these patents have established a plan of standardization and distribution at a recent meeting. A standard package with a distinctive fiber carton has been adopted packing 85 shingles to the box, four boxes to the square. An exclusive agency plan was adopted, to be supplemented by national and local newspaper advertising. The companies interested are the Beckman-Dawson Co., which controls the patents; Lockport Paper Co., Canadian Roofing Co., and Brantford Roofing Co.; Beecher, Peck & Lewis Co., exclusive sales agents for the Peck Asphalt Shingle Co.

Red Lead—How to Use It in Paint, by Alvah Horton Sabin, M. S., D. Sc., has just been published in a new third edition by John Wiley & Sons, Inc., 432 Fourth Avenue, New York, N. Y. This new edition, while containing much of the original text, has been re-written and amplified to such an extent as to make it a practically new book. Based as it is on 30 years of experience and study of protective coatings, the information given is practical and extremely valuable to the man interested in the uses of red lead, and is arranged in a simple, comprehensive and thoroughly usable form. Tables are appended for the convenience of those who use the British measures. The book contains 139 pages, 5x7½, with many illustrations, charts and tables. Cost, $2 postpaid.

The O'Brien Woven Lath Co., East Chicago, Ind., has renewed activities partially suspended during the War. The product is a new base for all forms of plaster and stucco. Special machinery cuts veneers of a fifteenth of an inch thick in sheets two by four feet. Slits are afterward cut by a special machine and an inter-



O'Brien woven lath unit

lacing seven-eighths of an inch wide is automatically inserted. A 40-per cent saving in cost of plaster and stucco and one-third in the cost of labor is claimed by the manufacturers.

Masonry Structures, by Frederick P. Spalding, presents in a brief and systematic way the fundamental principles involved in the design and construction of masonry structures. The term *masonry* has been construed to include concrete, and the field covered by the title is a very large one. The following branches of the subject are clearly treated: the development of masonry construction, cementing materials, stone and brick masonry, plain concrete, the ordinary theory of reinforced concrete, retaining walls, dams, reinforced concrete slab and beam bridges, and the various types of foundations and foundation materials are given brief descriptions. The book contains 404 pages, 6x9, with 129 figures and many tables. It retails for $3.50. John Wiley & Sons, Inc., publishers, 432 Fourth Avenue, New York City.

The Austin Machinery Corp., of Chicago, will rebuild its plant at Winthrop Harbor, Ill., recently destroyed by fire—its position geographically demands it according to the officers of the company in order to supply the west and northwest territory.

Stanley Garage Hardware is described and illustrated in a new four-page folder just issued. Hardware for brick and concrete garages or where doors require an offset and their new cushion-type of door-holder is shown. Issued by The Stanley Works, New Britain, Conn.

Kent Continuous Concrete Mixers are described in a new and attractive booklet just issued by The Kent Machine Co., of Kent, Ohio. Automatic measuring, dry mixing, wetting, wet mixing, and discharging, are among the distinctive features according to the manufacturers. A copy of this booklet may be had for the asking.

The Expanded Wood Lath Corp., Conway Building, Chicago, Ill., has placed on the market a base for plastic coverings for all purposes. Its unique features are shown partially in the illustrations. It is a strip

Fig. 1—Showing manner of cutting expanded wood lath. The back is cut in horizontal ribs

of wood manufactured by special machinery. Fig. 1 shows the front of the strip before expansion. Ribs narrower than the strips are cut in the back at the same

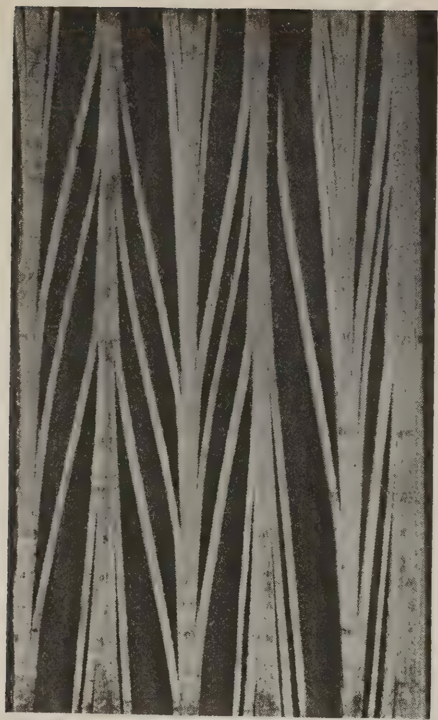


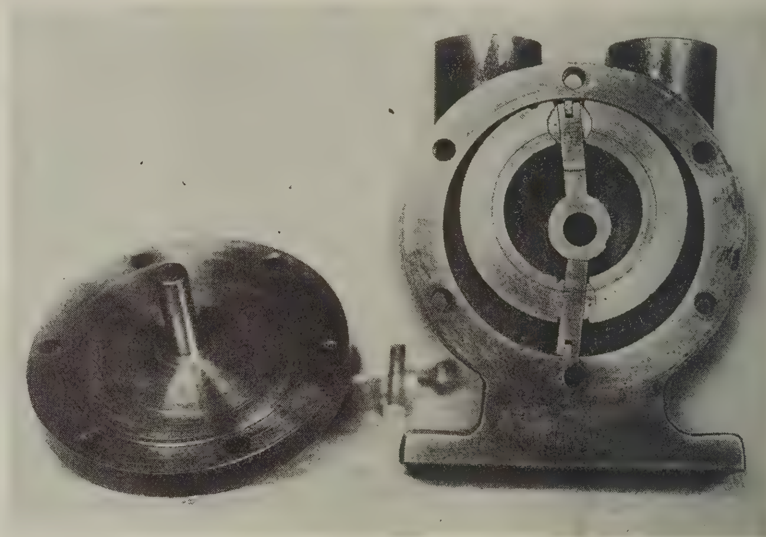
Fig. 2—Expanded wood lath backed with sheathing paper

time, so that plastic covering when applied passes beneath and around the ribs. Fig. 2 shows the expanded lath as completed, backed with paper of varying thicknesses to meet all requirements. The lath is manufactured in 5/16 and ½-inch thicknesses, 9 to 18 inches wide and 4 to 8 feet long. The lath may be shaped around corners and angles, and removes the necessity of papering or furring, as furring is part of the lath itself. It is said to economize plaster and labor, and its construction prevents buckling.

Mandt End-Dump Steel Bodies on Light Trucks—The Mandt Body Co., Keokuk, Iowa. announce extension of their operations and organization. The illustration shows one of the dual types of dump bodies used for direct charging of mixers. The single body is a one-yard body which can be attached to any one-truck body in 10 minutes. These bodies are all steel plate, are of gravity type, and dump load in two seconds. The operator does not leave the truck to dump the load, though a figure is shown in the illustration, and no power is required to operate the body which dumps clean at an angle over 60 degrees clear of the wheels, exactly where wanted and saving shoveling. The bodies can also be obtained for side-dumping on a three-ton truck.

The dual type of Mandt automatic dump bodies

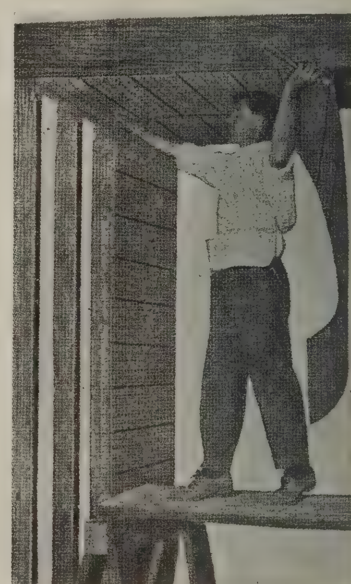
The "Wonder" Rotary Pump—The Houston Mfg. Co., Houston, Tex., have placed on the market an all-purpose rotary pump in three sizes, of the type shown in the illustration. The points of merit claimed are simplicity of design, having but three moving parts, no packing used, foolproof, and practically no maintenance expense. The efficiency of the pump of a size one-half larger than the illustration is demonstrated it is claimed in ability to pump five gallons per minute with 250 revolutions, and at a demonstration produced 30½ inches of vacuum under low pressure conditions.



Rotary pump, one-half size, pumps five gallons per minute

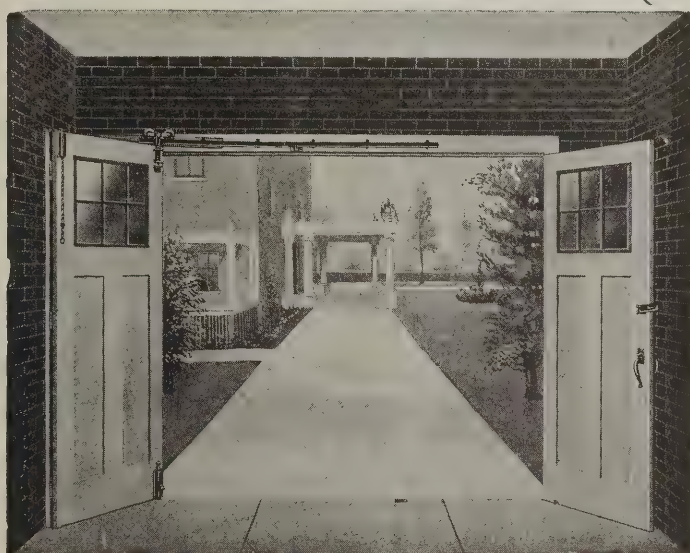
Thermo Pipeless Furnaces and Rybolt Reliable Furnaces—Illustrated descriptive folders issued by the Rybolt Heater Co., Ashland, Ohio, showing in detail construction and principles of heat distribution of these furnaces.

Sheet lathing illustrated herewith is decribed and directions for its use by the lather and plasterer are given in a pamphlet issued by the manufacturers, the Sheet Lathing Corp., 205 Sunset Avenue, Syracuse, N. Y. Among its merits according to the manufacturers are substantial reinforcement combined with light weight, 29-gauge steel strips attached to the surface cross-wise every six inches, and sixteen 25-gauge iron wires running lengthwise within the material.



Sheet lathes

The lapping of the sheets on both wall and ceiling forming a solid, continuous plastering surface without joints and divisions, thus eliminating wall cracks, is claimed as another distinctive feature.



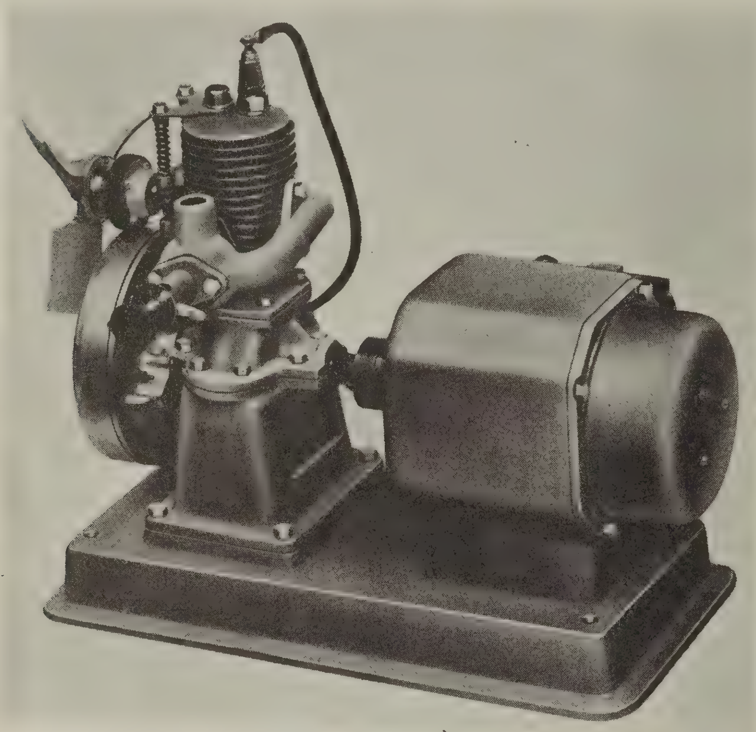
NATIONAL Garage Hardware

National Garage Hardware is built to fit practical needs, and the ability to fulfill these needs through long years of service has given this product a reputation that insures satisfaction with every installation.

Write for booklet, National Garage Hardware

The National Mfg. Co., Sterling, Illinois

Liberty Home-Lighting Machine—The Liberty Lighting Machine Co., Toledo, Ohio, announce a new automatic lighting machine of compact size and portability, suitable for summer homes, camps, motorboats, yachts and cruisers. It measures 22 inches in length by 16 inches in height, 12 inches wide, and weighs 85 pounds. The distinctive features claimed are operation on direct drive by a single-cylinder, two-cycle, air-cooled gasoline engine of two-port construction. No valves to grind, no gears or belts and no radiator to keep filled with water. Fuel is supplied through a specially designed siphon valve which prevents raw gasoline entering the cylinder. A limiting governor regulates the charging and discharging of the batteries. A hydrometer attachment by which the engine is automatically started when batteries need recharging and shuts off when charging is completed. The machine will operate twenty 20-watt lamps without depletion of batteries.



Liberty lighting machine

The Iron Products Corp., 90 West Street, New York City, have purchased the capital stock of the Molby Boiler Co., Inc., and will equip a plant for the exclusive manufacture of Molby boilers. E. C. Molby, founder of the Molby Boiler Co., Inc., will continue as general manager of sales for the new company.

The Central Foundry Co., of 90 West Street, New York, announce the appointment of Henry Hoeltge as advertising manager.

The Stanley Works, New Britain, Conn., have just issued the second edition of the Ball Bearing Butt Catalog. Actual detail drawings show the various types of butts applied to wood, Kalamein, and metal doors and jambs, and cuts show the ball bearing construction.

A new Stanley Screen Hardware Book describing and illustrating their latest offerings in screen hardware has been issued by the Stanley Works, New Britain, Conn.

"Zinc Spouting" is the title of a leaflet issued by the New Jersey Zinc Co., 160 Front Street, New York, explanatory of the uses and economy of zinc for leaders, gutters, valleys, flashing, shingles, and ridge-roll.

"Concrete Schoolhouses" is the title of a well-arranged booklet just issued by the Portland Cement Association explaining the benefits of concrete construction in schoolhouses particularly from a fireproofing standpoint. Illustrations and descriptions of schools constructed of concrete in various parts of the United States are shown. Copies of this booklet may be had by writing the Portland Cement Association, 111 West Washington Street, Chicago, Ill.

Johnson's Artistic Wood Finishes are shown in an effective and unusual way in a recent folio put out by S. C. Johnson & Son, Racine, Wis. This folio contains 30 thin panels of 1¾x3¼ inches, stained and variously finished to show the effects possible with oak, cypress, southern pine, birch and maple. In addition to containing instructions for applying Johnson's Wood Dye, Under-lac, Flat Wood Finish, Prepared Wax, Paste Wood Filler, Floor Finish and Kleen Floor, a table of covering capacities is included. The booklet will be sent free to those using and specifying Johnson Wood Finishing Products.

"Acceptances: Trade and Bankers'," by Park Mathewson, vice-president of the Business Bourse, New York, is a timely work dealing comprehensively with a principle on which the Federal Reserve System depends and in the modifications of which the building industry is vitally interested. The subject has heretofore been treated for the most part in scattered periodical articles, and the present volume classifying and digesting the rulings and opinions of the Reserve Board, outlining the methods of trade acceptances, with forms illustrating accounting methods, etc., provides a valuable work of information and reference. A copious cross-index of rulings and a subject index are notable features. 372 pages; price $3.50 net. Published by D. Appleton & Co., New York.

Hero Furnace Co. Opens New Plant—The general offices of the Hero Furnace Co., which have been maintained at 57 West Lake Street, Chicago, for the past 30 years, have been moved to the new factory at Sycamore, Ill. The company's product, Hero pipeless furnaces, Hero pipe furnaces and Hero room heaters, have for many years been produced in three different factories in as many different cities. The new factory located on two railroad lines with close siding connection to the Chicago Outer Belt, permits a concentration of the works, sales and administration offices, ensuring a higher sandardization, production and efficiency.

Fox Floor Scraper Blades — The Fox Supply Co., Brooklyn, Wis., manufacturers of floor scrapers, floor scraper knives and accessories, issue a sheet of instructions illustrating and describing approved methods of re-sharpening floor scraper blades.

Sloppy Concrete Scored

Sloppy mixtures of concrete used in many instances by road and building contractors, were condemned by H. C. Boyden, of the Portland Cement Association, in an address on "The Recent Developments in Concrete," at a meeting in Indianapolis, Ind., held under the auspices of the American Association of Engineers, at the Chamber of Commerce recently. He said the practice of using a sloppy concrete mixture was carried on by many contractors, and said that at least 60 per cent of the efficiency of the concrete was lost in such instances. "Such practices may be beneficial to the contractor," he said "but they are certainly not to the builder or the designing engineer." He advocated the lowest war ratio that would produce a workable mixture, and said that too much water in the mixture tends to produce a honeycomb effect when the concrete is placed to harden, permitting the aggregate to become segregated, and the water and cement to settle apart from the other elements.

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Vol. 64 June, 1921 No. 6

Contents

NATIONAL BUILDER

'olume 64 Chicago, June, 1921 Number 6

The Situation

)N the two following pages conditions and opinions are submitted regarding 'e labor situation as labor is now the chief :bject of interest in the building industry. hat the intricacies and ramifications of trigue and corruption now being exposed is touched all classes is the natural out-me of the practices of years begotten of ıfair stipulations or vague and one-sided .ntracts.

The "easiest way" has been taken because oral or ethical standards meant ruin, and ·ibery has become a recognized practice : necessary as "the roof of the house."

The outrageous practices that have been ›vertly and cynically admitted to exist hile confessed in private are denied in ›en court, and no stigma attaches to the ılprits beyond the slight amusement at ıeir predicament and their shuffling ethods of meeting or evading the mere ›rmality of admitting the obvious facts.

The A. G. C. Declarations

When the disclosures obtained by the ockwood Legislative Committees in New 'ork were announced the Associated Gen-ʼal Contractors of America demanded that ıvestigations be carried through to purge ıe building industry of the disease that as endangering its credit and reputation. he vigorous address of General Manager [arshall declared for "Skill, Integrity and esponsibility" as the watchwords of the rganization that even as a "saving rem-ant" would rebuild and establish a new ·der in a new day.

The organization has been progressing eadily in its work of placing the con-'acting business on an *informed* basis, and ıe magnitude of the work instead of being deterrent has evidently become an in-›iration. The contractors have adopted ›th a motto and a seal which the mem-ɜrship uses and advertises and both motto ıd seal advertise the individual members. 'he motto and the emblem is used on each ıembers' stationery and stencils have been rovided so that not only the equipment of ıe contractor members may bear the em-lem and the motto but any work they have nder progress may carry the insignia and eclaration as well.

The Unstable Dollar

It is fitting at this time to call attention to principles explained by Professor John R. Commons in his recent work on "Trade Unions and Labor Problems," in which he points out that the fluctuation of currency is the greatest of all the labor problems. "It throws a red brick continually into capital and labor. The first great method of importance in bringing about industrial peace is the stabilizing of the dollar. If we could have a system of currency in which the price movements which have been occurring in all these years could be stabilized, we would do more to stabilize industry, to bring about industrial peace than any other one thing. In times of rising prices we have restrictions. aggressive movements; in times of falling prices we have unemployment, bankruptcy, and depression. The whole situation is rendered unstable, and we are living continuously in a period of uncertainty."

"Skill, Integrity, Responsibility"

Professor Commons confesses that he sees no way of reaching this fundamental question except the remedy proposed by Prof. Irving Fisher, of stabilizing the dollar, a remedy remote. "Consequently," he says, "the best that can be done is for employers and employees to adjust themselves to the situation. Capital and labor alone cannot prevent the fluctuation." He calls attention to the plan being worked out by the book and job printing business with the labor organizations as the one great constructive plan in this country on a national scale to bring about industrial peace by meeting the situation of the currency. This plan in the process of adoption embodies the principle that the employers will not wait until demands are upon them, but will automatically change the level of wages as the changing price curve moves up or down.

All of which is food for thought and worthy of the serious consideration of the A. G. C., the labor committees of which reports the situation in a fair-minded way in the April *Bulletin,* thus:

"In adjusting wages, the cost of maintaining a wage earner's family is an essential consideration, but at least two other factors of scarcely less importance must also be carefully weighed. These are: the effects of a given wage, first, on final production cost, influencing the demand for construction, and secondly, on the supply and efficiency of labor.

"If, as is the case today, construction labor costs are so high that very few owners will build, then wages, as well as material must obviously drop to a lower level. Should this level threaten to fall below a decent standard of living, employees have two alternatives open: (1) They must increase their efficiency until the higher wage can be borne by unit production, or (2) turn away from the falling wages in their own craft to other industries where the demand is still capable of withstanding a relatively high labor cost.

"The latter course, in view of the impending construction program, would be a calamity to both employees and employers. If wages should be forced down so low that building mechanics are driven to other industries, then when the program gets under way, the shortage of labor will drive wages up and incur again all the difficulties of readjustment. On the other hand, if labor insists on both high wages and restricted output, the present condition of stagnation and unemployment will persist.

What Adjustment of Wages Mean

"The present wage problem, therefore, calls for a fine adjustment between a reasonable standard of living, increased efficiency, adequate labor supply and costs attractive to prospective owners. These factors, properly adjusted, ought to produce agreements which are both economically and socially sound."

The Labor Situation

"THERE IS NOT now and never will be a real surplus of skilled labor in the building industries," writes a prominent New York architect. Doubtless there is a good deal of truth in that statement and it should be a fundamental consideration in the settlement of labor problems.

Building work is just now (the third week in May) tied up in nearly all the large cities because of strikes or lockouts, but is going ahead in many smaller places. In Pennsylvania and possibly other localities a distinct movement of union tradesmen to open-shop country jobs is discernable, and if the deadlock in the cities continues this movement will probably become quite general. The result will be that as soon as building work in the cities picks up—and it must pick up before many months—the big city contractors will be scouring the countryside for skilled laborers and bidding up wages, just as many buyers will bid up the price of wheat or corn.

In Chicago, where a lockout has been in effect since May 1, employers say they could put 10,000 men to work immediately, if the men would accept a 20 per cent wage cut. But in some of the suburbs around Chicago contractors are reported to have broken away from the building trades employers' organizations and are going ahead with dwelling-house work on the old basis of wages.

The Chicago situation, and that in other large cities, is complicated by exposures of crooked deals by labor union heads, in which both the building owner and the union laborer alike have been the victims of unscrupulous men. This knowledge—that they have been sold out by their leaders—is doubtless driving many self-respecting workmen from the cities to the smaller places, where they are often willing to work under open-shop conditions.

Open or Closed Shop

There is no evidence in the letters and information reaching NATIONAL BUILDER that there is a national movement for open shop in the building trades. There is a practically universal belief that present wages should be at least 20 to 25 per cent below 1920 wages. The issue in nearly every case that has come to our knowledge is a real wage issue and not an open-shop issue, but the prediction is frequently made that if strikes and lockouts last beyond a month or so, the employers in many instances are planning open shop.

A typical case is reported by a building contractor in a small city in western New York as follows:

"We have not suffered in this city to any extent from unreasonable union rules regarding two or three men to do a job which one man could do alone, although this has affected some trades to a certain extent, such as plumbers and electricians requiring a helper where they are not needed. It would not be difficult to do business with our local unions if it were not for the fact that their meetings are dominated by federation agents from out of the city. I do not think that our employers of the building trades intend to turn to the open shop unless the issue is forced on them.

"I think most of us are willing to deal with the unions if they would be fair and not make it impossible to do business. If they continue in their present attitude toward employers it may be that the building trades will be compelled to work on an open-shop basis. This is practically an open-shop town outside of the building trades. Our last strongest industrial union has just declared a strike off as lost when the molders failed to enforce their demands in the last closed-shop foundry in town. Industrially this city is open shop. The unions may make the building trades open-shop. It is possible that this is the proper time to settle the matter."

The wage issue has not reached a critical stage in many small places because carpenters and other building mechanics are making a fair living working by the day on small repairs and changes directly for building owners. There are disadvantages as well as apparent advantages in this for the owners, because under many state workmen's compensation laws they are liable for considerable sums should the workmen be injured on these jobs. In Pennsylvania, for example, the law requires every employer to carry compensation insurance, and the owner, to be safe, must secure a signed release from the building mechanics he employs at day wages to do his repair work. Failure to do this may cost an owner half a man's wages for a period of 16 years or so, in case of a serious or fatal injury.

Wage Settlements

Labor disputes already have been settled in a number of the smaller cities. In some cases wages have been reduced and in other cases they have not been reduced, yet everyone appears satisfied. Again, it is demonstrated that the labor problem in the building industries is a local problem, the settlement of which should depend largely, if not wholly, on local considerations. There is too much tendency to talk "cost of living." In times like these no farmer, manufacturer or seller of a commodity can always expect to make his selling price dependent on "cost of living" (that is, cost of production). He gets as much as economic conditions will stand for. A man who sells his labor is, or should be, no exception to a universal economic law. He is certainly entitled to as much more than the mere cost of existance as he can honestly achieve, but that is obviously less now than in boom times.

Possibly if more union men could be induced to study the economics of the constantly changing conditions, or if they were properly approached by employers, men of affairs, and men who do truly have the best interests of their communities at heart, wage reductions would come as material price reductions come, as matters of policy, good business and as vital to the life of trade, rather than because *average* living costs are, possibly only temporarily, less than they were a year ago.

The economics of the situation are by no means beyond the comprehension of the average building trades employe, if worded in every-day, common-place language, of which the following from the New York State builder, already quoted, is an excellent example:

"I think the building trades together with other trades in the Federation, such as miners, railroad employes, etc., seem to be taking the position that the great majority of the common folks in this country should make a contribution in order that they (members of the federation) might have a little higher wage and a little more reward for a little less production than anyone else. If you will examine the housing situation you will get my point. To illustrate—the lowest weekly wage received by organized labor in the building trades seems to be about $30 per week. It also appears that about the lowest priced house which can be built today large enough to accommodate a family of four or five in comfort and decency with proper sanitary and household conveniences, will have to rent for at least $30 per month. According to the recent reports of the State and Federal Labor Bureaus it appears that the average industrial worker in this state is receiving about $26 per week. If we allow the householder one week's wages for a month's rent, it would appear that the unorganized industrial worker receiving $26 per week must deprive his family of something in order to meet the monthly rental of $30 which appears to be the minimum required to provide a home such as he ought to have. I know of no reason why the average industrial worker is not entitled to the same living condition that the lowest paid building trade worker expects to get."

If a situation like this is put before honest, responsible union labor men, in a man-to-man conference in which it may be taken for granted that the best interests of everyone are the major consideration, it seems certain there would be fewer controversies in the building trades.

Clear-thinking building contractors do not look to Congress nor to other law-making bodies for a cure for either the present situation, or many others like it which in all probability will develop in the future. As the contractor just quoted says: "I am inclined to think that we have too many national problems now, and the building industry is already one of them. I do not think that the difficulty can be cured by legislation.

"The building trades union by their rules limiting apprentices and making it difficult to learn a building trade, are placing the country in a position where eventually there will not be enough building trades mechanics to do the required building at any price, and the exorbitant wages asked by the building trades mechanics through their unions will be so prohibitive that the situation in this country will within a short time become very nearly as bad as it is in England, where there is practically no building by private enterprises along low-priced residential lines. In fact, I believe that the time is here when it is very nearly impossible for the small builder buying at retail and employing several sub-contractors, to build as cheaply as can be done through a large organization buying in carlots and handling all the details of building work through their own organization and saving sub-contractors' profits.

"I think there is, and always will be, plenty of common labor, but there is no surplus of really competent skilled labor. Owing to the present rules under which the building trades apprentices learn their trades, it would seem that knowing anything about the business or possessing any degree of skill has nothing to do with their being admitted to the union or being entitled to the union scale of wages. It appears to me that one of the problems in building in the future is to devise a type of building which can be erected with as little skilled labor as possible."

The Future of Building Trades Unions

The tendency to use more and more, for ordinary building, materials that do not require skilled labor for their incorporation into structures has of course been recognized by many observers. Houses and other buildings are now made of huge slabs of concrete, brought from a central plant and erected by locomotive cranes, eliminating the need entirely of many building mechanics. Who can say what the ultimate development along such lines will be, if the labor element in the construction industries refuses to see the light of economic laws?

The building trades employe is generally far more happily situated when working for a small contractor, who treats him as a man and as a fellow citizen, than when employed by a great organization where he is only a cog in the machinery. Most labor troubles have had their inception under such conditions.

The small contractor stands between the trades union building mechanic and the reorganization of the building industry into great organizations which will develop methods of doing work, so far as possible, without the need of the skilled building mechanic. The interests of the two are therefore common, and should have weight in the settlement and prevention of labor controversies in the skilled building trades.

Eliminating Waste in Construction

In an address to the annual meeting of the American Institute of Architects, at Washington, D. C., on May 12, the secretary of the U. S. Department of Commerce, Herbert Hoover, announced that the department had undertaken to study and organize such effort as the Federal government could give to the building situation.

While any attempt at readjustment of prices and wages is absolutely a local question, Federal co-operation with professional and trade organizations could advantageously be developed, particularly in the direction of eliminating economic and physical waste in the industry.

Committee to Seek Basis for Standards

Mr. Hoover stated that he was informed that from 10 to 20 per cent of the cost of building lies in the lack of standards in a broad sense. We have, for instance, 260-odd building codes to which a large portion of the building of the country must conform. They vary flagrantly in floor loads, wall thickness, stress requirements, character of material to be employed; they hold back progress in methods of construction; they make impossible the standardization and simplification of certain materials which could be effected without affecting the attractiveness of design, of style, the arrangement of the interiors, or the usefulness of the buildings.

In order to secure the best advice Mr. Hoover announced he had appointed a committee consisting of Ira Woolson, consulting engineer of the National Board of Fire Underwriters, who has made a practical study of the building codes for years; Rudolph P. Miller, engineer in charge of building ordinances of New York and president of the Association of Building Superintendents of the United States; J. A. Newlin, of the University of Wisconsin, in charge of the Forestry Products Laboratory, and a recognized authority on timber; J. R. Worcester, consulting engineer of Boston, an expert on structural steel stresses and design; Prof. Wm. K. Hatt, of Purdue University, who has had much experience with concrete structures; Ernest J. Russell, of St. Louis, an architect and a member of the American Institute of Architects, who has already contributed so much to the industry through his work with the Board of Jurisdictional Awards, and Edwin H. Brown, also a member of the American Institute of Architects, who has greatly interested himself in the small-home problem. By these arrangements the American Institute of Architects, the engineering council and other engineering bodies are represented.

Waste Incident to Intermittent Operation

One phase that requires exhaustive study is the intermittent operation of the industry. In Mr. Hoover's view it is the definite point where the greatest waste finds its roots and is the largest element of high costs affecting both labor and material. He voiced the belief that any study will show that the average employment of labor in these industries is not over 65 per cent of their possible time. One of the reasons for the constant drive for higher hourly wages is to maintain an adequate annual income, and to offset the loss due to intermittent occupation—and labor itself has contributed to intermittency by its rules.

Our equipment capacity for production of building materials is probably 30 per cent higher than is necessary for it, if we could secure nearly an average demand. For instance, our lumber mills have a capacity of above 50 to 60 billion board feet, yet the annual production is but from 32 to 40 billion board feet. The annual capacity of our cement mills is above 130 million barrels, but the annual production runs from 70 to 100 million barrels. The annual capacity of our brick plant is about 8 billion bricks; the annual production is from 3½ to 7 billion. There are periods when the production of many building materials is actually suspended, just as is labor suspended on construction work.

Jurisdictional Strikes Have No Justification

The seasonal weather problems are no doubt to a great decree insurmountable, but there could be local community action in establishing a definite repair season out of conflict with the season of new buildings. The lost time from general strikes could be reduced by local adjustment boards and loyal adherence to their decision. The jurisdictional strikes have no justifications, and it is estimated that of the lost time due to all strikes in these trades over one-half arise from this quarter. The committee on jurisdictional awards has performed good work. The abolition of such strikes lies entirely within the powers of organized labor. Settlement boards of their own, whose decisions would be binding, would be a contribution to labor's own income and employment. Labor could also greatly assist in lifting this blockade on building if it would set its face against any restraint on effort that still survives in some trades. There would be less dispute over wages and larger employment if the rules could be revised by the local adjustment boards and community conferences.

A Six-Room Stucco House

Charles E. White, Jr., Architect

See descriptive article on opposite page and blueprint working drawings in detachable insert in this issue

A Six-Room Stucco House

Charles E. White, Jr., Architect

THE house which forms this month's supplement is a modified English type designed by Charles E. White, Jr., architect, for Mr. R. S. Allen of Oak Park, Illinois.

The construction is of stucco on wood frame, with a concrete foundation and basement floor, and shingled roof. The first and second stories have oak floors throughout, with the exception of the kitchen which has a maple floor. The living room, dining room, and veranda, or living porch, have oak trim; the remainder of the house is trimmed with birch.

The exterior is carefully designed and although the front has several important features the result is not unpleasing. The entrance at the corner balances well with the living porch windows and the whole is held together by the bay window. This latter feature although quite large, has but a shallow projections and is thus prevented from dominating the composition. The cut-back gables and the mast of the chimney add interest to the roof. The use of brackets, trellises and flower boxes add to the domestic character of the composition without detracting from its appearance of solidity.

The basement has two entrances. One from a bulkhead at the rear of the house, the other by means of an interior stair. The interior stair is convenient to both the furnace and the laundry, and the latter has another door near the bulkhead so that steps may be saved when hanging out the clothes. The laundry has a sheathed partition separating it from the remainder of the basement and has windows in two walls, affording good ventilation as well as plenty of light when washing and ironing. An electric outlet and a floor drain are provided conveniently for a washing machine.

The coal bin is sheathed on stud construction and has two windows, one of which should prove more useful if placed on the heater side of the partition. A small vegetable room is also sheathed off and is fitted with shelves for canned stuff and so forth. This room is purposely made dark to assist in preserving the contents. This house is almost unique in that the space under the porch is excavated to form a room. This costs but slightly more, and if used for nothing more important than a children's play room the added expense is usually more than justified.

The principal entrance to the house is through a vestibule which contains a built-in wardrobe or coat closet. The vestibule projects from the house and thus does not cut into the living room. As there is no stair hall, the living room extends the full width of the house forming a fine large room, from one corner of which the main stair leads to the second floor. French doors are made a feature of this room. In fact these, together with the use of casement windows throughout all of the rooms give the house much of its individual character. The bay window in the living room contains a built-in seat under which is the radiator. A fireplace at one end flanked by French doors, together with the double fold French doors leading to the dining room, complete the principal feature of this room.

Blueprint working drawings of this house are shown in the detachable insert in this issue of National Builder. A photograph of the elevation appears on the opposite page.

The veranda or living porch is glazed in and provided with a radiator and thus is made available for year around use. The windows here have curved tops which add to the interest both inside and out.

The dining room is of good size, and at one side has French doors opening on a small wrought iron balcony. The balcony is too small to serve as such, but it provides a protective railing when the doors are open and adds a distinctive touch at all times. The use of French doors in similar locations should be more generally followed, as they improve the appearance of most rooms and cause them to appear larger. Corner china closets are built in between a pair of windows at the end of the dining room. The location of the radiator at this point is unfortunate as it is not only unduly conspicuous, but also prevent the placing of the sideboard between the china closets. This treatment of course would require that the windows be made high above the floor, but the result would no doubt be more natural and pleasing. A double-action door opens into a small passage which leads to the kitchen and also to the basement stair. Thus this house contains no serving pantry, the omission of which is becoming more general in servantless houses. It is held that serving pantries are not worth the space occupied, and that they create additional work and cause unnecessary steps for the housekeeper.

The kitchen has well placed windows to afford cross ventilation and at one corner opens into a short flight of stairs which connect with the main stair at a landing. Combination stairs such as this offer many advantages and provide good circulation together with compactness.

The built-in equipment of the kitchen is complete and well arranged. The sink is located directly beneath high windows and has cupboards at each end, thus saving steps when putting away clean dishes and utensils. An additional case is placed on the opposite wall. This case is for flour and other foodstuff and is provided with a slide shelf to afford additional space when preparing pastry and so forth. The breakfast alcove at one side provides a pleasant work space as well as a convenient place for the serving of minor meals. The end of the table is hinged to drop out of the way when not in use. The rear entrance to the kitchen is through a small entry which contains the refrigerator. A cabinet above the refrigerator provides a handy place for cooling hot food before placing it on ice.

The second floor contains three bedrooms, a bath room and a sleeping porch. The hall is compact and well lighted and contains a linen closet and the stair to the attic. French doors open into a small passage which connects the bath and two of the bedrooms. Their arrangement gives an air of privacy and forms a sort of suite arrangement that is valued by many people.

The front bed room is quite large, extending across the front of the house and opening into the sleeping porch through French doors. A bay window and seat is an attractive feature, and two large wardrobes afford plenty of storage space. Shallow wardrobes such as these are now considered superior to old-fashioned deep closets, as their double doors make the contents more accessible and they often conserve space in a floor plan.

The two rear bed rooms project beyond the first floor as shown on the rear and left side elevations. This projecting portion has the floor insulated with "quilt" and is thus made as tight as any other portion of the floor. The corner windows in these rooms appear rather forced. They certainly do not afford as much ventilation as they would if spaced farther apart. Each of these bed rooms have wardrobes and plenty of wall space for furniture.

Slate and Tile Roofs

By John Dunlop

SLATES which have been graded in the quarry and have passed into the hands of the roof coverers are generally punched, that is they are bored for the nails.

Many slaters are of the opinion that unless the slate is very small it should have two nail holes, which may be at the upper corner of the slate, or near the middle, when the slates are what is called center-nailed. That is not exactly correct because fairly large slates are very often single-nailed, which has this great advantage that a broken slate can be easily repaired, as the slates can be easily turned around and the new slate replaced without interfering with the nails or making any temporary arrangement.

Double-nailed slates are more firmly held and therefore are more secure than single-nailed slates, but when it comes to a question of the repair of a few slates which have been broken, it is almost impossible to get the whole of the new slates nailed and for this reason a broken slate in a double-nailed roof has to be replaced by one not nailed to the boarding, but held in position by a strip of lead or metal which has been nailed to the roof before the new slate is slipped into position. The lower end of the metal is turned up for one inch over the slate.

Objections are often taken to slates which are center nailed, as shown in the drawing, for the reason that moisture may be driven in through the nail holes and the nails may be injured by moisture because they are so near the exposed part of the slate. But neither of these objections are of much importance, and the slates are certainly more secure when nailed near the middle.

The position of the nail hole on a center nailed slate is of great importance and it must be accurately calculated so that the jigs or marks set up in the hand boring machine will insure the correct position of the nail hole in each case. Thus if slates 16 inches long are specified to be laid to a 3-inch lap, the slater will, unless especially cautioned, drill the hole 9½ inches from the tail, leaving 6½ inches from the hole to the head, thus giving on paper the lap of 3 inches.

In practice, however, slates vary a little in size and the nails must be clear of the head of the slate below. Therefore, to clear the head of the longest slate in the course underneath, the slater should allow from ¼ to ¾ of an inch clearance measured from the head of the average slate to the holes in the slate above. This allowance, of course, reduces the laps so that slates which are center nailed should have their nail holes show at least 1 inch more lap than is specified.

This difficulty does not apply with head nailed slates because in that case the slates would be holed about 1 inch from the head, leaving plenty of clearance. The slater on the roof marks off the gauge or margin of the slate to give the specified lap.

Another point which it is necessary to call attention to is that in covering a roof with graduated slates the method is entirely different.

In such cases all sizes of slates are received from the quarry and in many instances they have ragged and broken edges. The first thing is to have the slates dressed with their edges approximately parallel and the bottom ends cut square. They are then passed to the borer, who single or double holes them, as the case may be, about 1 inch from the ends. The slater's helper now takes each slate and measures the distance from the tail to the nail hole. The various sizes are piled in lots so that those 10 inches long, 9 inches long, and so on down to 6 inches—which may be used for the highest courses in the roof—are sorted out.

Slates are either laid on battens or on boarding and sometimes on battens nailed to boarding.

For the commonest work battens or strips are used and are spaced according to the size of the slates and the required lap, as below:

$$\frac{\text{length of slates} - \text{lap}}{2} = \text{distance of lath from center to center.}$$

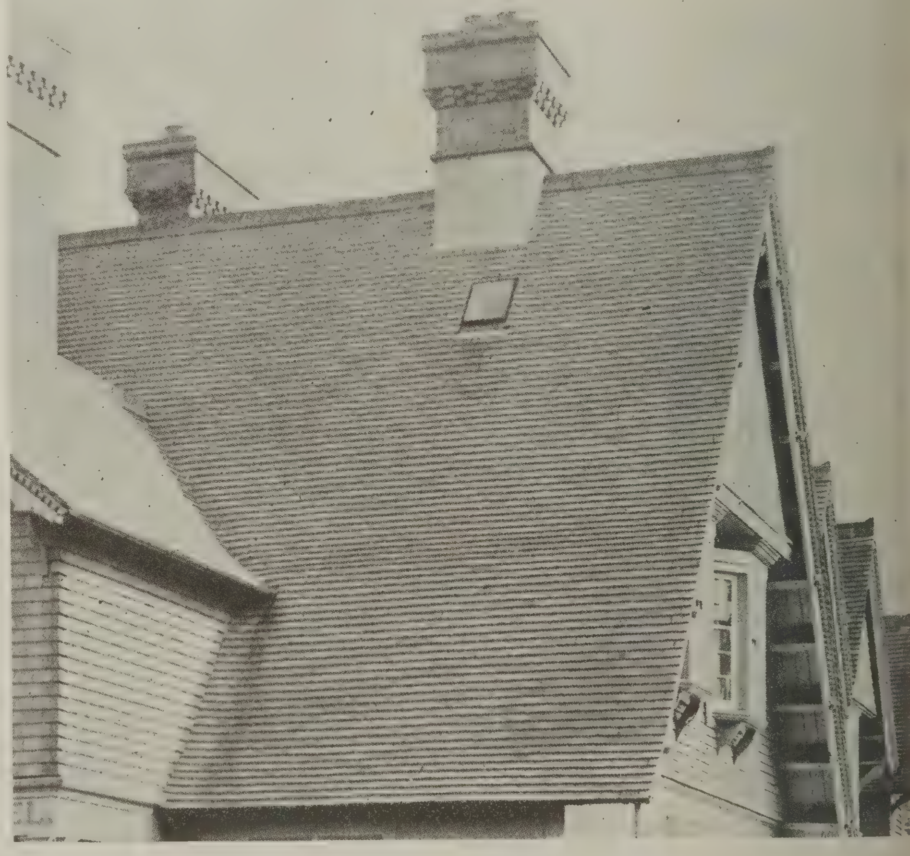


Fig. 1. The slates are laid close up to the chimney and the joint made watertight with a fillet of portland cement

Thus for slates 16 inches long to be laid to a lap of 3 inches the distance from center to center of lath must be

$$\frac{16 - 3}{2} = 6\frac{1}{2} \text{ inches}$$

In cold and rainy districts and where every precaution must be taken to provide a dry interior, boarding covered with felt

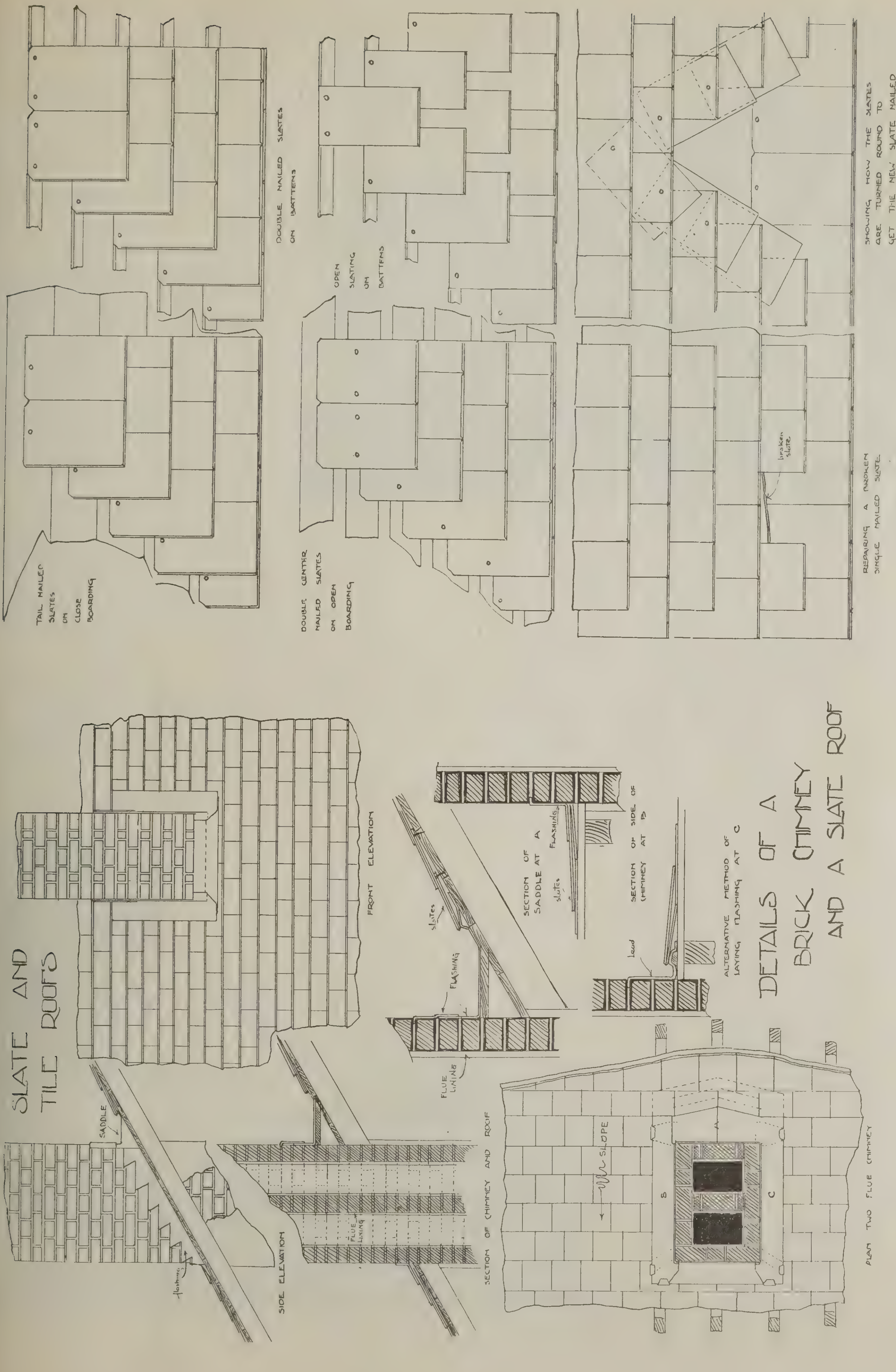

SLATE AND TILE ROOFS
SADDLE
flashing
SIDE ELEVATION
FLUE LINING
SECTION OF CHIMNEY AND ROOF
FRONT ELEVATION
FLUE LINING
FLASHING
slates
SECTION OF SADDLE AT A
FLASHING
slates
SECTION OF SIDE OF CHIMNEY AT B
lead
ALTERNATIVE METHOD OF LAYING FLASHING AT C
DETAILS OF A BRICK CHIMNEY AND A SLATE ROOF
SLOPE
A
B
C
PLAN TWO FLUE CHIMNEY
TAIL NAILED SLATES ON CLOSE BOARDING
DOUBLE NAILED SLATES ON BATTENS
DOUBLE CENTER NAILED SLATES ON OPEN BOARDING
OPEN SLATING ON BATTENS
REPAIRING A BROKEN SINGLE NAILED SLATE
broken slate
SHOWING HOW THE SLATES ARE TURNED ROUND TO GET THE NEW SLATE NAILED

Fig. 2. The tiles in these hips are cut and made watertight by using a lead socker piece

or paper is used in place of battens.

The lowest course of slates should project slightly at the eaves to form a drip. The first course of a slate or roof is a double course, and the first layer is shorter than the ordinary slate by the amount of the gauge to which the slate is laid. The gauge of slating is the length of the slate exposed to view in each course. For a 16-inch slate laid to a 3-inch lap the gauge is 6½ inches.

Roof Tiles

Roof tiles are of several kinds, but those generally used are simple oblongs, or shaped on the lower edge as shown in the drawings.

Tiles are usually hung to wood laths by nibs formed on the tiles, although recently many makers are adding holes on the top ends with the idea that in exposed situations they can be further secured by copper or galvanized nails about 2¾ inches long.

The usual color of tiles is deep red, but various other colors can be obtained. Semi-vitrified or glazed tile have the advantage of durability and imperviousness to moisture.

In tile roofs it is quite usual to cover the hips and valleys with special tile such as those shown in the drawing. Where special tiles cannot be easily obtained the hips and valley flanks are often formed by cutting the two courses where they meet and placing a piece of sheet metal over the portion of the joint that is to be covered by the course above, as shown in Figure 2 and on one of the drawings. In the two examples shown in Figures 1 and 2 the ridges are formed with special tile.

Ornamental Tile

Ornamental tile which has the lower edge cut to a geometrical shape is much used in certain classes of work. Examples of ornamental and plain work are shown in one of the drawings.

In tile roofs as in slate roofs some special arrangement has always to be made where a chimney passes through the roof covering. Most architects aim to have the roof carried close up to the chimney and this has lead to the practice of forming the junction of the chimney and the roof with a cement fillet. A great amount of risk is run in adopting such a method, because if there is the slightest settlement or movement of the chimney or roof the cement fillet will be broken, with the result that water will penetrate the roof.

The surest way to have this work done in a satisfactory manner is to use sheet metal flashing around the chimney as shown in the drawing. At the front would be the apron piece which is painted the same color as the tiles or slates. At the sides the flashing is laid similar to the alternate method shown in the drawing at C, and the roof is laid close up to the side of the chimney. The back would have the usual saddle or cricket.

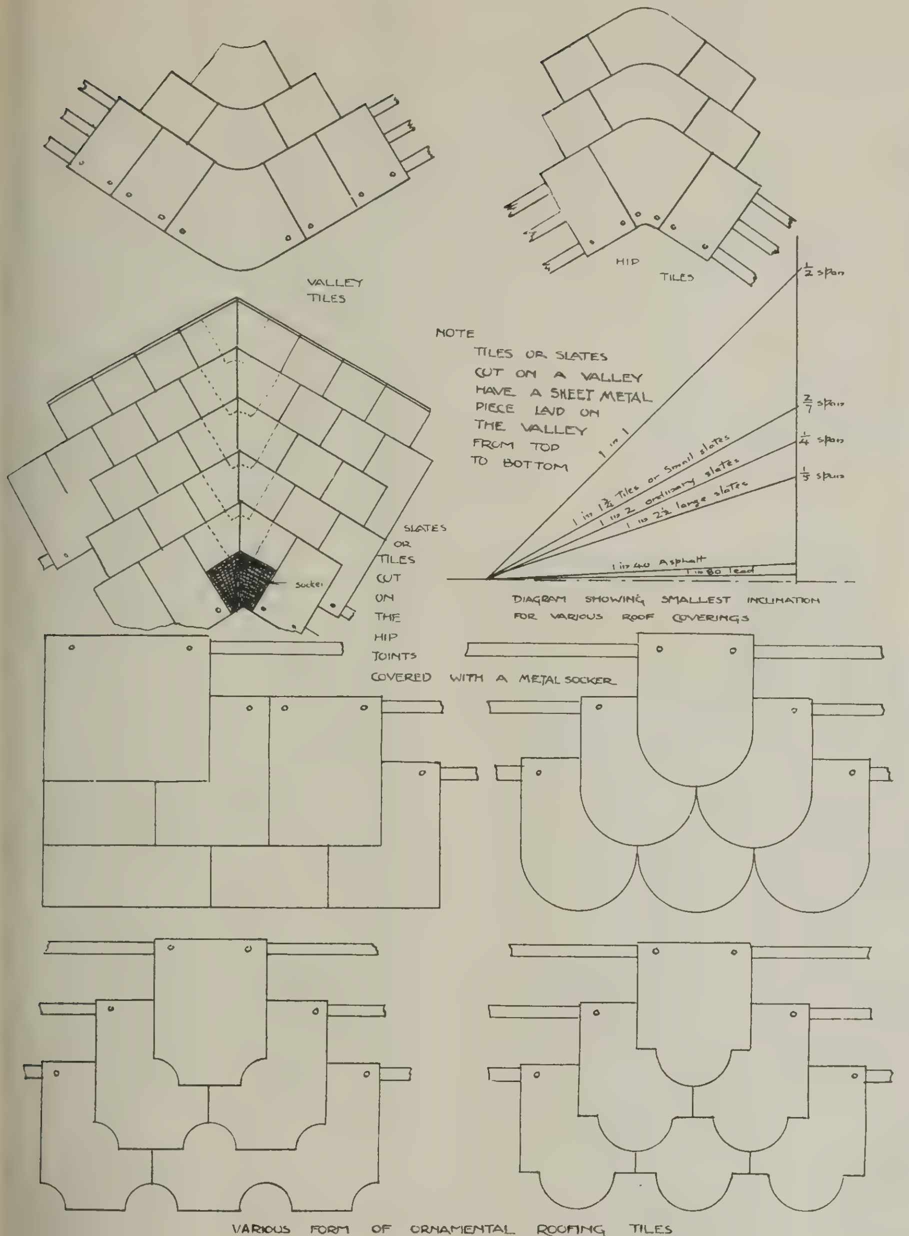
With slate or tile roofs in which there is no objection to the flashing being exposed on the roof slope a very simple method of flashing is shown in the drawing of the brick chimney. The flashing is carried all around the shaft and would be dressed and fixed in position before covering the roof. It is, of course, understood that counter flashing should be used on first-class work.

In dressing the side flashing and the apron piece in position both are usually kept high enough to allow for the courses of slates or tiles underneath. This may be done by putting a ⅞-inch board on the roof at the side and front of the chimney and dressing the flashing down on to it. When the flashing is finished these boards are withdrawn and the metal turned up to allow the slater to get his slates close up to the chimney. When the roof is completed the flashing is turned down into its final position.

Pay for Ideas

If you have any ideas that have been used and proved good in construction of any kind, you can sell them to National Builder. Send sketches and photographs, either or both, to illustrate your description.

Fig. 3. Ornamental tiling showing a very useful and easily laid form of roof tiling



To Kill Moss on Brick Walls

Paint the affected surface with water containing from one to two per cent of carbolic acid. After half an hour it can easily be scrubbed off with cold water and a stiff scrubbing brush.—*American Paint and Oil Journal.*

To Paint Up a Brick Wall

In a brick wall which is to be painted the old mortar has dropped out in some places. The *American Paint and Oil Dealers Journal* advises an inquiring subscriber to use stucco mixed with very thin glue size, say about two ounces of glue to a gallon of water. Mix only a small quantity at a time as it sets quite rapidly, though, not quite so rapidly as stucco mixed with clear water. This material has no affect upon paint or color put over it.

Concrete Block Buttress Cheeks

The accompanying photographs show the possibilities that lie in the use of concrete blocks in forming buttress cheeks for exterior steps.

The photographs were made at Mooseheart, Ill., where a great deal of attention has been given to the use of concrete block construction for dwellings as well as for more pretentious buildings; in fact Mooseheart has become a show place for concrete construction apart from its interest as an organization center.

"Rock faced" and other "fancy" blocks are strictly taboo at Mooseheart. Only plain blocks are used, but with such effect that much favorable comment has been aroused, and architects and builders who had become prejudiced toward concrete blocks because of the manner in which their design has been abused, are again taking up their use.

Test If Linseed Oil Has Been Boiled Sufficiently

Dip into the linseed oil a piece of well-sized writing paper and hang it up to dry. The submerged portion of the paper will remain greasy in appearance if improperly boiled. No mark will be left by the thumb and finger when placed against the paper if the oil is properly boiled, and the surface will have somewhat the appearance of having been varnished.

Pump Ashes Under Concrete Floors to Level Them

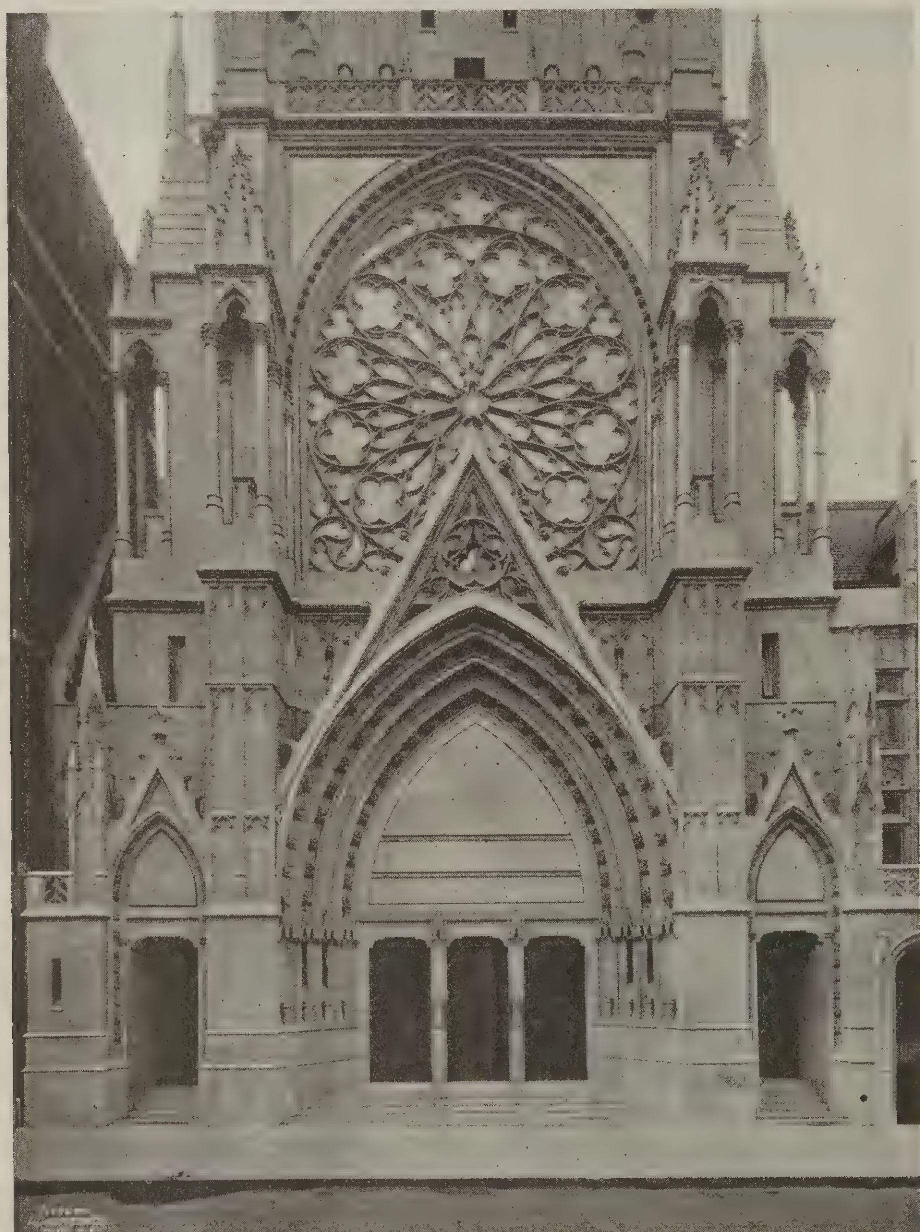
Concrete floors laid on made ground are sometimes warped by subsequent sinking of the soil. In constructing several large warehouses at Royal Albert Dock, London, this difficulty was corrected by inserting short vertical poles about every 20 ft. in the concrete, and withdrawing them when it had set. If the ground sank at any point, ashes and water were pumped at 20-lb. pressure into the adjacent hole by an electric pump. This raised the floor to its level and furnished a new foundation, the water escaping from the other holes. Holes not needed were filled up.

Precast Concrete Architectural Trim in Entranceways and Openings

IN "The Meaning of Architecture," Irving K. Pond, discussing creative art and imitations, says: "A race which has any vital message to impart will deliver it in its buildings;" and again, "The efforts of the individual, that they may be of permanent value, must be based on some sound principle which will appeal to the communal heart and understanding."

Naturally enough, precast concrete as used to decorate the exterior of buildings generally has been viewed as an imitation of natural stone, and the quite obvious points of dissimilarity in technique entirely overlooked or disregarded. Although it may be considered an alternate material, precast concrete trim should not be made to imitate natural stone or used as an "imitation" stone. Concrete architectural stone may have certain qualities of texture of two different stones and the color of a third; or it may combine the texture of floated or ground concrete with a color especially designed for harmonious contrast with surroundings. For example, a certain building has an entranceway of precast concrete in warm buff tones which has the softness of Bedford stone when viewed in the distance and the texture of granite when examined close up. Such an infinite variety of colors and textures are possible with concrete that it must be considered as distinctively *concrete* and treated accordingly.

Returning to the two quotations by Mr. Pond, let us ask, "What message might the race wish to impart?" and secondly, "On what sound principle should our efforts be based?" One answer will suffice for both questions. This is a democracy. We are democratic in form of government and democratic in our habits. Economy of time, labor, material, and all commodity, in order that all may share, is a cardinal democratic concept and one which our architecture should and is bound to reflect.



Church of the Blessed Sacrament, New York City. Cast stone and cast stone tracery

Economy Long Recognized

The economy in the employment of concrete for the framing of the door and window openings and to fulfill the general functions of architectural trim, has long been realized, but it has only been of recent years that the character of precast concrete obtainable for this puspose has been of sufficiently high level of refinement to justify its use in buildings where requirements are particularly exacting.

If many identical pieces are required, a single mold solves the problem; a variety of similar pieces are made in the same mold by providing the latter with suitable block-offs. As an example of economy of material, fine concrete surfaces are produced with marble scraps, often a waste product of the quarry. There is an absolute minimum of tool wastage and a most advantageous use of material—casting very little more than the exact amount needed in the finished piece, using a surfacing mixture for the faces of a "structural" mixture for the body of "backing."

It must not be inferred from the foregoing that the process of manufacturing concrete cast stone is commercially so simple that it may be indulged in promiscuously. On the contrary, it is considerably more technical than is the general belief involving expert pattern making, plaster modeling and molding, selection of aggregates, preparation of formulae for the facing mixtures, stone cutting and setting.

Handling on the Job

There is a certain individual technique required in the economical handling of concrete cast stone on the job. As a rule the concrete units are furnished the same as dimension stone, and in complicated designs each piece comes numbered for easy identification. In the use of this material

Fig. 2—Entrance way to Brookfield-Riverside Township High School of pink granite-faced precast concrete, in pleasing contrast with the russet-brown face brick. The pink tone was obtained by using a mixture of white cement, white marble, white sand and red granite

the builder must realize the great importance of careful handling from the point of manufacture to the job and then into the work, for the pieces may not have acquired full strength and the shocks incident to transfer and placing are usually greater than the concrete is ever called upon to withstand thereafter. For the same reason corners and protruding portions must be carefully protected until completion of the work. Cast stone is commonly crated or shipped in shavings, excelsior or straw and protruding portions in the wall are boxed in or otherwise suitably covered, where in danger of injury. In due time, of course, the concrete acquires greater strength and hardness than it usually has at the time of handling.

A stone mason not accustomed to laying concrete trim finds a number of interesting peculiarities. To protect the concrete surfaces from stain or efflorescence, cement and sand mortar, without lime, should be used. Concrete units cast in wet molds are decidedly free from the irregularities of shape and dimension, and, therefore, match up perfectly at the joints. Quarter-inch joints are practically the minimum for proper bedding unless the pieces are especially matched by grinding. Small injuries to corners or other parts of the work are not smeared over with mortar, but are successfully concealed by careful patching later with the identifical mixture used in the facing of the injured piece.

How Various Colors and Textures Are Produced

Concrete architectural stone is available in so wide a variety of textures and colors that these qualities are brought under the complete control of the designer and may be varied as required to match any other

Fig. 3—Entrance to a bank, Rochester, N. Y., done in concrete units made with granite and marble aggregate. One of the numerous examples of fine cast stone work by Platt & Chrisp, architects, Rochester

wall material. Granite in pink, red, yellow, gray or green; marble in pink, red, yellow, green, black, white and mixed; mica spar in black and transparent colors; sandstone in yellow, buff, red and brown, and sands in a wide variety of shades are the aggregates chiefly credited with making this possible. Then there is the choice between white cement, gray cement and a mixture of the two, and a few reliable mineral pigments which are practically non-fading when used in small quantities.

In the use of mineral aggregates the experienced concrete trimstone manufacturer knows that color and texture are controlled very largely by the grading of the particles. Where there are smooth or delicate surfaces and fine edges, obviously the particles must be limited to small size. Coarser textures are obtained with larger particles and drier consistencies, some textures requiring almost an entire absence of finer material. More pleasing color effects are secured where the fine aggregates are of one color and the coarse particles of another, giving a blended result the shade of which will be influenced by the larger or finer particles in proportion to the relative surface space occupied by each.

Mineral pigments are used sparingly for concrete surfaces exposed to the weather. Half a pound to a pound of red oxide of iron to the sack of cement will produce pink, while greater quantities of the oxide, up to about six pounds, will produce colors varying from terra cotta to red. Gray may be produced with half a pound of carbon black to the sack of cement and added quantities of the black with gray cement will produce slate to black shades. Light buffs and yellows are produced with five to ten pounds of hydroxide of iron, to which red oxide in small quantities may be added.

How to Face Wet Mold Concrete Block With Crushed Stone

H. B. J., Rochelle, Ill., asks for the best method of facing wet mold concrete blocks with crushed stone facing. The following answer is supplied by the Portland Cement Association:

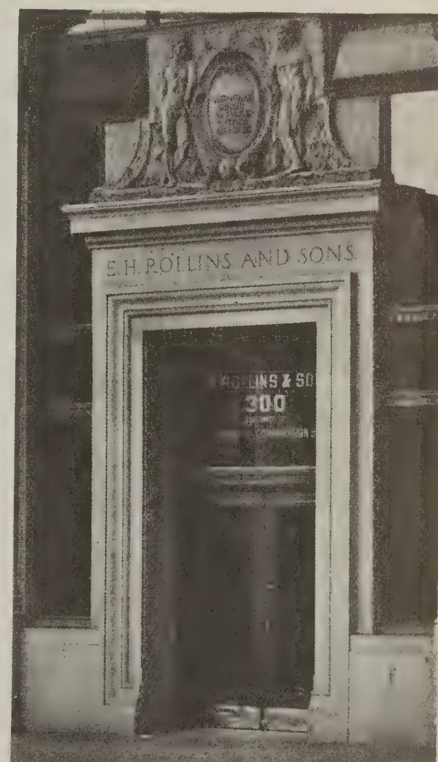


Fig. 4—Concrete cast stone entrance to banking house of E. H. Rollins & Sons, San Francisco, surfaced with a mixture of white cement, marble and granite. A dignified but attractive entrance which receives much of its character from the excellent technique with which the material was handled

In preparing the face plate for making granite faced block the plate is coated with glue of a thick consistency. Coarse crushed granite is then sprinkled over the glue-coated face plate. followed by a quantity of fine granite, in this way covering all of the surface of the plate.

When the face plate has been entirely covered with granite, it is placed on a rack and let stand for about three hours, allowing the glue to settle and hold the granite more firmly. After the glue with the granite facing has set for three hours and the plates are set up in the molds, a small amount of cement and water mixed to a creamy consistency is placed into each mold to give all the particles of the granite facing a thorough bond with the concrete backing. This mixture is brushed in to be sure that it penetrates everywhere, and is placed about one-half inch deep. The concrete for the backing is then placed in the mold. The wetness of the concrete with which the granite facing is backed up softens the glue so that when the blocks are removed from the steam tunnels they release from the plates very easily and present a clean surface.

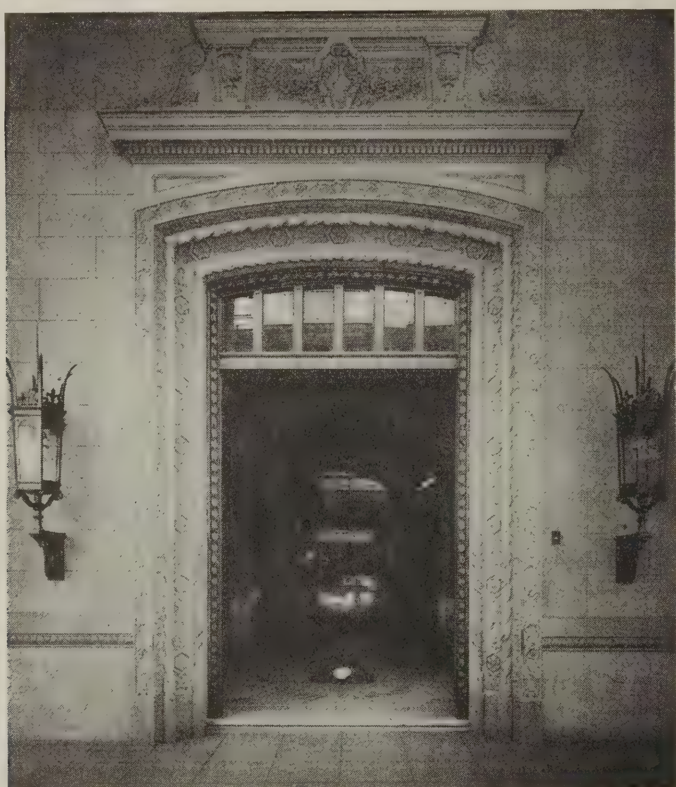


Fig. 5. An exquisite example of intricate casting in gelatine molds in the entrance to the offices of the Havana Electric Co., Havana, Cuba. Numerous examples of fine cast stone entrances are to be seen in the Cuban capital

Suggestions for a Co-operative Building Company

Charles E. Marks, contractor, formerly of Madison, Wis., and now located in Los Angeles, Cal., 346 S. Broadway, submits the following plan for co-operative building companies to relieve the housing situation.

Members of the Company to be as follows:

First. The owner of a desirable building site.

Second. A contractor for each branch of work.

Third. A selected crew of carpenters.

Fourth. A lumber and millwork firm.

Fifth. A general manager.

Referring to these in the order named:

The owner of the building site must agree to a price on his lot, if anything, a trifle lower than the price asked for lots in his locality. By all means the lot should be where people desire to live and not where all one's sales ability must be employed to make a sale.

The contractors must be reliable, capable men who will agree to give the work their personal attention sufficient to accomplish satisfactory results.

The carpenters should be skilled mechanics, as a first-class man is always more profitable.

The lumber and millwork firm should be willing to furnish the material required practically at cost to them in their yards as the profits on the final sale of the property will net more than the usual amount.

The general manager should be able to combine the duties of architect and business manager. He must also have a full knowledge of general contracting work and

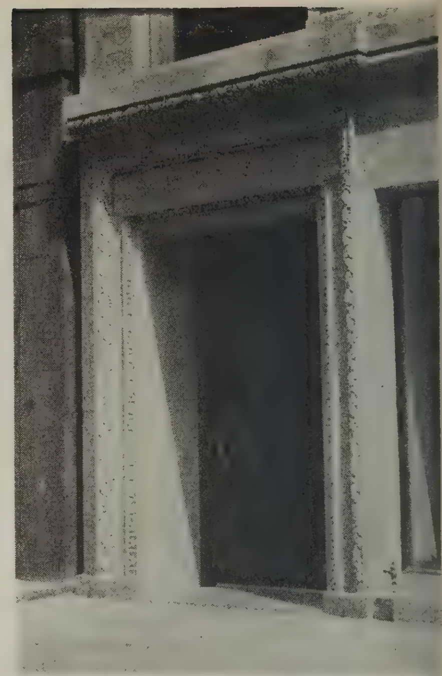


Fig. 6. Simple and beautiful entrance to a small shop building on Fortieth Street, just off Fifth Avenue, New York. Cast in Tuckahoe marble mixture and hand tooled

methods of general contracting.

As the labor engaged by the sub-contractors would not be directly interested under this plan as laid out, it might be well

Fig. 7. Entrance to the Berger Building Albany, the entire front of which is o[f] cast stone. The simple ornamentation cas[t] in gelatine molds is decidedly effectiv[e]

to set aside a small amount, say 10 pe[r] cent, to be distributed among them as [a] bonus.

Payment for labor or material could b[e] made by voucher at intervals agreed upon. When loan was available these would be paid pro rata and amounts acknowledged on the back of vouchers. No interest would be allowed anyone until the loan had been disbursed but from that date each one would be paid the regular rate of interest on remaining balances. Another division or payment would be made when property was sold which would vary according to terms of sale and balance, if any, distributed as received.

The only expense above actual cost in operating under this plan would be the amount paid to the manager, but this should easily be offset by the increased efficiency on account of everyone being a party to the profits. The amount paid would have to be at least 10 per cent of the net cost of the entire investment as this would cover cost of plans, superintendence and all business administration.

Another saving would be accomplished because no carrying charges would be made until after loan was distributed, which might be easily held off until property was entirely completed and ready for sale.

The members of such an organization should be selected by the manager and it would be agreed that each one would be interested solely in the project in which he joined so in case anyone proves inefficient or unsatisfactory he could be dropped and paid off in full at the termination of the job in question.

In order to hold proper title to the property it would be well to incorporate and each member would hold stock only in the work on which he was employed as above stated. Another plan for holding title would be through the loan association that was to furnish the first loan.

If a house built and sold under the usual plan can be sold at a possible profit of 15 to 25 per cent, it should be easy to build and sell them by this method, make a liberal profit and still sell a *better home* for less because of the considerable reduction in cost due to greater efficiency and co-operation on account of all parties' direct interest.

Fig. 8. Details of entrance, Trinity Lutheran Church, Akron, Ohio, J. W. G. Corbusier, architect. The concrete color and texture were designed to harmonize with brown face brick

Australian Artificial Veneers

A recent Australian invention of an artificial composition similar to veneer should be of interest to manufacturers in proximity to large supplies of waste material of vegetable origin, such as sawdust. As patent applications are pending in Australia and other countries, the inventor is at present reticent in furnishing details other than that the substance is worked up entirely from waste fibrous products and other vegetable matter, and that sawdust can be utilized in considerable quantities in the manufacture of the cheaper grades of the composition. The Canadian trade commissioner at Melbourne describes the product in the following terms:

"The substance—named —'Keltona'— can be used for a variety of purposes, such as chair backs and seats, furniture generally, veneers, and wall and other paneling, and can be produced to represent excellent marble effects. It is capable of being bent freely for a variety of commercial purposes, worked with tools, sawn, bored, planed, sandpapered, etc., and will take nails with ease."

A beginning has been made in manufacturing the composition in Melbourne.—Consular Reports.

Standard Color Scheme Suggested for Pipes

An article signed "S. J. W." appears in the *National Safety News* suggesting a standard color scheme for pipe lines in factories, power plants, etc., as a means of safety.

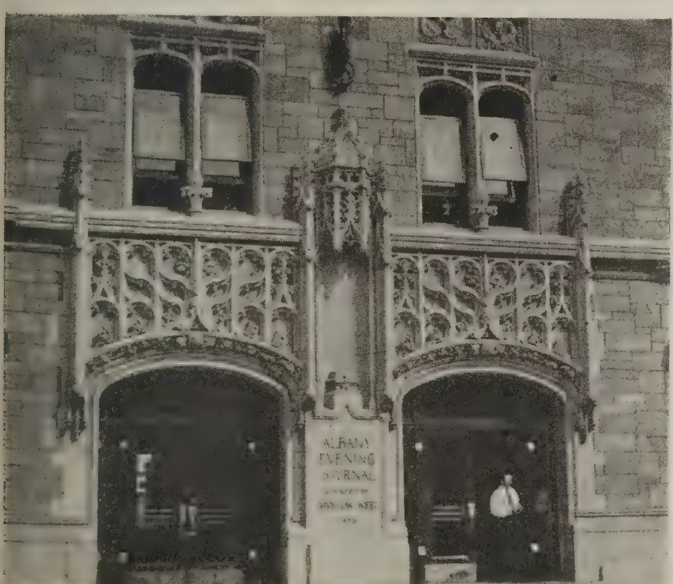


Fig. 9

Fig. 10

Fig. 9. Intricate tracery over the entranceways of the Albany Evening Journal Building is a masterpiece in concrete architectural stone in this country and represents a large saving under the cost of tooled stone. Marcus T. Reynolds of Albany is the architect. Fig. 10 is a detail of window at the right of Fig. 9, Albany Evening Journal Building

The Genii of the Paint Pail

By A. H. Burt

How to Enlist Paint and Varnish as Your Business Ally

HAVE you ever looked upon paints, enamels and stains as your business allies? They *are* allies when properly used —and on the other hand when they are not properly used they can easily be an enemy through destroying the beauty of a carefully planned interior or exterior. When used with understanding, paints of good quality will tell the eye, "This house is built strong. Pains were taken with the construction. Its rooms are much larger and its ceilings much taller than your measure indicates. How pleasant it will be to sit in this room after a hard day or on a stormy Sunday! What an attractive house this is!" Yes, the genii of the paint, pail can work wonders for his masters.

In a previous article the writer described the method of color application whereby a tall, narrow house could be made to appear wider and a broad, low house appear taller, through bringing out vertical or horizontal lines in the trim. This same principle can be applied in interior finishing as well. Vertical lines lend an appearance of height and horizontal lines of width. The principle even applies in the matter of dress, for the fashionable Fifth Avenue costumer will tell a particularly corpulent patron "Madam should wear stripes."

Thus, in applying the principle to interiors it is easy to comprehend that horizontal lines should be avoided in small rooms with low ceilings. Horizontal lines such as caused by chair rails, heavy moulds, large figured wall paper borders or large painted stencils should be avoided. Where beams are employed in rooms with low ceilings, they should be finished in as light a color as possible, otherwise the ceilings will appear even lower than they really are.

In small rooms, therefore, the perpendicular lines should be accented. These lines increase the apparent height of the rooms and add a feeling of airiness. Vertical lines can be brought out in the door and window casings and where wall paper is used, in vertical designs in the paper. Enamels in light grays, ivory or white as well as light gray "system" stained effects make very desirable finishes where the interior is to be called upon to increase the apparent height of the ceiling.

Plate I is an excellent example of the use of the vertical line principle in a well balanced interior which is admirably carried out, even to the wall paper. The ceiling in this case is not low, but an air of stately height of ceiling, and spaciousness is desired. If the interior trim had been finished in a dark stained effect, and a dark wall paper of conventional pattern had been used, the apparent size of this hall would be greatly diminished—the low panelling and angle mould in heavier colors, tending to neutralize the vertical lines.

Plate 1—An example of the use of the vertical line principle

The importance of the selection of colors of wall paints or wall papers should never be minimized. Certain exposures require certain colors. For example, light coming from the North is a cold light. The same is also true to a degree, of light coming from the East. Rooms facing North and East should be decorated in warm colors, such as yellows, browns, warm grays and reds. Rooms facing South and West are exposed to sunlight the greater portion of the day, and are best treated in the so-called cool colors, such as greens, light grays and blues.

In selecting colors to be used on interior walls there is another important feature to consider. This is that certain colors reflect a higher percentage of light than others. Take for example a paint color known as Ivory White. This color reflects 76% of the light striking its surface and *absorbs* 28%. On the other hand a color known as Cocoanut Brown *absorbs* 78% of the light striking it and only reflects 22%. It is easy to see therefore that colors govern to a large degree whether a room is to be a bright, warm, pleasant appearing room, or a dark, depressing room.

For this reason a schedule of the percentages of light reflection of so-called flat-tone wall paints is given below. This schedule is indeed a valuable guide and is frequently referred to in the offices of the country's leading architects.

	Per Cent
White	79
Ivory White	76
Ivory	72
Caen Stone	72
Cream	71
Lichen Gray	70
Pearl Gray	63
Buff	59
Ivory Tan	58
Shell Pink	57
Silver Gray	52
Bright Sage (Green)	43
Tan	37
Azure Blue	36
Forest Green	21
Cocoanut Brown	22

While there is no definite rule for the selection of color schemes for various kinds of rooms, it is generally understood that a color scheme made up of one color in different values is best for the small room. The use of light colors is to be desired in small rooms—the ceiling always being distinctly lighter than the walls. In rooms with low ceilings, the wall color should be carried up to the wall and ceiling angle. Where the ceilings are high, the ceiling color can be dropped down on the wall approximately eighteen inches from the ceiling angle. This lowers the apparent height of the ceiling and is another application of the principle of horizontal and vertical lines.

When considering color treatments of interiors the fact must not be overlooked that floors play an important part of the scheme. Not only must the color of the floor be considered but also the manner in which the floor is to be finished. Few things detract more from the appearance of a room than a poorly finished floor.

Generally speaking, a floor should be neither light nor dark in color. Floors finished in the natural color used to be the vogue, but the popularity of this type of finish is rapidly on the wane. Floors which are slightly stained with paste fillers or stains have a more substantial appearance and blend in better with the surroundings. The floor finished in a very light natural finish makes itself too conspicuous and does not harmonize well with the rest of the interior. On the other hand floors which are stained too dark are not practical because they show dust and dirt so easily and also bring out all defects in the finish.

The finish to be used on the floor is entirely a matter of individual preference. The majority of residence floors in this country today are finished in varnish. This is probably due to the fact that the varnished finish is the most durable of all floor finishes. Next in the line of popularity and use comes the waxed finish, which in itself is a very beautiful finish but does not wear as well as the varnished finish and consequently requires refinishing more often.

Last in popularity comes the shellacked floor. While some finishers are able to produce a shellacked finish on floors, which will give fairly satisfactory service, this type of finish is not satisfactory where the floors are to be subjected to any expensive wear. Shellac is not tough like varnish, and will not begin to hold up under the rough usage that varnish will withstand.

It is the practice of some finishers to use shellac or spirit liquid fillers as a first coat over which floor varnish is to be applied. This is a dangerous practice and is productive of thousands of poorly finished floors. The reason that this practice is followed by some, is on account of the saving of time. Shellac dries much faster than varnish making it possible to apply a coat of shellac and a coat of varnish in one day, while it is impossible to apply two coats of floor varnish in a day. To apply a coat of tough, elastic floor varnish over a coat of shellac is like laying glass on the floor and then varnishing over it and expecting the varnish finish to remain unimpaired although the glass might be crushed to bits by the heels of people walking over the floor.

The first step in the proper finishing of a floor is to insure that the floor is perfectly dry, free from spots and dirt. The floor is then given a color coat consisting of stain or paste filler. In finishing close-grain woods, such as edge-grain pine, the floor is sually stained with an oil stain, although where close-grained woods are used in the upper floors and service sections of a house, the floors are usually finished in natural color. On open-grain woods like oak the coloring of the wood is invariably accomplished by applying colored paste fillers, which are primarily used to fill the pores in the wood, but which act as a stain at the same time. Paste fillers are applied by brush to the wood, in the consistency of cream, and are allowed to "set up" for 30 minutes and then are wiped off across the grain of the wood, leaving the pores filled. Paste fillers should be allowed 48 hours for drying. The floor is then ready for the first coat of varnish.

In floor varnish, as in any other material which is used in building, one usually gets what one pays for. It costs no more money for labor to apply a floor varnish of good quality than to apply a floor varnish of poor quality. The cost of finishing a floor with the highest grade of floor varnish would be but a few cents more per room than the cost of using a cheap varnish. The degree of service rendered by a quality floor varnish, and that rendered by a varnish of poor quality, are not comparable.

Where cost will permit, it is advisable to use three coats of varnish in finishing a floor, although two coats will give satisfaction. The first coat of varnish should be thinned with turpentine in the proportion of one pint of turpentine to the gallon of varnish, in order to aid in the penetration of the varnish. Second and third coats should be applied as the varnish comes from the can. At least 24 hours should be allowed for drying between coats, and before applying subsequent coat the surface should be lightly sanded, to remove the high gloss of the varnish, so that the succeeding coat may adhere properly.

In high priced residences the final coat of floor varnish is sometimes rubbed to a dull finish with powdered pumice stone and rubbing oil, where the owner objects to a high gloss finish on the floors.

In securing a waxed finish on a floor, the preparation and staining of the wood is the same as that described in the foregoing paragraphs. A coat of floor varnish thinned with turpentine in the proportion of one pint of turpentine to one gallon of varnish is then applied, and when dry is sanded lightly with No. 0 sandpaper. A coat of prepared paste wax is then spread evenly over the surface with a soft cloth. Thirty minutes is allowed for drying, and the surface is polished with a long handled weighted brush, first across the grain and then with the grain. A second coat of wax is then applied in the manner specified for the first coat of wax.

Time worn and moss covered is the saying "Beauty is but skin deep," but how seldom do we think of it in the sense of paint and varnish. That decorative "skin" or film that is applied by brush over unfinished wood, cold unfinished plaster and cement surfaces, turning them into things of beauty, is one of the greatest aids in modern building, for those who have learned the few simple truths concerning the use of colors, and the proper application of finishing materials.

Warm Air Heating

Suggestions Toward Improving Heating Arrangement Shown in Blueprint Working Drawings in May Issue

IN response to invitations as announced in the May issue of NATIONAL BUILDER regarding the blueprint plans in that issue, the following is submitted by the engineers of the Excelsior Steel Furnace Company, of Chicago, Ill.:

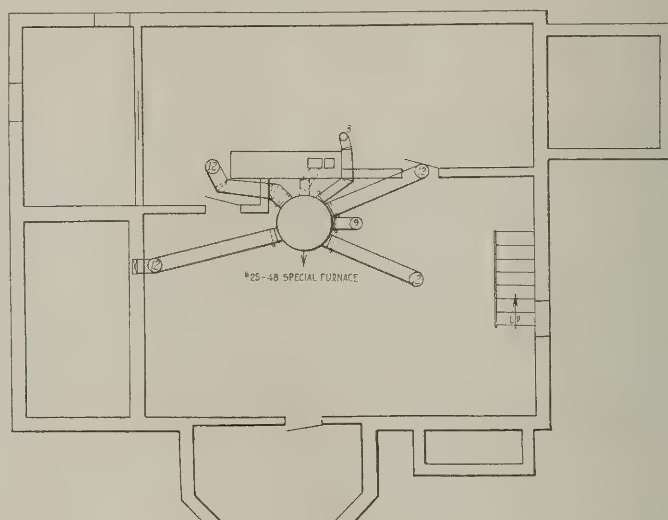
"We wish to point out changes in the arrangement of the heating plan shown in the May issue of NATIONAL BUILDER, which, if made, will very materially increase the efficiency and comfort in heating the home there described.

"Warm air heating is a system wherein the difference in the air weights cause the air to circulate. The heat units carried in the air are transmitted to the objects in the room, thereby producing warmth.

"As warm air heating is generally a gravity proposition it is essential that the arrangement of piping and circulation have careful consideration so as to avoid all possible resistance and friction, and to overcome all possible cold air drafts to the smallest degree tending to create uncomfortable drafts upon the floor.

"With these facts before us, the design mentioned should have very careful consideration.

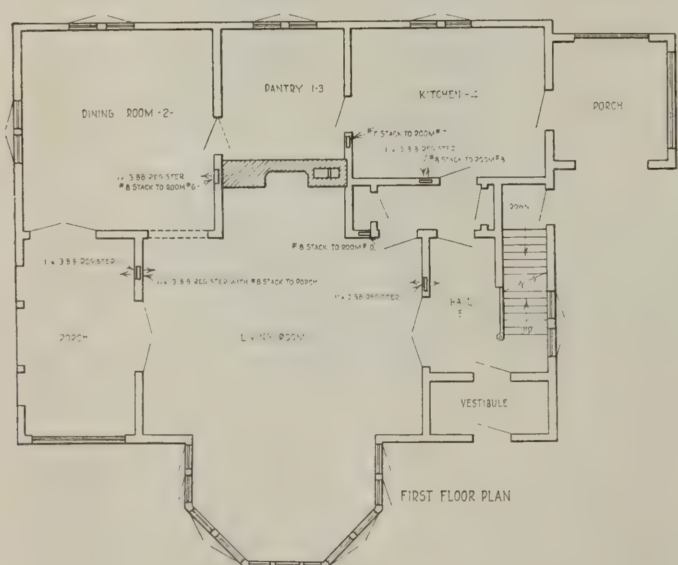
"The first consideration is to know in which direction of the compass does the building face, or, in other words, from which directions do the prevailing winds come? For the reader will surely agree that some sides of the building will be subject to greater pressure and cold than others. With this in mind, the cubical contents of each room must be computed together with the total amount of wall and glass surface. Particularly the wall and glass surface must be figured in order to determine the number of heat units required, for walls and glass are the greatest factors, they being the greatest cooling surfaces, and heat must be delivered accordingly.



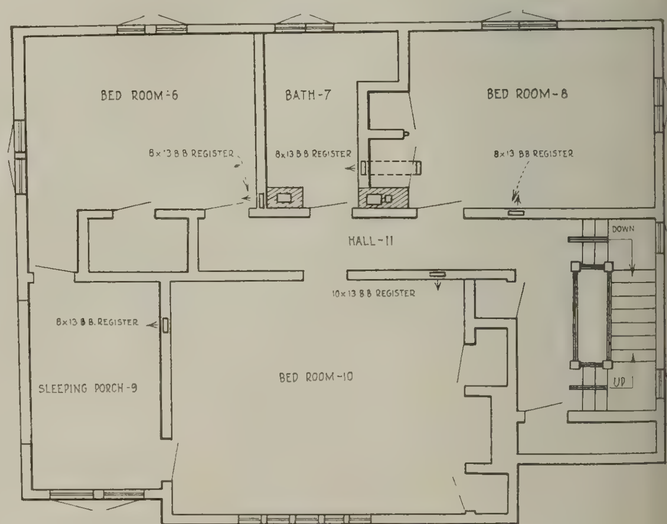
BASEMENT PLAN

"When it is known how many heat units are required to heat each particular room, it is necessary to determine the sizes of pipes, stacks, and registers that will be required to supply a sufficient amount of warm air to each of the rooms. Next, the location of the registers so that these will be out of the lines of colder air circulating on the floor to avoid resistance to the warm air supply. The registers must also be arranged so as to distribute the air as uniformly as possible and also to locate them so as to have the warm air supply pipes as short and direct as possible to overcome friction and resistance. The locating of registers must also be given consideration in relation to furniture which is to occupy the various rooms.

"After the register and stack locations have been decided upon, the proper location of the furnace to a central position in relation to all of the registers and stacks should be determined so that all warm air runs will have a nearly uniform rise, a nearly uniform length, and a nearly equal distribution of the warm air.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

"Now lay the blueprint shown in the May NATIONAL BUILDER before you and note the location of the stacks. Take a red pencil and mark on first floor plan each register and stack location. Then note the location of the register in the living room and vestibule, and see its relation to the furnace as compared with the register in the dining room or kitchen. Draw a circle on first floor plan approximately one inch in diameter, at about the location shown on basement plan, and then try to extend the warm air pipes from furnace to openings and see what complications you get into. It should also be noted that no provisions have been made to heat the enclosed porch, which in the writer's judgment is more essential than to attempt to heat the vestibule, although it will be shown later that the vestibule can be warmed satisfactorily if necessary.

"Now turn to the plans here reproduced as laid out by our engineers and compare the same with the blueprint before you. Perhaps the first question that will be raised is that the location of the furnace has been changed. It is true, and in view of what has been said we believe the reader will agree that the change is absolutely necessary.

"The home and its comforts do not and should not be affected by what is in the basement to any large degree. The location of the coal bin should not determine the location of the furnace, and in this particular instance, it is a question as to what amount of storage space will be necessary as compared with the size of the house.

"Now note on the basement plans here shown, the compact layout of warm air piping as compared with those you have drawn with red pencil on the blueprints. It will be left to the readers' judgment which in his estimation is the more practical job.

"It can also be now noted that if an owner desires heat in the vestibule, that the warm air supply will not be so nearly out of line.

"Also note that a provision is made to heat the sun porch and provision can be made to heat the sleeping porch.

Further consideration must be given to the air supply to the furnace, which in every case should be what is known as the return air systems, whereby return register faces are located at various points in the house to cause the air to circulate. These locations depend almost entirely upon the direction of prevailing winds and on which direction the house faces.

"In the case of this plan the cold air returns have been omitted, for the reasons named.

"To readers of NATIONAL BUILDER who contemplate the erection of this design we will be glad to send blueprints, free of charge, covering a complete installation, provided the reader will tell us the location of proposed building as related to climate exposure and wall construction, whether frame, brick or stone. The furnace is only the generator of heat and the best furnace ever constructed will fail if improperly installed. We are interested in better warm air heating and even if no products of our manufacture are used we will freely give you information regarding this plan or any other that the reader may have in mind. Our engineering department is ready to serve NATIONAL BUILDER readers regarding any new or former installation."

Converting a Residence to Business Use at a Small Expense

As towns and cities grow, business districts are constantly encroaching upon residence districts, with the result that many dwelling structures are rendered undesirable for residences and at the same time are unsuited to business because too far back from the street. Likewise the cost of remodeling them usually makes such changes almost prohibitive. Under such circumstances an architect or builder may find a happy solution in the arrangement shown here, as carried out in Hollywood, a rapidly growing suburb of Los Angeles.

Here the owner has converted a two-story apartment building into commercial or store use, with resulting increase in income, by erecting an entrance-way display structure at the street line. Care has been taken to make its finish, color and general style like the building which stands about 18 ft. to the rear, and which is connected with the forward structure by a pleasing vine-covered pergola.

The frontage of the display structure is about half that of the main building, permitting the laying out of a garden on either side of the walk leading to the front door. The plate-glass windows afford ample display space, and while not as large as they would be in a regular store front, the unusual character of the arrangement and the artistic effect probably results in their attracting more notice than the average store front.

A further feature which commends the arrangement to builders and architects called upon to deal with remodeling problems of this sort is that the arrangement offers a minimum of offense, if any, to adjoining resident owners. The plan is far preferable to the extensions so often made at the front of residences so converted.

By erecting an entrance way display structure at the street line, the owner of the residence property in the rear has been able to convert this apartment building to store purposes without serious offense to adjoining property owners

Wrecking a Brick Wall

A contractor in Gainesville, Fla., was doing some work for the Florida Industrial Corporation. He had to remove a brick wall 150 ft. long, 22 ft. high and 18 in. thick. It was a hurry-up job.

The wall rested on a concrete foundation 18 in. below the ground level. It was desired only to take down the wall to the surface.

Twenty-six holes were cut into the wall just above the ground. Two and a half pounds of 30 per cent ammonia dynamite were tamped with clay in each hole. The charges were connected up in series and fired with electric blasting caps.

The wall was cut down as clean as a whistle at the ground level. The work was all done by one man in less than a day. The total cost, including labor, was about \$26. That would about pay the wages of five laborers for a day, but five laborers would have taken several days to tear down that wall.

Building Material Prices

THE following charts represent graphically the current retail prices of building materials based on figures taken from various published sources as of May 15, quoting retail, delivered on the job prices, and their variation according to locality.

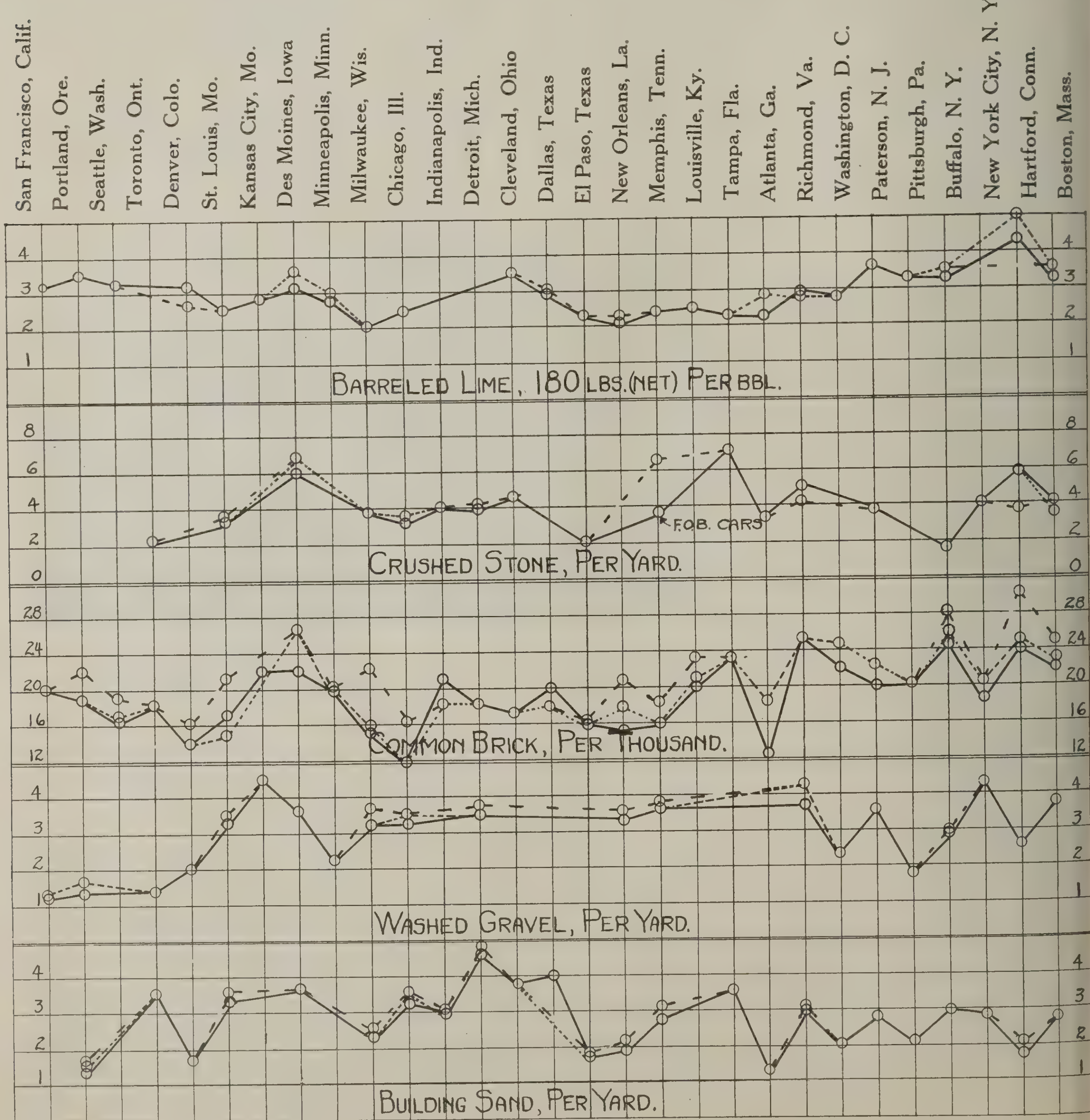
Twenty-nine representative cities covering the whole country are quoted from. Prices of material are shown in figures as dollars at the right and left sides of the pages. A circle opposite any city represents a quotation, an dthe amount of the quotation is represented by the figure at the sides of the chart.

No circle, or plotted point, means no quotation from that city. For example: New Orleans, La., shows quotations of $2.25 in March and $2.10 in April and May for lime; no quotation on crushed stone; $20.50 in March, $17.85 in April and $15.00 in May for common brick, etc.

The dashed line indicates March, the dotted line April and the full line May, or current quotations.

The price changes during the past month with few exceptions are small. In the case of common brick the tendency appears to be that of stabalizing at a little lower level. Cities not included in last months' drop are adding their names to the list of those reducing their prices.

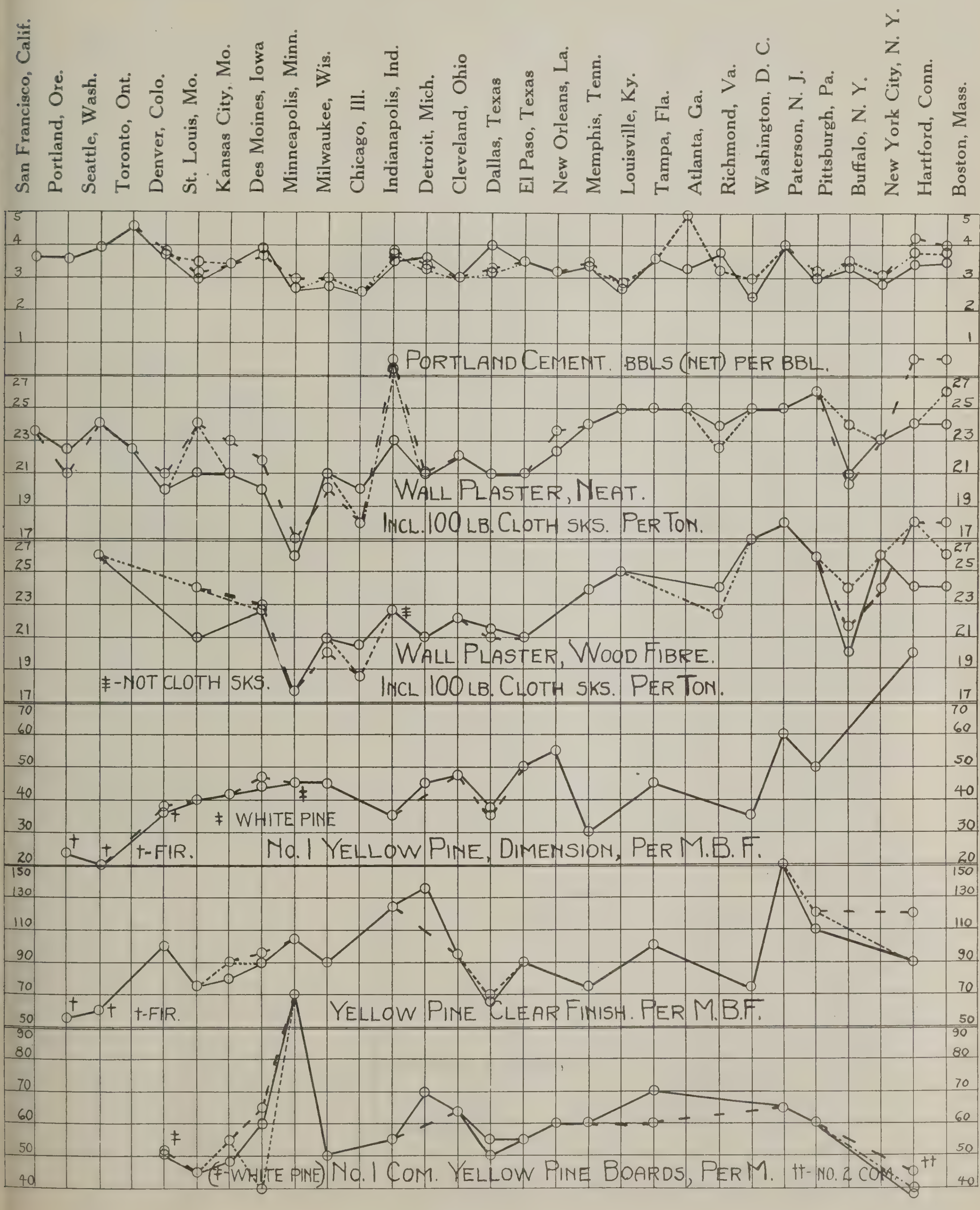
The quotations in some respects are not complete, reliable reports from points in-



cluded in the plan not having been received. These will be supplied as the charts are developed from month to month and advances or recessions shown.

Absolute accuracy is not possible under all the circumstances in the preparation of these charts. Their utility consists in their approximate accuracy in disclosing price tendencies and the relative prices in representative points in various sections of the country.

The co-operation of our readers is cordially invited in checking and correcting any inaccuracies in quotations from their localities. While the sources of information are sought from the best authorities—the most reliable is the man who is buying the material.

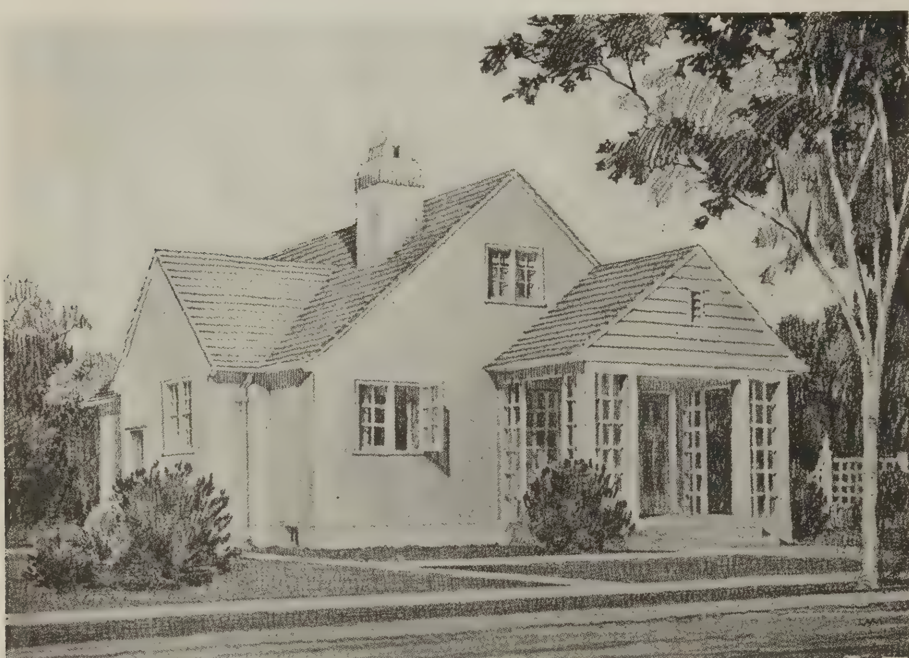


The Unit House*

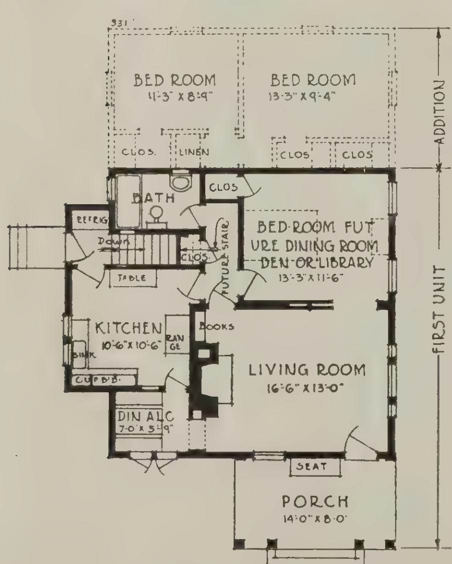
ONE objection to the small bungalow is that sooner or later the occupants will want more space and will then be compelled to purchase a larger house. The unit house is the answer to this problem. The unit house is so planned that it may be built little by little, as the owner has the money to build or as the size of the family increases, and yet the house will look attractive after the completion of each unit.

The first section is planned large enough for a small family and contains a large living room, bedroom, kitchen, bathroom, full basement and complete equipment for heating, plumbing and lighting devices. These latter equipments are so arranged that there need be no moving of them when the new sections are added. The cost of the first unit will be about two-thirds of that of the completed house; thus, if a complete house costs $5,000, the first unit will cost only about $3,500. Under this plan the owner of a good lot can have the entire house financed, and his monthly payments will not be more than the rent of an apartment of the same number of rooms. He will be paying off part principal and will have in addition larger rooms and a yard and garden.

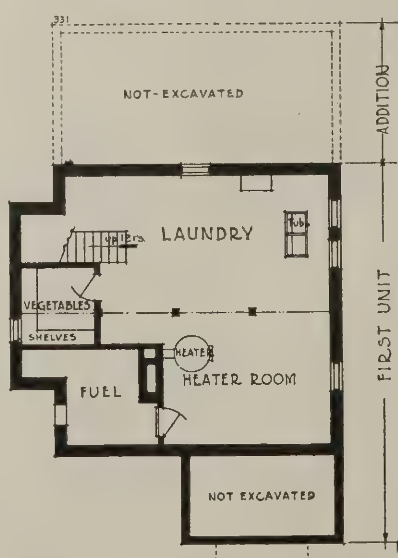
There is a fine charm about the stucco house shown here, whether considered in its original plan or after the additions have been made. In the original plan there is a large living room with a fireplace and a built-in bookcase. The attractive dining alcove with its casement windows opens off of a well-arranged kitchen. The bedroom has a good closet; the bathroom is modern in every way. This bedroom will probably become the dining room when the additional sections are built, and it is upon this flexibility of arrangement that the success of the unit house largely depends. It is one thing to plan a house, be it three rooms or six, where each room will have a definite function and will maintain that function continually. But where the original three rooms must change their functions with the addition of more rooms to the unit, it requires imagination and foresight, careful and skillful planning, and it is in just this flexibility that the design presented here has unusual merit. In the original scheme the family will eat in an attractive dining alcove or in one end of the living room. When the two rooms are added they become bedrooms connecting on the original hallway. The old bedroom may then be used as a dining room, library, den, or in emergency as a third bedroom. If used for a dining room it is entirely convenient to the kitchen; if as a bedroom it is convenient to the bath; and as a library it has sufficient seclusion.



Unit House—contents 24,678 cubic feet. First unit, 17,207 cubic feet; second unit, 7,340 cubic feet



FIRST FLOOR
CEILING HEIGHT 8-6"



BASEMENT
CEILING HEIGHT 7-0"

*Reproduced by permission from "How to Plan, Finance, and Build Your Home," published for the Southern Pine Association by the Architects' Small House Service Bureau of Minnesota, Inc.

New Fourth Edition of the Building Estimator's Reference Book.—This standard work appears in a new fourth edition completely revised and with a large amount of new matter. It is a practical and reliable reference book for contractors and estimators in the building industry, covering all classes of construction work. Labor costs and labor and material quantities are comprehensively treated. The subjects include excavating, estimating, concrete construction, brick masonry, rubble stone work, hollow tile, structural tile, and gypsum blocks, rough carpentry, mill work, wood and metal lathing, sheet metal work, cork insulating, roofing, interior marble, glass and glazing, painting and varnishing, structural iron and steel, metal lumber construction, heating, plumbing, electrical work, etc. The work is freely illustrated and contains 2,930 well printed pages in compact form substantially bound. Frank R. Walker Co., 2209 Archer Avenue, Chicago, Ill.

The Garden Path

By John Y. Dunlop

THE modern garden path or yard walk is generally one of those jointless coverings that looks as if it had been rolled out for the time-being, or had been set off to indulge the strenuous activities of a walking tour.

But how does this type compare with the path which gives one the impression that it had been laid from the refuse of the mason's yard?

To me there is no comparison; the one being laid to all appearances for speed to which garden walks should have no relation, of serving rather as a pleasureable path for the listless saunterer.

Of the various forms of walks which the illustrations show, the stone path in Fig. 1, which is laid with thin slabs of stone from three to four inches thick, is the simplest in construction. The system of arrangement of the stones is so irregular that one could be led to believe that there is no rule in the jointing. Still on closer examination it will be found that one idea which seems to be strictly carried out is to have as few joints as possible in the one line and the second rule is that there should be no internal angles in the jointing of the stones. This will be easily understood by reference to the photos of these walks and also to the line drawing.

In constructing a stone path in mild climates the walk should be dug out to a depth equal to the thickness of the stone and one inch for the bed of sand on which the stone is laid. The digging should be done carefully as it is not wise to disturb any of the soil below that depth.

In severe climates where there is danger of frost heaving the walk, it will be necessary to provide a more substantial form of construction. In such cases the excavation is usually carried deep enough to receive a six or eight-inch bed of cinders or gravel to provide sub-surface drainage. A rough course of concrete three or four inches thick is laid on this, and is finished with the material that is to be exposed on the face of the walk.

The next thing is to have the whole of the walk made up with the stones laid in place and cut and jointed.

After this has been done, lift a few yards of the stones off the path beginning at the end and sprinkle the bed of sand, onto which the stones are to be laid. The stones are now set in their finished position and are well beaten down with a heavy tamper, and as each block is set in position the surface of the walk is straightened out along and across according to the levels of the finished path. Grout the joints with a little hydraulic lime or cement or, if no foundation is used, leave the joints open so that grass may grow between the stones as shown in Fig. 1.

A brick and stone path is also shown in the line drawing and a view of the curb of this walk is also shown in Fig. 1.

Fig. 1—Stone and brick garden path

In making up this walk, which slopes up from the house, a six-inch foundation of concrete is laid under the brick curb.

The four courses of brick are laid in cement mortar, and at the top and bottom ends the brickwork butts against a square pedestal on which a terra cotta vase is set.

The arrangement of the stone path in this walk is more exacting than the first design, and it will be more expensive owing to the waste of material in cutting the ends of each course to fit against the diagonally placed rectangle. Still with a stone path of this design in which the square stones are chosen of the same color as the brickwork, and the filling in stone grey or whitish yellow, the effects of the color scheme with the surrounding lawns is very contrasty.

Another way in which a path of this type is often laid where the ground has a slight rise is to lay each portion of the stonework level and to form broad steps according to the needs of the sloping ground.

The cobblestone and brick path shown in Fig. 2 is rather an artistic arrangement of these materials. In this case bricks are used for the setting out of the main lines while the inner parts of the pattern are filled in with round cobblestones which have been worn smooth by the weather. These stones are of a whitish color, and their setting in panels formed by the baked clay gives a delightful contrast.

The first impression which one gets on viewing a path of this kind is very pleasant. But it is on a sunny day when the glistening surfaces of these tiny stones are flashing back the irridescent coloring of the sunlight that the visitor is most impressed.

In building a walk of this type the excavation must be made according to the size of the brick which in this case is a brick set on edge. So that the ground must be excavated to fully five inches and on that the various bands of brickwork are bedded in mortar. In fact, the brickwork would be built up and have its joints flushed up just as in a brick wall.

After the brickwork is set the space in each panel is filled up with some small, broken stone or gravel and on the top of this a bed of mortar is laid and the cobblestones set in position just the same way as tiles are laid.

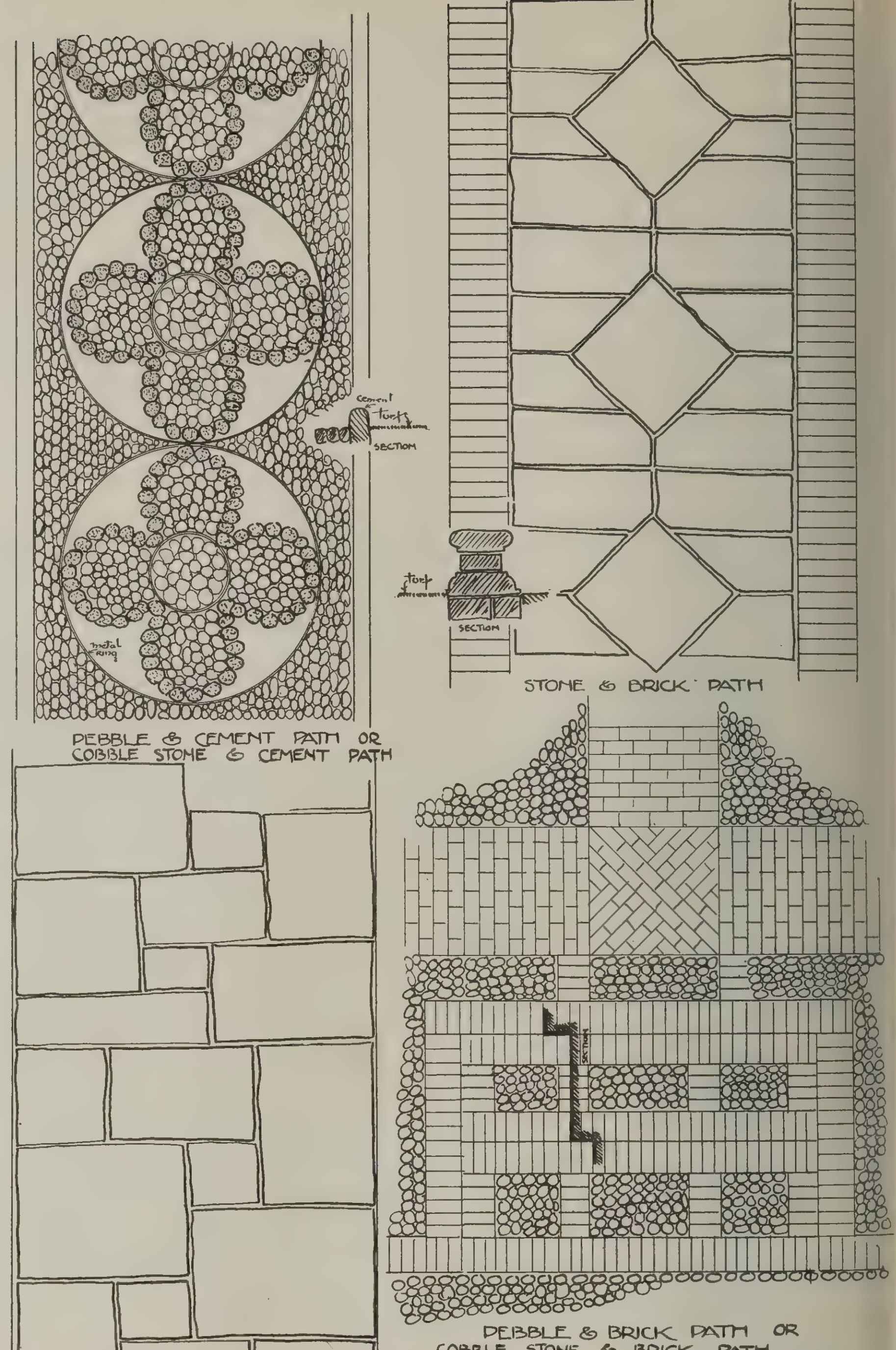
The filling of the panel is then tamped until the tops of the stones are flush with the brick band and any excess of mortar which rises up between the joints of the cobblestones is washed off so that when the filled-in panel sets the surface of each stone is clean and rounded.

In the pebble or cobblestone and cement path shown in the drawing we have a garden walk which entails a great amount of labor. In this design the form is the circle and quatrefoil, and the main lines of the geometrical pattern is obtained by using barrel hoops in conjunction with the cement.

The path after being dug out should be bottomed for a depth of three inches with broken stone on brick or fire clay. On the top of this should be spread a thin layer of cement mortar which would be sufficient to bind the top of the bottoming together and form a fairly level surface.

The outer hoops are then set in position, being blocked up and made good with some cement on the inside of the cement spandrel.

The work of laying the stones on the outside of the hoops would then proceed, bedding and setting small portions at a time and then beating each portion down into its final position.



LAYING OF GARDEN PATHS

The inner portion of each pattern would be laid in much the same way, and when this part has set the darker stones which form the outline of the quatrefoil would next be dealt with. After all the cobblestones have been set and when the surrounding work is sufficiently hard to walk on, the cement spandrels are poured in place.

This is one of the most expensive garden paths from a labor point of view. Still, for those who wish to have something different the example is worth copying or adapting.

Eave-Trough Outlet Repair

Oftentimes an eave-trough on a building in the country, where it is not possible to get immediate relief, will rust through and great inconvenience and damage result unless some make-shift can be devised to serve until the trouble can be corrected with a new section of trough put up by skilled mechanics.

The following device is suggested: Take a section of metal large enough to extend four or five inches beyond each side of the

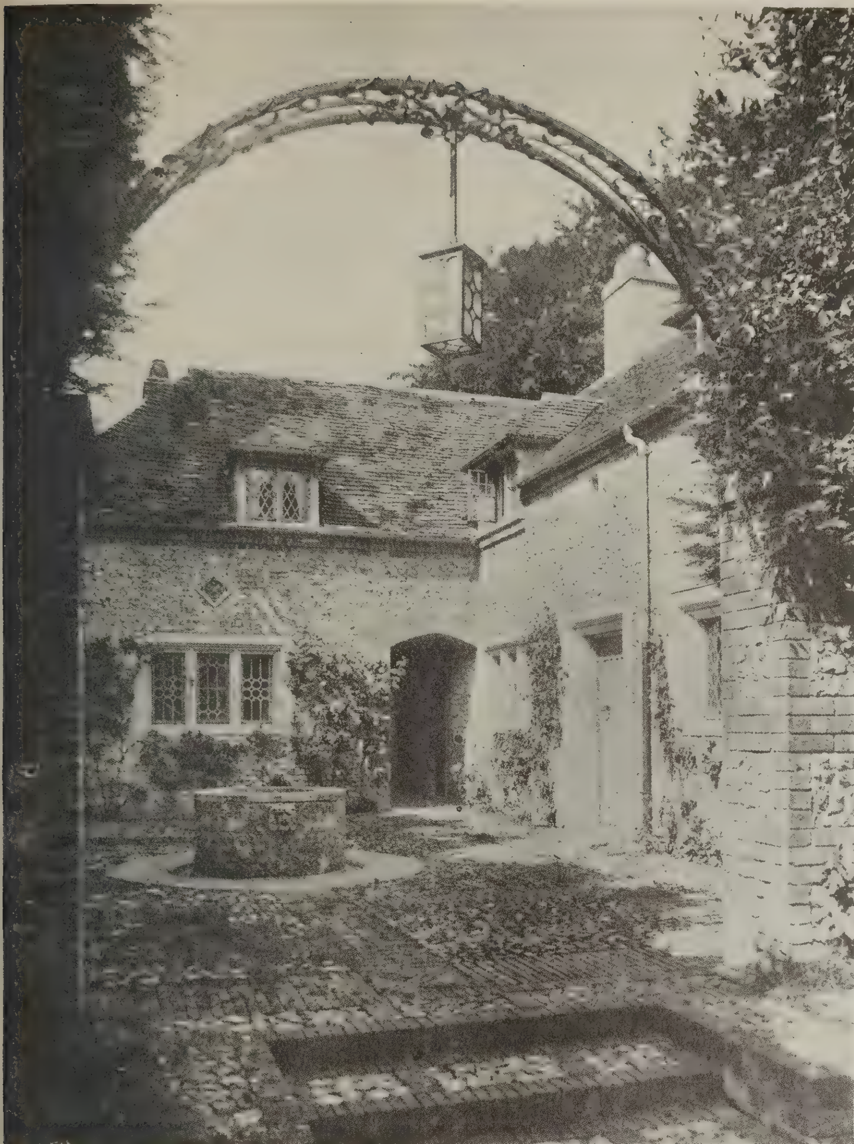


Fig. 2—Pebble or cobblestone and brick path

old outlet, and form it the shape of the old trough but with plain edges, and wide enough when placed against the under side of the old trough to be forced up under the

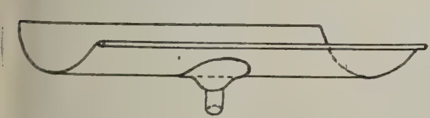


Fig. 1

old trough bead in front and to be bent over the edge and into the old trough an inch at the back. Into the centre of this

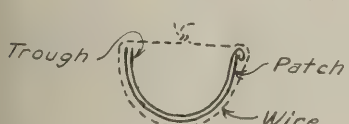


Fig. 2

patch should be soldered a tube large enough at the upper end to cover the hole left in the old trough after the old tube was knocked out and away. This tube may be tapered from the top to fit the old conductor. Coat the under side of the trough and the inside of the patch smoothly with a good prepared cement or thick lead paint, either red or white, though red is preferred. Place the patch firmly against the bottom of the trough, force the front edge up under the bead and draw the back edge as tightly as possible up over the back edge of the trough and clinch it inside. Reinforcement can be given by twisting a No. 14 wire snugly around each end of the patch (See. Fig. 2). The ragged edges of the hole may be tapped down all around into the tube of the patch, giving a neat finish to the job.

This patch can be made in a short time by any tinner.—*L. S. Bonbrake.*

New Solvent Said to Perform Feats Hitherto Impossible

Properties of a liquid described before the students of the department of chemistry of the University of Nebraska show that it promises to realize the alchemist's dream of the universal solvent.

As described by Dr. Victor Lenher, professor of chemistry at the University of Wisconsin, in a series of addresses on the subject, tests have shown that selenium oxychloride, as the solvent is called, dissolves rubber, glues, enamels, hydrocarbons and many other substances which hitherto have been regarded as most resistant to all chemical agencies except fire.

By its use ordinary paints, varnishes and shellacs can be removed from furniture and carriages and other objects without injuring the wood, and enamels can be taken from automobiles completely without affecting the steel body.

The raw material from which it is obtained was once a waste product from the electrolytic refining of copper.

Face Brick Bungalows and Small House Plans

A portfolio of bungalow and small house plans has been issued by the American Face Brick Association, Chicago, presenting in a series of four separate folders of 3 to 4 room, 5 to 6 room, and 7 to 8 room plans prepared by thoroughly trained and experienced architectural skill. The plans and working drawings are obtainable at nominal prices.

The Kiln Drying of Lumber, by H. D. Tiemann, M. E, M. F., in charge section of timber physics and the kiln drying experiments of the U. S. Forest Service; special lecturer in wood technology and forestry, University of Wisconsin, Forest Products Laboratory; Madison, Wis. This authoritative work is issued in a third edition by J. B. Lippincott Co., Washington Square, Philadelphia, Pa., at an advance of only 50 cents on the first edition. The price is now $4.50. The contents includes the structure and properties of woods; common practices in drying; how wood dries, shrinkage, warping, casehardening; the principles of kiln drying; the circulation and method of piling; special problems in drying; improved water spray humidity regulated dry kiln; drying by superheated steam and at pressures other than atmospheric; theoretical considerations and calculations, humidity, evaporation, density, the drying cycle, amount of air and heat required, thermal efficiency; effect of different methods of drying upon the strength and the hygroscopicity of wood; instruments useful in dry kiln work and methods of testing wood; temperatures and humidities for drying various kinds of lumber; humidity diagram. There are 54 illustrations in the 306 pages, with 12 plates and 16 tables in the book, and a complete index.

The Back-Garden Fence

By Chas. Alma Byers

GOOD taste gives good house design an appropriate setting, in walks, shrubs and fences. Builders know that a neat, snappy house design makes a salable property. Then surely neat, tasteful surroundings will add to that salability, and nothing helps to give this selling quality more than the neat backyard—except paint.

As a starting point for making the back yard neat and attractive, something in the way of a fence or wall to enclose the area is naturally desirable. Thus enclosed, this garden plot, first of all, becomes more or less private, or secluded; and hence, besides providing a degree of appreciable seclusion for outdoor work and recreation therein, it permits the exercise of at least a certain amount of individuality in its planning and planting. Then, too, the garden fence or wall affords many charming possibilities in a decorative way, especially as a support for climbing rose bushes, as well as a background for effective border schemes.

The garden fence, even though we consider only the kind that is constructed of wood, may be designed in any number of interesting styles. In fact, it probably affords a much wider range of possibilities in this respect than is commonly realized. It may be also still further varied in appearance by its color treatment. Briefly, the matter of building the garden fence may well be given considerable thought; and it is with the hope that they may prove interesting and profitable as suggestions that the accompanying illustrations of garden fences are presented.

The first fence here shown (Fig. 1) has a solidly boarded base and a latticed top, the former reaching to a height of 3 ft. and the latter extending the height to 4 ft. 6 in. The boards of the base, set perpendicularly, are 1x8 in. in dimensions, and the strips that comprise the lattice are ⅜x3 in., spaced with 3x4-in. openings. The posts, set about 8 ft. apart, are of 3x4-in. material, and the three stringers employed, the top one of which caps the posts, are of 2x3-in. timbers. This fence is painted white, and the few climbing rose bushes with which it is traceried add a most effective touch of color.

The second illustration (Fig. 2) shows a somewhat similarly designed fence, although differing in certain details and in color treatment. The base section in this instance is of narrow tongued and grooved boards, reaching to a height of about 3 ft., and the latticed top, adding 20 in. to the height, is designed with diamond-shaped openings. The boards of the base are of ¾-in. material and the lattice steps are ⅜x2½ in. Here again the posts are 3x4's, set 8 ft. apart

Fig. 1

Fig. 2

Fig. 3

Fig. 4

nd the three stringers are of the same imensions as those of the first fence, except that the top one is only $1\frac{1}{2}$x3 in. The ence is painted a very dark shade of green, ith white trimming.

The third fence here shown (Fig. 3) is urely of the lattice type, and, despite its implicity, is especially attractive. The posts, et 8 ft. apart, are of 3x4-in. material, and each to a height of 4 ft. There are but wo stringers, which are 2x4's, the top one f which caps the posts and the bottom one

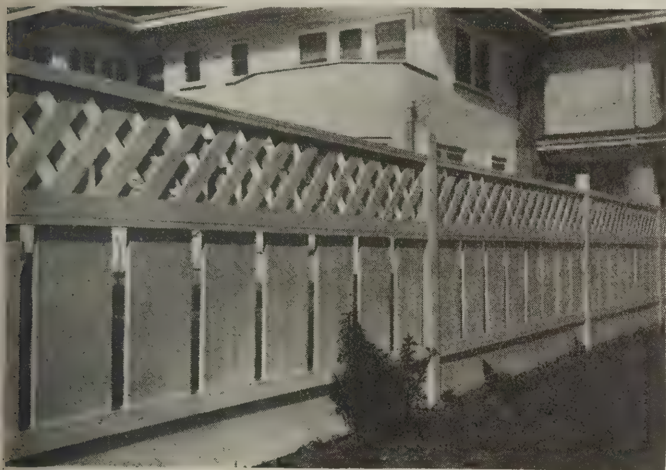


Fig. 5

love-tailed to them. The lattice strips, paced so as to create openings approximately 3 in. square, are $\frac{3}{8}$ in. thick by $2\frac{1}{2}$ n. wide. Every alternate upright extends ft. above the top stringer, and each intermediate upright is about 6 in. shorter. The ence is painted white, and is charmingly lecorated with the green foliage and pink olossoms of climbing rose bushes.

The fourth illustration (Fig. 4) shows a ence of the novelty type, particularly in espect to its scalloped top. Beginning with concrete base that averages about 1 ft. igh, the fence has a maximum height of 7 t. The latticed portion immediately above his concrete base is 3 ft. 6 in. high, and is lesigned with openings approximately 7 in. quare. These lattice strips, as well as the ieces which create the scalloped top, are $\frac{3}{8}$ in. thick by $2\frac{1}{2}$ in. wide. The 3x4-in. osts, spaced about 9 ft. apart, are set in he concrete base, and the one real stringer, f 2x3-in. material, which tops the center atticed section, is dove-tailed to them. Utilzing a 1x4-in. board as its principal, the ottom stringer is of the built-up kind. A ence of this type and height provides a ery excellent support for vines, and by he aid of such covering can be made to ive the garden almost any amount of priacy desired. The fence is painted a light hade of French gray.

The next fence here illustrated (Fig. 5) s composed of a wide baseboard, a middle erpendicularly boarded section, and a laticed top course, the three combining to roduce a fence 4 ft. 6 in. high. The baseboard is 1 in. thick and 12 in. wide, and the up right boards above, cut 24 in. long, are of the same dimensions. They are spaced about 2 in. apart. The lattice work, comprising a section about 16 in. in height, is of criss-cross design, and is constructed of strips $\frac{1}{2}$ in. thick by $2\frac{3}{4}$ in. wide. The posts are 4x4's, spaced nearly 10 ft. apart, and the panel boards and lattice work are centered on both posts and stringers. The fence is painted white, and is as yet without floral decorations.

The last of the illustrations (Fig. 6) shows a fence that is especially well adapted to terraced grounds. As will be observed, there is a concrete base of stepped elevations, which is coped with red brick set edgewise, and immediately above this coped base alternate wide and narrow boards comprise a 2-ft. 8-in. center course of paneled effect. The wide boards of this course are 8 in. wide and the narrow ones are 3 in. wide, both of 1-in. thickness. They are spaced with cracks of about 2 in. width. Each alternate narrow upright extends 15 in. above the intermediate wide ones, and these extended ends are crossed horizontally with three 3-in. strips spaced 3 in. apart. The wood portion of the fence is painted a rich shade of brown.

Fig. 6

Fig. 7—Detail of end panel of a fence

The back-yard garden enclosed with a fence like any of the ones here shown can hardly escape appearing neat and attractive, for but little effort is required to make and keep it so. A few climbing rose bushes or other vines, or merely a bordering row of low-growing flowers, indeed completes the fence into a thing of real charm and beauty. And inside such an enclosure the garden becomes a private domain, however small, of real delight, and is desired. And that is what the builder should aim to accomplish.

Driving a Nail Through Fragile Wood

B. W. C., of Moncton, New Brunswick, submits the following suggestion for procedure when driving nails where the wood is likely to split: Take the nail or brad before driving, place the head against some hard surface such as a hench axe or the side of another hammer and tap the point of the nail or brad with your hammer. This makes the point blunt so that instead of spreading the fibres of the wood into which it is being driven it cuts its way through, and by so doing does not split the wood. I use this way when driving nails in molding when it is necessary to drive a nail where two mouldings are mitered and the miters must be glued and nailed, or in any other place where the wood is liable to split.

To Cope Molding

To cope molding in place of mitre, first cut a mitre on the piece to be coped. This will give a good line to cut by and give a good fit.

A Servantless House

Spanish adobe home, into the designing, construction and furnishing of which building interests and related industries have put their best efforts for the sake of producing a structure which would be a model of its type. The dwelling is designed for a servantless family

ARCHITECTS, builders and house furnishers have joined their efforts in producing the residence shown in the accompanying illustration, the object being to plan, erect, and furnish a home which would serve as a model of its type. This is the second "electrical home" erected in Los Angeles through the co-operative efforts of building interests, electrical interests, contractors, etc. Conceived with a view to being shown to thousands of persons special pains was taken in all its features. It is intended for a small family which does not employ servants.

The outer walls are of adobe 27 inches thick, to which lath and plaster were added, making the total thickness a little more than 28 inches. The over-all dimensions are 46 by 54 feet, not including the gatehouse situated at one corner of that portion of the yard enclosed by a stuccoed adobe wall. This wall is broken at the front as shown in the ground floor plan to provide an entrance to the patio which occupies the space immediately in front of the main portion of the dwelling. This patio is paved with red tile corresponding in color to the red roof tile used and a few shades darker than the color of the stucco which is old rose. A pleasing fountain and

The patio at the front of the house taken from the front doorway. In the background is the "gatehouse" which takes the place of a portcochere. The front entrance to the patio is between the end of the wall in the right foreground and the shrubbery just beyond

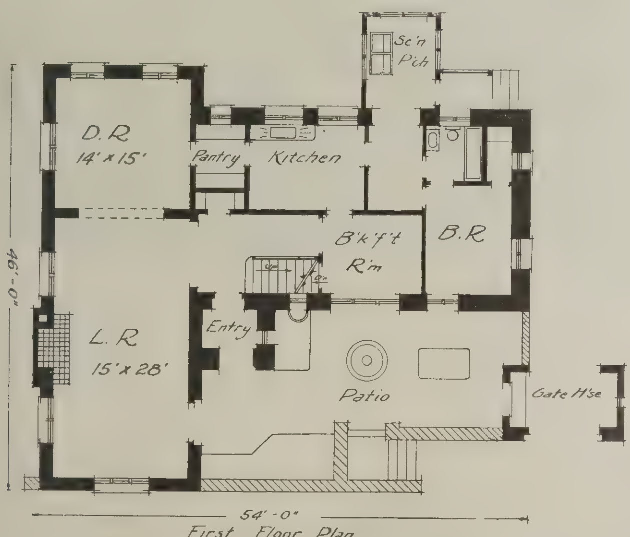
The living room, showing the vaulted ceiling which is typical of the treatment in all of the rooms, except that some of the ceilings are groined

Looking from the living room of the modern electrical home through the hall into the dining room

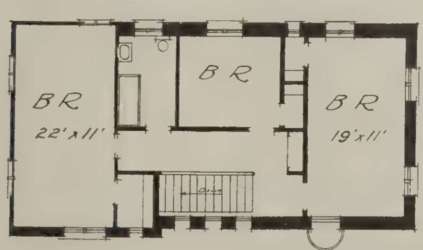
grass plots or flower beds, give an opportunity for the introduction of vegetation in the enclosure. French windows lead from the dining room to this patio.

A feature of the interior is the arched ceilings of all the rooms except the bathroom. In the case of some of the rooms the ceiling is groined and in others, as in the living room, the single arched vault extends lengthwise of the room.

The house having been promoted by the co-operating electrical interests, special attention was given to the electrical outlets, the number provided being so large as to surprise some builders. Examination of the accompanying plans will show that there are seven outlets in the living room, including one for the vacuum cleaner (No. 1) and two for torcheres (Nos. 5 and 6), either side of the fireplace. There are four outlets in the dining room, one of these being the floor outlet for toaster, percolator, grill, waffle iron, etc. The kitchen is provided with four outlets, one for the electric dishwasher, one for the buffing motor, one for the electric range, and one for the electric range switch. On the screened porch, or laundry there are five outlets, providing connections for a clothes washer, ironing machine and dryer, electric refrigerator, flat iron, and hot water heater. The large bedrooms have five outlets each, two being for dressing table appliances.



First Floor Plan



Second Floor Plan

The house furnished as shown in the illustrations was offered for sale at $75,000. This includes two automobiles on exhibition in the garage. Unfurnished the price was $35,000. The lot on which the house stands measures 96 by 140 feet and is located in a high-class residence district.

S. H. Woodruff, of Los Angeles, is the architect of this striking dwelling, the Western Construction Co. are the builders, and Barker Bros., of Los Angeles, are the interior decorators and furnishers. The hardwood floors throughout the house were furnished by the Hammond Lumber Co., and the inter-locking rubber flooring, and floor and drainboards were furnished by the Western American Rubber Co. The ornamental ironwork was produced by the Brombacher Iron Works and the heating apparatus was provided by the Unit System of Heating and Manufacturing Co. The electrical work in the structure, including the electrical appliances and lighting fixtures represented the co-operative efforts of a large number of Los Angeles electrical dealers.

Varnish Without Gloss

To prepare a varnish that will dry with little or no gloss, the *American Paint and Oil Journal* says to dissolve two ounces of yellow or white bees-wax, finely shaven, in one-half pint, or less, if possible, of turpentine. Place in a water-bath or sand-bath when melting the wax, because of danger of fire. Add this mixture to any ordinary varnish and apply to surface. It will dry flat. Half the quantity will cause varnish to dry with an eggshell gloss.

Good Taste and Savings--Bad Taste and Waste

By the Architects' Small House Service Bureau of Minnesota, Inc.*

IN Fig. 1 we have selected a home typical of many built in nearly every city and town. It illustrates according to established principles of architectural practice what is considered poor taste in design.

In Fig. 2, we have re-designed the house to show you how, by the use of a few simple principles of architectural design the same house can be built for less money and with a more tasteful appearance.

Fig. 1 is really an extravaganza in waste as well as a comedy of errors in home building. Fig. 2 shows dignity, simplicity, good proportions.

Let us point out to you some of the differences between these two houses—differences which may make the home you build either a success or a failure.

For example, No. 1 in Fig. 1 indicates post unnecessarily large to support the roof above. These supports are pudgy, bulbous, toad-like. They represent waste material in an attempt to secure uniqueness in effect. Because of this fact they are not beautiful. Rather, they are coarse in appearance whereas they might have been treated with greater refinement at much lest cost.

No. 2 illustrates a poor attempt to add something to the exterior for purposes of decoration. The projecting roof over the bay windows is unnecessary. In fact, the bay windows are not required. They do not add appreciable floor space to the interior of the house. On account of projecting beyond the front of the house these bay windows and the over-hanging roof add expense for framing and finish. The complicated construction increases labor costs. They serve no purpose in the way of decoration. They produce an uneasy, cut-up feeling in the exterior of the house.

No. 3 illustrates roof brackets as a vain attempt to support the roof. If the roof really required bracket supports the three

indicated in size and style would not do the work. This roof, however, is so constructed that it supports itself. The brackets are shams and unnecessary expense as well as added labor.

No. 4. The porch roof appears to be slipping away from the house due to the wide over-hang and furthermore on account of no connecting feature to tie the roof with the rest of the house.

No. 5. Here you will see the same mistakes we have pointed out in No. 4 of the porch roof. In this particular design the exposed rafter ends serve no purpose. They increase expense for millwork and labor.

No. 6 illustrates a clumsy, crude example of brickwork. These heavy, massive piers are uncalled for. A brick wall of this size and proportion should be used only with a masonry building and even so with discretion. One of the practical objections to a solid wall of this type is that when you sit on the porch during summer weather you get little if any free air circulation on the feet. This wall would make a better garden fence than a balustrade for a home.

No. 7 shows misplaced horizontal band on the building. These bands are effective when properly used. They serve to tie up and interrelate different exterior features of the home. The band in this case serves no really useful purpose.

No. 8. The bay windows we have already spoken of as nonessentials from a constructive point of view. They are protrusions that add an uneven, chaotic, bumpy appearance to the exterior surface of the house.

No. 9. The twin windows are out of scale and poorly placed.

No. 10. The brick balustrade of which we have already spoken is out of scale and

*Reproduced by permission from "How to Plan, Finance, and Build Your Home," published for the Southern Pine Association by the Architects' Small House Service Bureau of Minnesota, Inc.

is in appropriate treatment for a wooden structure. Furthermore, it offers no adequate means of carrying off rain water from the porch.

No. 11. The bay window has no apparent foundation. Every structural feature of a building should have apparent support. The windows are small and out of scale. They are unnecessarily high.

No. 12. Here is an unjustifiable use of windows in the living portion of a house. Unless more light is required it is better to omit such "peek holes" altogether. They suggest a poorly-lighted room.

We have pointed out to you a few of the nonessentials and wasteful features of this house. In Fig. 2 we have tried to show you how by elimination and refinement, by subtraction rather than addition, less materials and labor can be used to procure a more simple, harmonious, attractive home.

We have used the same house in both cases. We have altered Fig. 1 according to architetctural principles hoping to demonstrate in a concrete way how savings in materials, time and labor are possible, how building costs can be lessened by the application of architectural knowledge and skill to what otherwise is considered "hit or miss" design and therefore a waste.

Notes on Building

By Charles Cressey

Regulations and Resentment—A comical kink common to the nature of most of us, seems to be that spirit of self-pity and righteous indignation, whenever we buck against a solid regulation which says "Thou shalt not," just when we particularly want to indulge our little fancy in a building way. Well, since it helps our case but little to stick out the tongue of scorn, or to make rude reflections into the very ear drum of a cruel inspector, let us think that after all most of our building laws result directly from the offenses of some former raider against public welfare. In other words laws rarely precede or anticipate offenses, but are usually a well meant attempt to stop repetitions of some recognized bad practice, actually experienced and resented. It follows, of course, that laws in this class must at times act as a brake, or even as an interference in progressive building, of which the delay in recognizing reinforced concrete is one instance. This question is not the point of my writing however, but in passing let me say that the negative attitude of laws and officials did more perhaps for concrete and other new methods of construction than any amount of enthusiastic first acceptances could have done. It is certain that whilst working hard to secure sober official recognition, experimenters at the same time were working hard to gain public interest together with a sound conviction amongst technical men, of immense value to the future of these newer types. It is especially true of building matters, that values are in direct relation to the time spent in their development, and laws which are not too easy to twist and change help much in forcing sober consideration, and later adoption of improved types on a basis of reason and fact, rather than of passing fancies. This viz: that too few of us recognize and appre- comes again to the point I wish to present, ciate the tremendous friendliness, stimulus, protection, and self-interest, associated with good building regulations. Few men of ordinary experience can deny that, but for building laws, buildings would present a sorry spectacle. It is an unfortunate fact that the public needs constant protection against itself, by its carelessness, greed, haste and disregard of neighborly decency. I never hear a building man resent a city law, without thinking of the ill policy of one who fouls his own nest. Not all the laws are by any means past improvement, but it is certain that worth-while amendments can usually be secured, if a substantial presentation of facts supports a desire for revision. It is obvious and incontestable that elementary pocket-interest, outside higher motives, calls for the absolute loyalty of all men who build, to both civic law, and to its administrators, whose task is far from enviable in the face of many cold-blooded proposals to shut off light and air, to build dangerously, to deliberately neglect sufficient and seemly sanitation, and the thousand-and-one proofs that the building public at large must be forced rather than be lead to protect itself against itself. One of the joys of this mixed life is to quietly squelch a domineering building hog, by reading section ten of ordinance so and so, clearly designed to prevent such as he from perpetuating the errors of his porkly progenitors. After all, the laws relating to building are mostly the mere minimum, and almost never is the best demanded. By failing to stand firmly and with conviction against evasions and disrespect for building regulations, we disregard a most convenient, sure, and effective means of self-protection, and weaken the foundations of civic health and security.

* * *

Firewalls and Dampness — Although considerable attention is usually given to prevent dampness rising in foundation walls from adjacent surface or sub soil, there are but few attempts to prevent the bad conditions due to moisture passing downward by way of fire walls, gable walls, and stacks above roof and gutter lines. Effloressence, cast joints, and frost disturbed brick work above the upper parts of good buildings are common disfigurements and depreciations worth more serious study than is usually given. It is now a prevailing fashion even where fire rules are not concerned, to design without the use of overhanging eaves, that old reliable of damp prevention features, and the results, especially in plastered buildings are lamentable where the fire wall is poorly protected. First, it is important and obvious that a watertight top to any fire wall should be insured, but probably 80 per cent or more of the examples in any city would fail to pass a casual scrutiny in this particular, after one year of exposure. Cement plaster finish on the top of firewalls is unreliable unless laid of greater thickness and with more care than is usual. Further provision against dampness is necessary if the common risks of vibration, expansion, settlement and similar troubles are to be met successfully and I have found a good grade of asphalt roofing sanded for key, laid one course below the top, to be a convenient protection where finish requirements prevent asphalt on top. Stone coping, terra cotta, or similar capping are all subject to troubles of absorption, or direct leakage, and I have used asphalt sheeting, lap jointed, as a bed in these cases with success. Also where plaster finish over stud framing occurs, it is worth while to assume that plaster will surely fail, and provide undersheeting as a second line of defense. My chief object in writing however, is to emphasize the need for a continuous and full width damp course in fire walls at the flashing line or at some convenient level which will prevent downward saturation affecting walls or ceilings below. I have taken this precaution also in exposed stacks with good results in maintaining better flue conditions. In hollow tile buildings with plaster finish the protection of fire walls requires special care and a cut-off line of two-ply roofing against downward saturation will often save the reputation of both man and material. Once the necessity of protecting the "upper works" of buildings is recognized, there are many ways of securing good results, including vertical protection, which separates facing material from the backing and by preventing absorption into the body of the wall allows quicker drying of the face, with reduced depreciation.

Bricklaying

By Wm. Carver, Architect, and Andrew Pentland, Mason Contractor

THAT the life work of a young man is secure in starting as a bricklayer is certified to by W. W. Dyer, a successful mason contractor of Pittsburgh, Pa., whose father was in the same business, and he himself has trained his own son for the same career.

Mr. Dyer had the contract for building the test panels of Ideal and solid brick walls in the U. S. Bureau of Standards laboratory at Pittsburgh. These panels are now aging and when thirty days old will be swung for testing into the bureau's ten million poun crushing machine, the largest in the world. As an experienced and practical builder Mr. Dyer has had opportunity to thoroughly appreciate the Ideal Wall and gives it his hearty endorsement, not only for its inherent principles but as a means of enlarging and extending the use of brick and the business of bricklaying.

Tests of the Ideal Wall

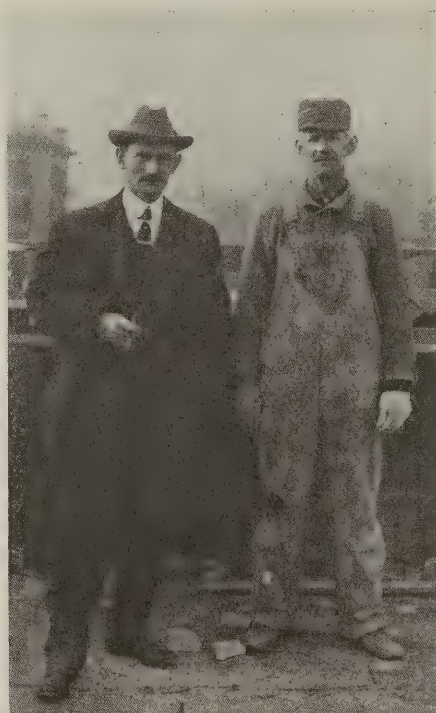
At the Building Officials' Conference, held in Cleveland, Ohio, April 27-29, important facts were presented regarding the Ideal wall.

Although the idea of this wall was worked out a few months ago by the Common Brick Manufacturers' Association they found here and there an architect or contractor who had independently hit upon this idea and used it in his locality. They found bricklayers from Russia and Germany who say that this wall is used in certain sections of those countries. In America the Ideal Wall has been used most extensively in Phillipsburg, N. J., and in Southern California.

In Phillipsburg a great many houses have been built with 8-inch Ideal all-rock walls, under the direction of Paul R. Smith, the architect for this development, The report on these houses, made by the Structural Service Bureau of Philadelphia, who made the investigation says: "In Mr. Smith's opinion, the 8-inch hollow wall house is a very great success, and in a very short time will come into general use throughout the country for all types of houses. He stated that the houses were not furred and insofar as they had been able to find out, there had been no moisture show through on the inside of any of the houses erected—and the to one year. In his opinion, the brick age of these houses runs from a few months header would not carry sufficient moisture to appear on the plaster. The mortar joint —which would carry moisture much more readily than brick, does not run all the way through.

"I had conversations," the report continues, "with bricklayers, plumbers and carpenters, and all stated that they had never heard any complaint concerning the heating, air leakage around windows, or moisture appearing on the inside wall.

"In conversation with the people living in the brick houses, and in response to definite questions, there was no complaint of either moisture or air leakage,—and in fact, all appeared very well satisfied with their occupancy in houses of this type of construction. We conclude that the 8-inch Ideal wall house is very satisfactory throughout this development. Moisture does not appear to work through the walls or damage plaster or paper in spite of the fact that there is no furring."



W. W. Dyer, Mason Contractor, and one of his laborers

In Los Angeles the Ideal all-rock wall has also been tested thoroughly by practical experience. This wall has come into such wide use in that section of the country that it is now the prevailing type of masonry construction for residences in Southern California. Mr. L. S. Collins, of the Los Angeles Brick Company, stated at the recent convention of the Common Brick Manufacturers Association in New York City that at the time he left Los Angeles they had just passed through the first week of their rainy season and the rain had been very continuous and very heavy. He had been at pains to call up a number of people living in Ideal wall homes and without exception all reported that no sign of moisture had made its appearance on the inside of the walls, and in every one of these houses the plaster was applied directly to the brick, without the use of furring.

The 8-inch Ideal wall is at present permitted under the building codes of Los Angeles, Worcester and Phillipsburg, N. J., and Philadelphia, Wilkes Barre, Roanoke, Chicago and other cities are now considering admitting the Ideal wall into their codes.

After all the tests have been completed the field of usefulness and economy of Ideal construction may be greatly extended.

The Common Brick Manufactruers Association state in their literature that a bricklayer can lay more square feet of Ideal wall per day than of solid wall. Mr. Knickerbacker Boyd states that the comparative time of laying the fire test panels for the Bureau of Standards which were about 16 feet long, 11 feet high and 8 inches thick, was as follows: solid wall bricklayer's time, 16 hours; Ideal wall, 13 hours. It should be noted that the bricklayer was unfamiliar with Ideal construction, while he had been laying brick in solid walls all his life. Mr. R. R. Stoddard, secretary of the association, recently met a mason contractor who built a home for himself, with Ideal walls, and had no difficulty in laying 1500 bricks per day.

The 8-inch Ideal all-rock wall requires 9 brick per square foot as against about 12½ for the solid wall and weighs about 50 lbs. per sq. ft. as against 79 lbs. for the solid wall.

The 12-inch Ideal all-rock wall, requires from 13¼ to 14¼ brick per sq. ft. as against 19½ for the solid wall, and weighs from 74 to 80 lbs. per sq. ft., as against 115 lbs. for the solid wall.

The Ideal wall saves one-third of the brick, one-half of the mortar; saves mechanics' time, as well as furring and lath.

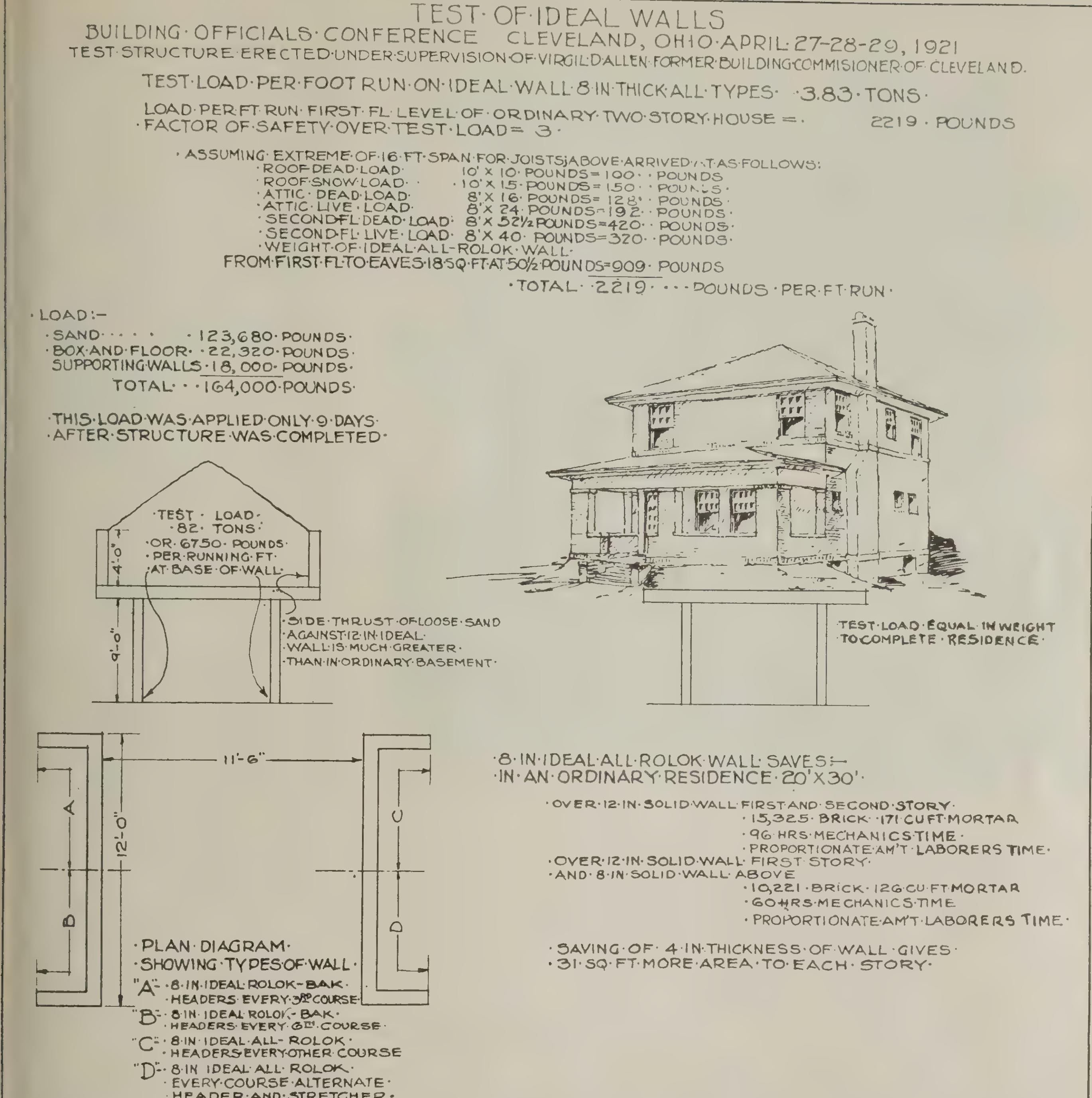
Tests of the Ideal wall were made at the Conference. Their character and the results are shown in the accompanying photograph and comparative sketch and tabulations.

The Thickness of Brick Walls for Small Residence Buildings

The adequacy of an 8-inch wall for small residences was presented to the Conference by the Common Brick Manufacturers' Association, to this effect:

"A thickness of 8 inches for the brick walls of a home, above the basement, is ample, both for the first and second stories.

"We are now in process of making an investigation as to code requirements for dwelling house walls. Some of the following data is taken from building codes and



ome from returns received direct from uilding officials. Our information is not et complete and is subject to addition and orrection as further returns come in and how that codes have been amended. Thirty-three cities allow an 8-inch wall for oth stories of a two-story house. These re: Baltimore, Birmingham, Boston, Cambridge, Columbus, Cleveland, Detroit, Minneapolis, New York City, Philadelphia, Seattle, Spokane, Pittsburgh, Tacoma, Washington, D. C., Wilmington, Richmond, Syracuse, Tampa, Worcester, New Haven, Manchester, Rochester, Toledo, Duluth, Hartford, Rock Island, Lynn, Cincinnati, Trenton and Portland, and recently Bufalo and Milwaukee have amended their rdinances to allow the 8-inch wall and Norfolk, Roanoke and many other cities are now considering the matter."

"Taking the other extreme, we find that some cities require the first story of a dwelling house to be 18 inches thick and many cities require a 12-inch wall at the first story and eight above. In the light of experience, a building code which insists on these things insists on a waste of material and money. Let us consider the case where a 12-inch wall at the first story and eight above is required. An exterior wall must support the floors above and form an effective barrier against the elements. The fact that 8-inch walls are allowed for the second story or for bungalow walls, indicates that such walls are considered, in those cities, satisfactory for excluding the elements. The question of strength, therefore, remains. Disregarding the experience of the cities mentioned, which would constitute a satisfactory reply in itself, let us consider the actual strength of brick work. The tests illustrated show that one complete house can rest with safety on two short sections of Ideal wall, which is probably not as strong as a solid wall. The test wall showed no signs of distress. We stopped the loading only when the box would hold no more sand."

"The Bureau of Standards made a series of tests on large brick piers about two years ago, some of the piers being constructed of what they termed 'soft burned or poorest product marketed.' The average of three tests on piers of this material 30x30-inch

Applying the test to Ideal brick walls. See chart showing data and diagrams

by 10 feet high, laid in 1-3 lime mortar—poorest brick and poorest mortar—showed the total resistance to crushing at failure was 12.3 tons per square foot. Eleven similar piers 30x30-inch by 10 feet high of medium burned brick,—the ordinary brick supplied to a job—laid in cement lime mortar, failed at an average load of 90 tons per square foot.

"Remembering that the average story in a small residence is about eight feet high, as against a 10-foot height for the test piers, and as only well burned brick are used for exterior work, we may reasonably assume, until the tests under way are completed, that the ultimate strength of such brick work, laid in cement-lime mortar—the mortar ordinarily used,—will average in the neighborhood of 90 tons per square foot for an 8-inch wall or 60 tons per running foot. The greatest load placed upon it at the first floor line of a residence is not more than about a ton and a quarter, giving a factor of safety of over 45 for the 8-inch wall. Surely that is conservative enough for anybody.

"Experience and theory, therefore, amply prove the 8-inch wall to be weather resistive and to possess much more strength than the loads of a residence ca never develop.

"There is another important consideration; that the extra space taken up by the 12-inch thickness reduces the area of the rooms in the house. In the case of a house 20x30 feet, approximately 31 square feet of area is thus lost on each story, an area equal to a small bathroom or several good closets."

Fire Test on Brick Walls

"The Bureau of Standards is now making a series of fire tests on brick walls, 8-inch and 12-inch solid walls and 8-inch and 12-inch Ideal walls. The tests on the solid walls have been completed and the panels of Ideal walls have been built and are now ready for testing.

The official report on these tests will be issued in due course.

Answers to Remaining Questions in March Issue

5. A jack arch is a self-supporting brick arch in which the soffit is either absolutely flat or has a slight camber. The brick must be rubbed or specially moulded so that the joints, which are radial, will be of even width from top to bottom.

6. For flush joints with a rough texture, ¾-inch to 1inch wide, it is advisable to use very coarse sand or fine gravel in the mortar, and cement mortar should always be used, as it stiffens quickly. It is a slow job at best to lay brick on such a thick bed of soft mortar.

7. According to the tables in "Brick—How to Build and Estimate," a bricklayer should lay 1400 brick per day in a solid 12-inch basement wall laid in cement-lime mortar.

8. In straight cement mortar, according to the above tables, he would lay fewer brick, averaging about 1100 brick per day. This difference is due to the increased plasticity given by the addition of lime. Straight cement mortar works "short" and does not trowel so easily.

We especially invite readers to send in their questions and experiences to this department for discussion.

NOTE

An error crept into the summary of the tests on large brick piers in last month's article, which stated that of the piers tested the strongest developed an ultimate strength of 3,211,000 pounds, the weakest 578,500. This should read, the weakest 129,000. The latter was a pier of underburned brick laid in 1:3 lime mortar.

Scaffolding a Brick House Same as a Frame House

A contractor has been building building homes for many years in Cleveland and until recently has been in the habit of building an exterior scaffold on every brick house so the carpenters could work on the eaves and cornices, this scaffold being, of course, built from the ground up. Not only did this scaffold take considerable material and time to build, but resulted in a considerable number of 2x4's and other material being left over and having to be carted to another job.

He has, however, hit upon the solution here illustrated. Like everything else we think is original, however, probably somebody else, somewhere, has adopted the same idea, but we have never heard of anyone else using it and we beleive that mason contractor readers of the NATIONAL BUILDER can save themselves considerable money by availing themselves of it.

Briefly, this is a system whereby the same bracket supports used for a frame house can be used for a brick house.

The objection in the past to the use of these anchors for brickwork has been the fact that their considerable side pull would tend to throw a newly laid 8-inch brick wall out of line, there being a possibility that mortar might not be set sufficiently to enable the wall to resist the stress. This objection is overcome by a very simple device. A piece of 2x4-inch is placed vertically on the inside surface of the wall behind the anchor, the top of the 2x4 extending above the wood roof plate. This plate is, of course, always spiked to the second floor ceiling joists and this arrangement takes care of the side pull of the bracket. A short 1-inch piece is placed between the top of the 2x4-inch and the plate to take

:are of the bend. Where the ceiling joists ·un parallel to the plate the top of the ıpright 2x4 can be braced with a plank or ınother 2x4-inch, which is spiked at the ›ther end to a partition stud or a first loor joist.

The height at which the scaffold will be equired is determined before the wall is uilt and simple bolts bent at the inside nd to go around three sides of the 2x4 re laid at the proper height as the wall oes up. Any blacksmith can make these olts. The bolts are either wrapped in uilding paper or they can be greased so ney can be knocked out afterwards and the ole plastered up.

Putlog for Scaffolding

J. C. Madison, of Traverse City, Michi-an, sends the following letter and sketch f a new "footlock" or putlog for scaffold-ıg:

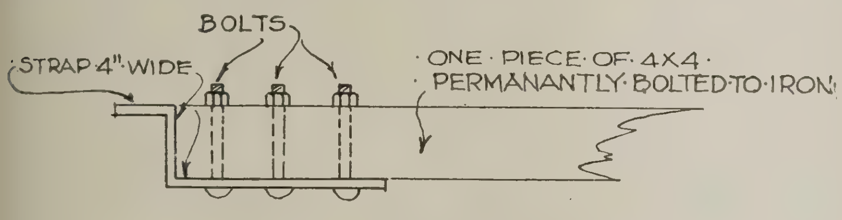
"Generally get everything in NATIONAL UILDER from cover to cover. So have been ollowing your articles on bricklaying, find ıem interesting and instructive.

"Also noticed your ideas wanted. Last ummer, got an idea which saved us time nd money, so am enclosing you drawings nd information.

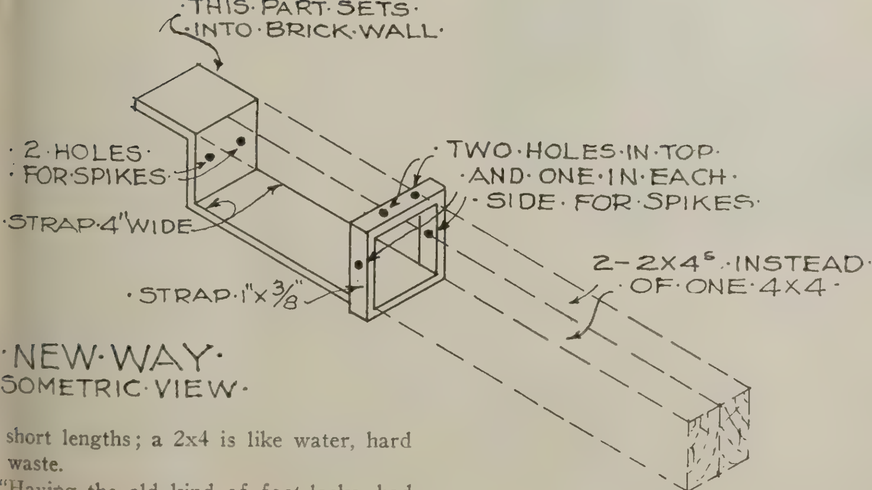
"It is a footlock for scaffolding brick valls. Most contractors have the old fash-oned lock, made out of a 3½ or 4 inch vagon tire bolted onto a 4x4.

"Found that kind of a bracket took too nuch money to build, keep in repair, and art around, so figured it this way.

"A 4x4 to the ordinary builder is not a ery useful stick of timber, especially if cut



·OLD· WAY·
·SIDE· ELEVATION·

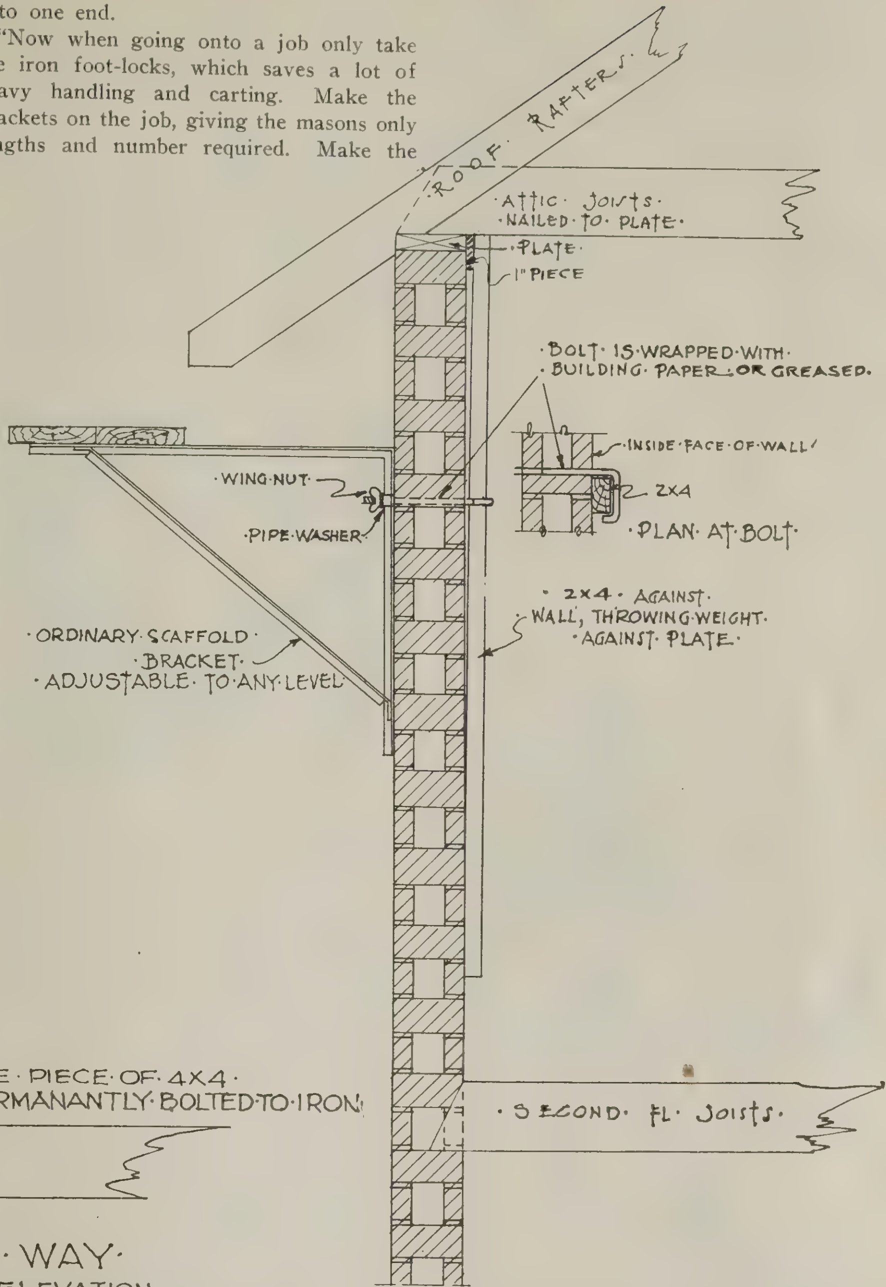


·NEW·WAY·
SOMETRIC·VIEW·

short lengths; a 2x4 is like water, hard waste.

"Having the old kind of foot-locks, had a 3/8-inch by 1-inch strap of iron welded onto one end.

"Now when going onto a job only take the iron foot-locks, which saves a lot of heavy handling and carting. Make the brackets on the job, giving the masons only lengths and number required. Make the



brackets by spiking two pieces of 2x4 together, making a 4x4; leave the spikes stick out far enough to pull with a hammer or bar.

"After the masons are through with their work, the 2x4's can be taken apart and used in the building. They always furnish the usual shortage of 2x4 pieces.

"The advantages are: there is no original cost in 2x4; no upkeep; the timber is always new and strong; saves cartage and storage, can store the iron locks in the open.

"There is always a length for the length required.

"With the old bracket our experience was, they were cut, spliced, or broken up. The bolts when rusty were hard to get out.

"With some of the old foot-locks we use the bolt holes for spikes, driving the spikes in part way and bending them over to hold the iron onto the wood. We like two holes in the end of the lock best."

Questions, Answers, Kinks and Discussions--V. L. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

What About Design?

Across from me there are several new houses, built for sale, and there is not one of them that has not false framing or other defects in design. The consequence is that any graceful addition to any one of the houses would be very difficult. They now stand unoccupied and unsold, and are likely

An ancient English cottage that still survives

A Canadian house

to remain unoccupied and unsold for some time even in these clamorous days of demand for more homes.

The trouble with some architects and builders is that they can talk design but cannot feel it, and make up their lack of power to get effects through simple means by recourse to fussiness, oddities and dingbats.

A California bungalow

I am not trying on any high-brow stuff. Here is the point: Types of house design are good of their kind because these houses were built to suit the climate and conditions of localities where they were constructed. Because our means of transportation allows us to obtain a great variety of materials and to become acquainted with forms of house design used under different climatic conditions to our own, we are disposed to mess up the whole works in trying to get "something different."

Some of the finest lines have been found in the steep-roofed northern homes at one extreme and the flat-hipped open buildings

A north woods cabin

of California at the other. I have a little cabin in Northern Wisconsin which was built by a forester. The place is thirty miles from the nearest railroad and that very fact, because of forced simplicity, developed a prettier place than I could have drawn, for the material at hand had to be used to build a cabin that is a delight, whereas if a variety of material and facilities were at hand the cabin would probably have been a blight on the clearing.

I think it would be helpful to let in a little light on our ideas about design. The adaptations you have thought good, whether you are of the Northern storm track, the heat of the South, or of the flood districts, are worth something to all of us. Let us discuss them. Send them in.

Questions

What measures are of use to protect summer cottages and boat houses from ice jambs through the winter?

How about small or temporary piers for summer homes along rocky shores?

Let us have some suggestions on the little ice house for summer homes.

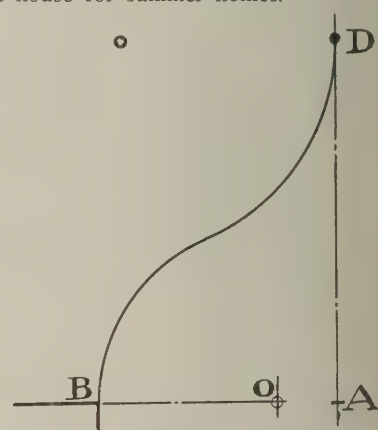


Fig. 1

Problems of an Ogee Arch

In Figure 1 the soffit curve of an ogee arch is shown. A-B is half the width, and A-D is the rise. The lower radius is O-B. Determine the upper center.

Framing a Barn Roof

B. R. Maxwell of Charleston, Ill., sends the following notes and sketch for framing a barn roof such as will withstand the winds. You will notice he casually mentions the winds of North Dakota. They're there.

"I am now building a barn similar to the sketch shown only it is of frame construction instead of brick. However, there is no

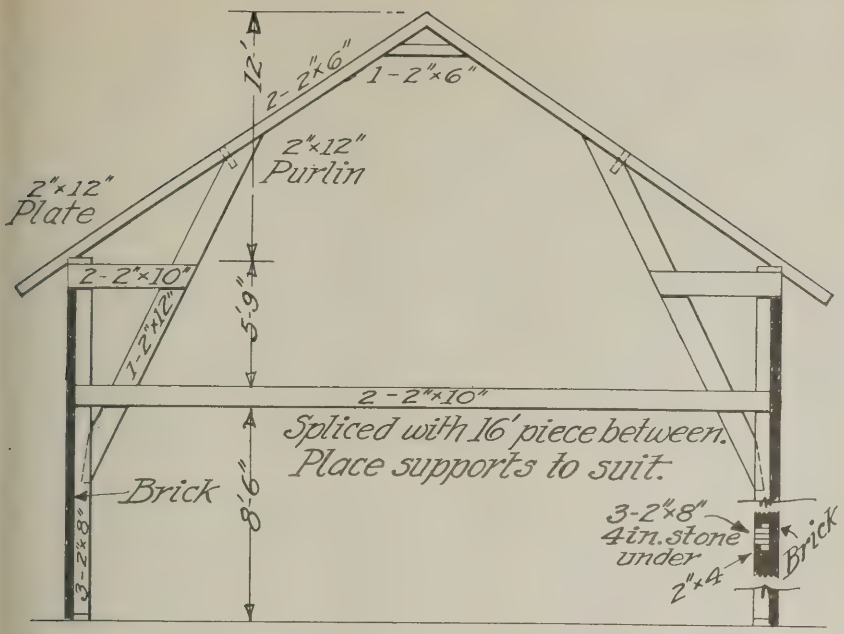


Fig. 2—Barn framing to withstand winds

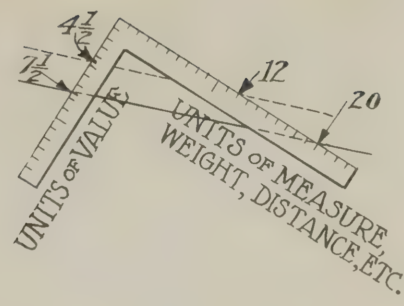


Fig. 4

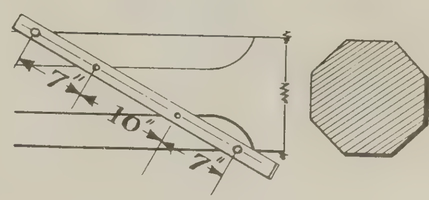


Fig. 5

ason why it could not be made of brick, I have used this method for years and has never failed to stand the test. I have octagon pavilion 85 feet in diameter amed on this principle, and it has stood r four years in the winds of North akota. It has not a post or brace on the tire space from wall to wall, and I am re would eliminate the braces shown in e cut of the mow floor.

The sketch I am sending is for brick conuction with wood posts incorporated in e brick walls and truss. The drawing plains itself clearly enough I think. urteen-foot centres are about the right stance apart for the trusses on a build- of this kind, and by putting a 2x12 for perline as shown with edge to the rafters 2x4 24 in centres can be used. The gables should be finished with a 2x6 rafter snug against the inside and out, otherwise the wind would be likely to blow the wall in or out. The principal object in this construction is to have straight grain and knotless timber, then have the joints well bolted or spiked.

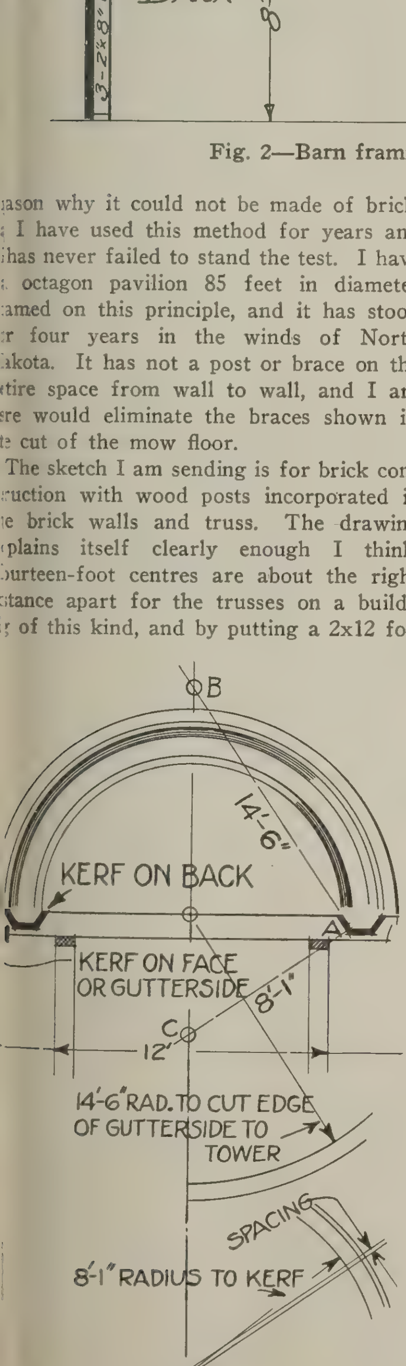


Fig. 3

A Circular Gutter

B. R. Maxwell of Charleston, Illinois., writes as follows: "I see that some one is puzzled about a circle gutter. I am sending a plan, Fig. 3, I have used for years. It is simple and I never had any trouble with it. The idea is to determine first the pitch you want the sides of the gutter (for a gutter should never be square); then make a line in the centre of the tower, or whatever it may be, extend a line on the pitch of your gutter board, and where it strikes the centre line gives the radius for the edge of the gutter board next to the tower roof. Saw it out to this circle if it is a large circle a one-half inch board will very easily spring in place, but if the circle is too small and it has to be kerfed draw a line at the right angles with the former radius line, which will give the radius it will bend on, as shown in sketch *B*. By this method, any gutter can have a solid backing on either side with very little extra work.

The Square as a Rapid Calculator

F. H. Bogle of Phoenix, Arizona, contributes his experience, using the square as a rapid calculator, illustrates a new use for this wonderful tool, as shown in Fig. 1. The problem as shown is as follows: If coal is selling at $7.50 per ton, find the cost of 1200 lbs. Place the figure 20 on square even with edge of board, letting each inch represent 100 lbs. Now place 7½ on other blade of square even with edge of board, each inch representing $1.00. Draw line along side of square *AB*. Now slide square along line until 12 inches is even with edge of board, and the answer is shown to be 4½ =$4.50. With a little practice this can be applied to problems of varied units of weight, measure or distance. In other words, it is ratio and proportion worked out with the square.

The Octagon Post

Mr. Bogle also, in Figure 5, shows us that by using the tangent of forty-five degrees twice and one once a tapered or straight post may be marked for octagon. Thus: tangent of forty-five degrees is .714; twice .714 plus 1 is 2.428. Of course the distances 7-in., 10-in. and 7-in. on his gauge are close enough.

He says: "The accompanying sketch illustrates a simple and accurate gauge for chamfering a square post so as to make a perfect octagon. Take a piece of lath and drive nails through at each end, having them just 24 inches between, as shown. Now drive the other nails (using small sharp-pointed lath nails) being careful to have them just 7 inches from end nails and only going through enough to make gauge points. Care must be taken to keep end nails tight to sides of timber when sliding. This will work on tapered timber as shown, or on one of equal size at both ends.

Device for Putting on Siding

Arthur Ribbens of Harrison, S. D., sends us the following device for siding long stretches of buildings: "Where we used to use a line and chalk to put on long stretches of siding, it takes two men to do the work conveniently, and there is the danger of getting your siding out of place by snapping the line upward or downward. I take two blocks as illustrated, each about 4 inches long and seven-eighths inch thick, 1 inch wide at one end and one-half inch on the other. A groove is cut in with a fine saw for the line to pass through, from the inside

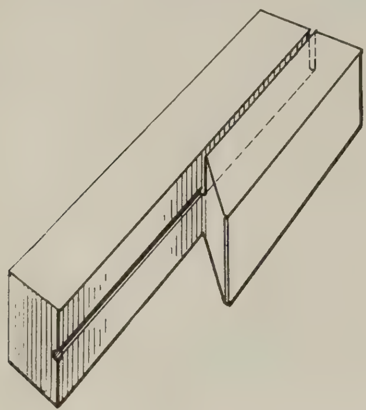


Fig. 6

of the angle to the end of the block. Then I groove a line-passage with a pocket knife from the bottom of the saw cut—that is from the angle to the end of the one-half inch part—so that the line has a safe place and can't be shifted.

Now place a double knot at the end of the chalk line, slide the line in saw cut and pull tight, then catch the angle in back of corner board, then place the other block on the other side, by placing the line in the block and wind it in the lower corner of angle (see that when blocks are placed that the line is perfectly tight).

After you have spaced your sidings on corner boards like you would with a chalk and line.

Now all you have to do is shift your blocks upward. You need no chalk this way, because the line is right there to go by. One man can do this work easily now. I can do again as much siding this way. If this is not clear to you I will be glad to send you a sample of it. If it should not be clear to our brother readers I will send them a pair for 35c for expenses.

"Turn This Over in Your Mind"

John Upton, LaFargeville, N. Y., writes: "Take a sheet of paper some 24x30 inches and lay it out smooth on the table, then place your square on this and with a pencil draw a line on the outside edge and mark the inches, then draw a line across from the 3 on the tongue to the 4 on the blade, also from 6 to 8, 9 to 12, 12 to 16, 15 to 20 and 18 to 24.

"You will notice two things about these lines. They are all parallel and all are even inches in length, 5, 10, 15, 20, 25 and 30 inches, all multiples of 5 as the figures at the ends are multiples of 3 and 4. There is another point which you should note—if you square the figures at each end of the line and add the squares their sum is equal to the square of the length of the line as, $3\times3=9$; $4\times4=16$;

$5\times5=25$.

"Draw another square and mark the inches or use this same one and mark across from 5 to 12 and find that the line is 13 inches long, then square these numbers and the sum of the squares of the smaller ones and the square of the larger one. Take 10 and 24 and get 26 on the line joining them. Extend the long side of the square to 36 and measure across from tha tto 15 and the figures work out as before and these three last lines are parallel. Draw a line from 12 to 12. It measures almost 17 or 16.97 inches, and the figures work out as before, twice the square of 12 is 288. The square of 17 is 289 so the line can not be quite 17 inches.

"Mark across from 6 to 6, from 18 to 18 and from 24 to 24. These lines are almost 8.5, 25.50 and 34, the greatest difference being in the longest one. Now take any two figures as 10 and 15 and by the rule, that the square of the hypothenuse of a

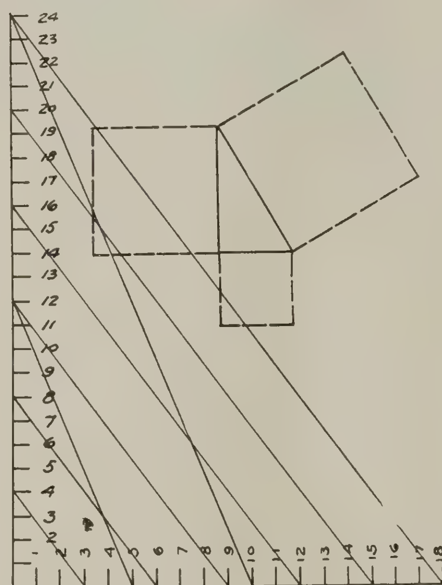


Fig. 7

right angled triangle equals the sum of the square of the other two sides sides we know that we can measure across between these figures and get the square root of a number equal to the sum of the squares of 10 and 15, which is 325. Measure across any get 18 nearly, $18\times18=324$, but we may have a number like 800 and want to find the square root and perhaps wonder how the square will help us here. Let us go one step further in geometry. If we take any of the right angled triangles which we have drawn and draw squares on each side of them like Fig. 2, the area of the large square is equal to that of both the smaller ones so there must be two squares nearly equal to 800. Take the square of 24 which is 576 and of 15 which is 225 add htme and get 801. Now the distance across from 15 to 24 must be almost equal to the square root of 800. Measure it and get about one-fourth inch over 28. Then $28\times28=784$. $28\frac{1}{4}$ squared= 798 1/16, or if we figure it out by the usual method we get 28.28+. Now I do not expect that you will use this method for working square rot unless you forget the rule but you can scee that it is quite accurate in case one can not recall the rule.

"But I want you to remember that when you draw a line across the square, the sum of the squares of the sides equals the squares of line drawn across. For example make the line 20 inches. It reaches from 12 to 16, or you can move it about putting the one end on each of the figures from 10 down to 1, and each time the square of the figure taken from 400 will give the square of the figure where the other end comes.

Try it out for yourself and see if this is not correct.

Pre-Cast Cement Sills for Steel Sash

E. F. Jones, Menominee, Mich., writes: "During the fall of 1920, my working partner and I were employed by A. G Wahl at St. Cloud, Minnesota, finishing cement on the Seavey & Meyers Transfer Company's building, a reinforced concrete structure 66x127 feet, three stories high. Owing to delay in delivery of material and the early winter of that year, it was too cold to pour window sills in place before the building was far enough along to permit it.

In order to keep busy while waiting for steel for the first floor, we laid the basement cement floor. Mr. Wahl told us to try to cast sills and cornices in the basement and the bricklayers would lay them if we succeeded. He gave us a drawing of the ends of sills taken from the general plan and gave us a detailed drawing of the steel sash he got from the manufacturer of the sash. From the sash drawing we were able

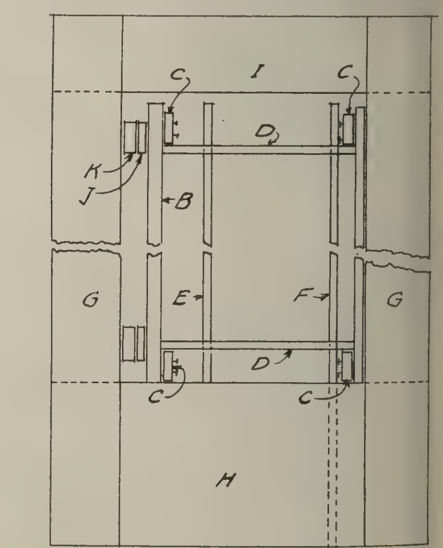


Fig. 1.

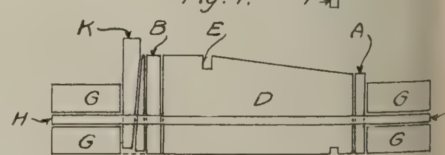


Fig. 2.

:o figure the length of sill sections by making them the same length as sash sections adding one-half the width of the mullion and reducing the amount the sash entered the columns of the building. Spaces between columns on sides of the building were about 13 feet 6 inches, the sills for which we made in three sections. On the ends the spaces were two wide sections and an ordinary section between them. We cast these sills in five sections. Allowance was made for mortar and joints. The walls of the building from floors to sill height were of brick and tile. We had the sills ready to set as soon as the bricks were laid.

To pre-cast sills as we did the following directions must be followed:

Fig. 1 shows end of mold. The members are: *A*—Surfaced 1-inch board 5 inches wide and 6 inches longer than the longest sections of sill to be cast. *B*—Surfaced 1-inch board 6 inches wide, same length as *A*. *C*—Cleats nailed to *A* and *B* to hold end boards (nails should be left so they may be pulled to change cleats for sills of different lengths. *D*—End boards, which must be the same as the end of sill. *E*—Strip of wood 1½ inches wide at top, 1 inch wide on bottom and 1¼ inches high, to make slot in top of sills to receive sash and grouting. *F*—Half round ½-inch iron bar to form drip—it should be about 20 inches longer than *A* and *B*. Clamp frame is made of four pieces of 2x4-inch plank. *G*—Two feet longer than *A* and *B*. *H*—A 1-inch board 10 inches wide and 23 inches long. *I*—A 1-inch board 4 inches wide and 23 inches long.

Lay two pieces *G* flat on bench or floor. Nail *H* firmly to them at one end and *I* at the other end. Nail two remaining pieces *G* on top of *H* and *I*. Make the two pairs of wedges *J* and *K*. Nail *J* to *B* but leave *K* loose.

The mold is now ready to set up on any smooth floor or sidewalk. It is well to have some building paper to cover floor and prevent sills from sticking. Place the clamp frame on the paper. Then assemble as shown in Fig. 2, beginning with piece *A* and locking up by forcing wedge *K* between *J* and *G*. Ends of *A* and *B* should be against *H*. Put *F* in place and tamp the mold nearly full of concrete, using care to place strip *E* before concrete is too high in the mold. After *E* is in place finish tamping full and trowel top of sill smooth. Then remove *E* and pull *F* out endways. Now remove wedges *K* and lift away the clamp frame. *A* and *B* may now be taken away from the concrete and the front and back finished with a trowel. End pieces *D* should be the last to be removed.

Make all the pieces of sill of a given length and then take the next length. Cleats *C* may be changed to the right place on *A* and *B* to make any length desired.

A good mixture of concrete to use for this work is 1 part cement, 2 sand and 4 gravel or crushed rock, and a finish mortar of 1 cement and 2 sand. Place a thin layer of finish mortar against *A* and *B* and tamp concrete in until mold is nearly full. Put a coat of finish on top of concrete and trowel. Use just enough water in mixing to make the material wet enough to ball in the hand or as wet as it will stand without sagging when mold is removed. Keep damp for at least one week after cast and do not try to handle before they are thoroughly set. Care must be used in handling not to damage edges or corners.

Inside of mold should be coated with shellac. A good substitute is to dissolve rosin in alcohol and paint the mold at least once every day.

We used the same plan to cast the cornice stone for the building, making the clamp frame and mold large enough to cast stone 10 inches by 16 inches and 4 feet long. The average cost of stone cast on the job was about 40 cents per linear foot, including setting. We made about 1,000 feet of sills and about 200 feet of cornice.

Wall coping and caps for door and window openings can be made by the same system.

With regard to the above, Mr. A. J. R. Curtis of the Portland Cement Association comments as follows:

"It is suggested that a 1:2 cement and sand mixture be used for surfacing the sill. While this might be an acceptable finish for sills and similar pieces going into factories, warehouses, etc., I would very strongly recommend that for residences, garages, churches, store fronts and other fine work, the mixture should contain as aggregate a certain amount of marble, granite or mica spar.

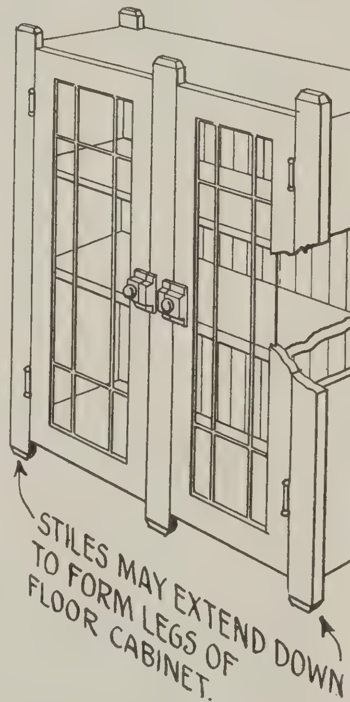
"A very pleasing light gray color may be obtained by using a mixture of one part gray portland cement to two parts aggregate, the latter consisting of one-third light sand, one-half white marble and one-sixth gray granite ranging up to about one-eighth inch in size. A small quantity of mica spar crystals will be sufficient to give the sill a sparkle. A small quantity of black or dark green marble or granite will produce a very pleasing contrast with the light aggregate in the mixture. Lighter effects can be secured by the use of white cement or a mixture of white and gray cement, using a larger quantity of white marble.

"In order to avoid hair crazing, it is advisable not to attempt getting a very smooth finish. A steel trowel must not be used in finishing exposed portion of sills, lintels and similar pieces, as trowelling with a steel trowel tends to bring the fine particles to the surface thereby increasing the tendency to craze. Trowelling should be done as sparingly as possible and with a wooden float. Many manufacturers consider it preferable to mold these pieces with the faces to the mold, avoiding the use of an excessive amount of fine matter. The coarser the particles in the surface the rougher the texture and the less the possibility of crazing. However, by eliminating the use of a steel trowel and avoiding excessive fine particles crazing may be entirely overcome.

It must not be considered that the sill is completed and ready for use when taken from the mold. Sills and other similar pieces should be cured in a warm, moist atmosphere for a week or ten days at least before being set into the wall. Great care should be exercised in setting these pieces, for at best they are usually set rather green. They are usually subjected to greater strai in handling and setting than will be imposed upon them in the wall.

"Craftsman" Built-in Cabinet

The cabinet illustrated is perfectly simple, and a time-saver in both labor and material. It is especially suitable in bungalows. Cupboard and china closet doors with wood panels, checked or solid glass lights can of



course be had from any mill work concern. Plain boards of width desired form the shelves and sides. Strips of the same thickness as the doors, or thicker, and from 1½ to 3 inches wide for hanging stiles, and flooring or wall board for the back, is all that is needed—no moulding.

When used in kitchen cabinets, the lower part is of course built in the usualy way with open work shelf, while the "Craftsman" forms the upper part.

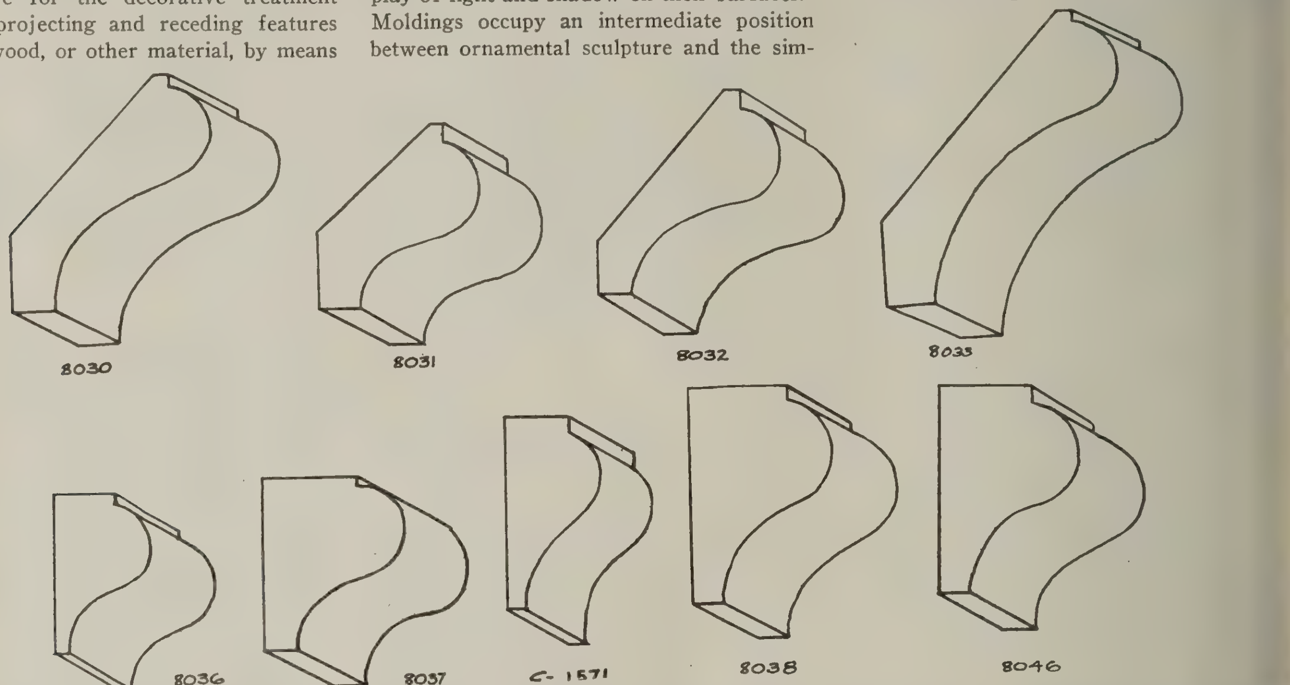
It also makes a good wall bookcase, or the stiles may be made long enough to form legs for a floor cabinet. They have been used as a wall china cabinet in the dining room, and with a mirror in the door they make a medicine cabinet or a dressing room cabinet. The center shelves may be made adjustable if desired.

The cost in labor for this cabinet is less than half what it is for the old style.—*B. G. Houser, Stevenson, Alabama.*

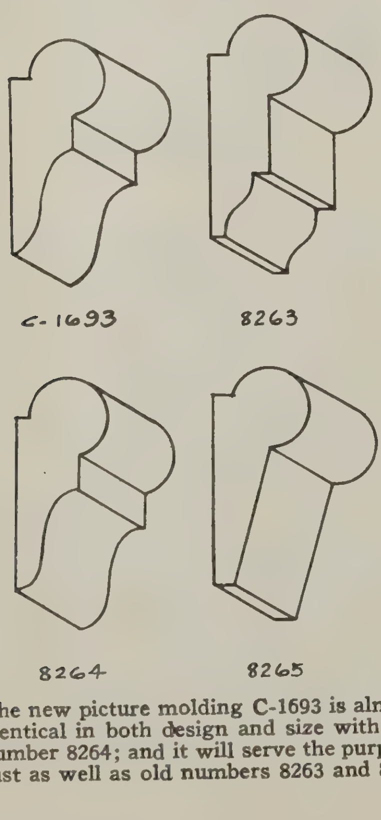
A Sensible Molding List

Fewer Patterns and Better Designs Allow Better Service to the Contractor and His Customers

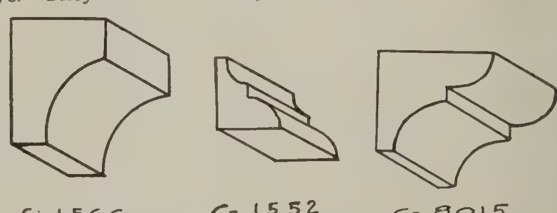
"MOLDINGS," as defined by the Encyclopedia Brittanica, "is the term in architecture for the decorative treatment given to projecting and receding features in stone, wood, or other material, by means of curved forms, whereby these features are accentuated and varied, owing to the play of light and shadow on their surfaces." Moldings occupy an intermediate position between ornamental sculpture and the simple architectural lines of the main structure. The principal characteristics of an archiectural expression can often be found in its moldings. They are the architect's means of drawing lines on his building. They enable him to limit its boundaries and its natural divisions with a resulting pleasure to the eye. They do not excel by their complexity or the number of their members, but rather by the proportions that the few members bear to each other. These are matters of such nice discrimination, though of such tremendous importance, that the designing of moldings should be left to the experienced and schooled architect. The function of the contractor is to apply them and to carry out the details of the house design as shown by the plans.



How one good molding in the new list serves the purpose of any of eight in the old. Old numbers 8030 and 8033 are unnecessary patterns; the new number C-1571 is substantially the same in outline but slightly smaller than old numbers 8031, 2032 and 8037, which it can easily displace without inconvenience to anyone; it is substantially the same in outline but slightly larger than old number 8036; and as a brick mold it can be used instead of old number 8046, to which it is similar in outline though slightly smaller in size



The new picture molding C-1693 is almost identical in both design and size with old number 8264; and it will serve the purpose just as well as old numbers 8263 and 8265



The new bed molding C-1552 can be used in place of old number 8015 where design is essential but size is not; where size is essential and design is not, one of the new cove moldings, C-1566, will answer

Moldings are bought more frequently though not in greater volume, by the contractor from his lumber dealer than probably any other item that enters into building construction. It is important that the dealer be in a position to supply his contractors, from stock, with a variety of patterns and sizes. These small items are no[t] large in themselves, but they are necessar[y] factors in the completion of many buildin[g] operations, and delays in obtaining them ma[y] occasion much annoyance to the builder.

Contractors who build houses designe[d] and planned by architects know that th[e] average architect hesitates or refuses t[o] specify patterns from the average stock list of moldings. This is because the average stock molding is without architectural merit; in other words, its design is not

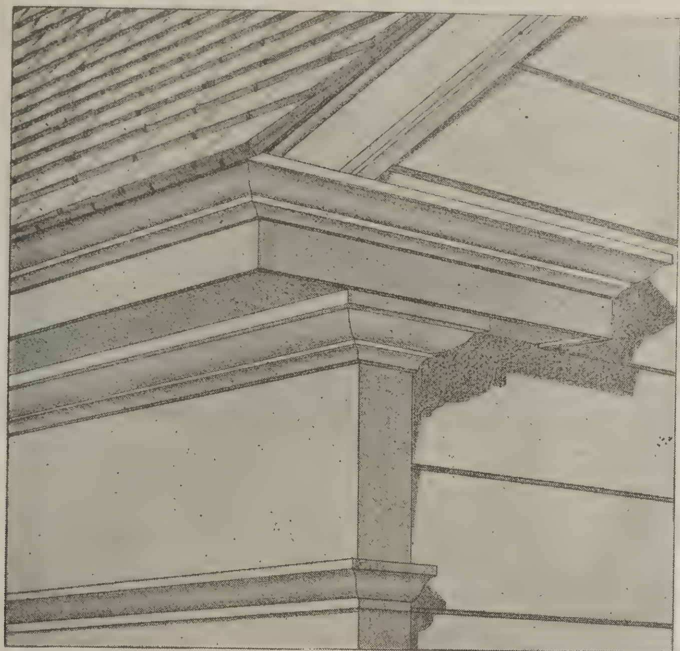
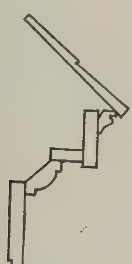


Fig. A—Moldings for a Colonial house with gable roof. See cross section. Crown molding C-1531; a 1 x 4 fascia board; a 1 x 8 plancier, a bed or crown molding like C-1522, a 1⅛ x 12 frieze board and frieze molding C-1531, are employed

ood. Consequently, made-to-order moldıgs are frequently used, with the result ıat delays often occur waiting upon them ɔ be run, and there is always the chance ıat mistakes will be made in ordering and ıanufacturing the designs run to special etail. Furthermore, the specially manu-

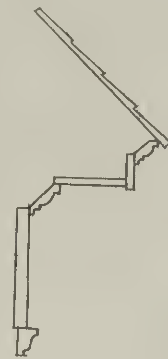


Cross section of Fig. B

.ctured forms always cost the owner more an stock patterns, and in these days when onomy is to the interest of all concerned building operations, this is a condition be avoided if possible.

What the trade has sorely needed for ars has been a comprehensive list of ɔck moldings of good design which the chitect could, from his standpoint, justibly specify, and which the dealer could asonably be expected to stock so as to ve his customers ready service on their olding requirements. Such a list of moldgs has recently been offered by a wellown millwork manufacturing organizan which has wide distribution through ail lumber dealers. Better designs and wer patterns are offered with resulting better service to all concerned—owner, architect, contractor, dealer and manufacturer. How the new list was prepared, how it compares with the old, and what it contains, are subjects worthy of note.

"Any architect who has ever attempted to select from the average catalog of stock wood products," says Frederick L. Ackerman, the architect who had charge of preparing the new stock list for the Curtis Companies, the millwork manufacturer referred to, "items which he might utilize and thereby save the expense of special forms, moldings, etc., is so well aware of the utter lack of merit, from the standpoint of design in the materials shown in the average stock list and catalog of woodwork, that no argument is needed to convince him of the desirability of having a



Cross section of Fig. A

stock list of simple elements of such a quality of design that he could actually use them in his practice. It was really out of their own recognition of the shortcomings of these various old stock lists of moldings, sash, doors and trim previously furnished that the Curtis Companies undertook the work of reorganizing all of their stock forms and lists."

The first concern of the architects in approaching the problem was that of design. Among members of the architectural profession, two "schools" with respect to moldings prevail: those who favor forms derived from the Greek and those who favor forms derived from the Roman. Greek moldings exhibit profiles whose curves are arcs of parabolas, hyberbolas or ellipses; Roman moldings are in cross-section arcs of circles. The majority of present-day architects prefer the latter, which are the simpler types. Consequently these were chosen as a basis for making up the new list.

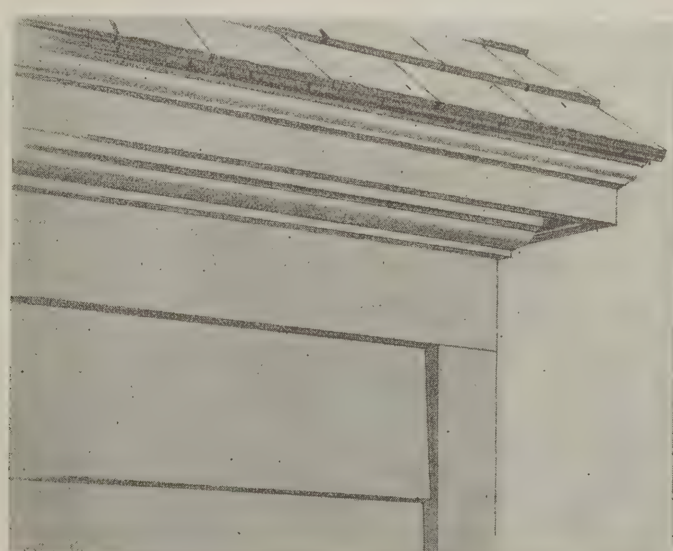


Fig. B—Cornice for a Colonial or English house with a hip roof. See cross section. It is composed of crown molding C-1537, a 1 x 4 fascia board, a 1 x 8 plancier, any bed molding, and a 1 x ⅞ x 10 frieze board

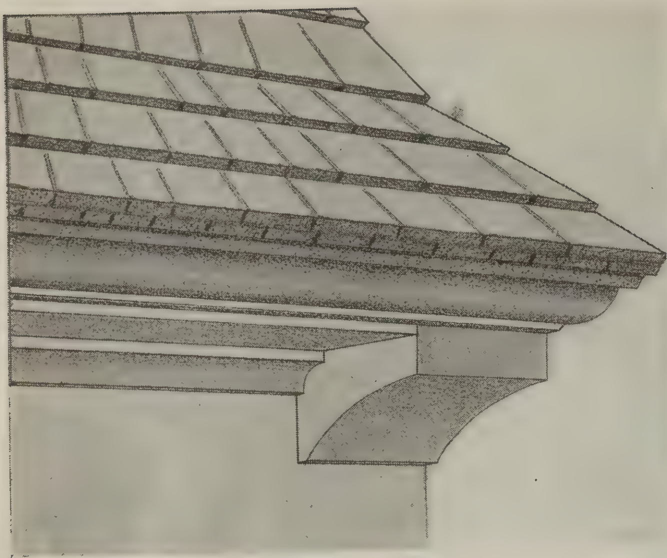


Fig. C—Suggested gable termniation for an English house built of stucco and with a gable roof. See cross section. A crown molding, a 1 x 10 plancier, and a cove molding like C-1566 compose it

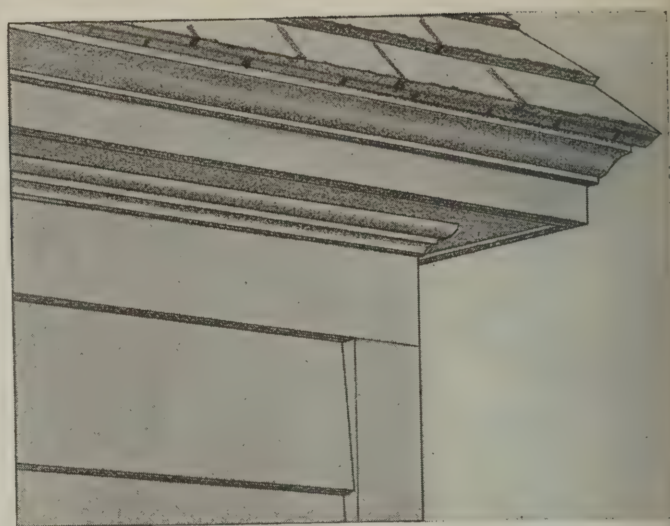
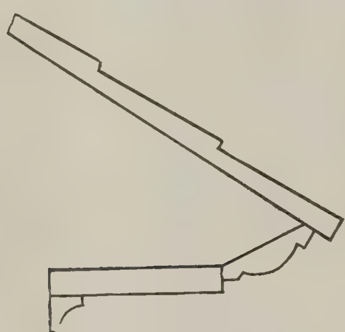


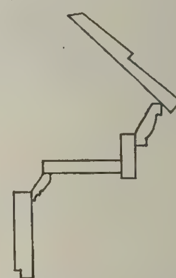
Fig. E—Another cornice for a Colonial house with a hip roof is shown. See cross section. It is composed of cornice molding C-1568, a - x 4 fascia board, a 1 x 2 plancier, a bed molding, and a frieze board



Cross section of Fig. C

In the matter of design is to be found the point of greatest difference between the new stock list and the old. The old or "Universal" molding list contained moldings of no particular type. They had been drawn, apparently, at random, and not by anyone skilled in knowledge of moldings. Many patterns had undoubtedly come about, also, as a result of competitive efforts among manufacturers, and these, too, showed absence of architectural merit. The accompanying illustrations picture the important part played by the outlines of the moldings. Because of just these shades of difference in the profiles, the new stock list has proved highly acceptable to the majority of architects to whom it has been presented. The contractor who builds from other than architect-drawn plans and details will appreciate the advantage offered by this list in securing for his customers patterns of moldings which are recognized as good designs by those who specialize in the field of design.

The second point of greatest difference between the new list and the old Universal list is to be found in the *number* of patterns offered. It was realized by the compilers of the new list during its preparation that a shorter list would mean better service to dealers and by them to their contractors, for a sufficient stock of moldings could be carried to serve every ordinary purpose. A glance at the demand of the past, as reflected in the sales record, showed that out of 253 patterns, 89.5 per cent of the sales had been made from but 77 patterns. Of course, not all of the other 176 patterns could be eliminated without inconveniencing the other 10.1 per cent of the demand; but it was found that many of the other patterns were not necessary, for one or two designs of a kind would serve the purpose of perhaps half a dozen moldings. For example, note how the bed molding C-1571 illustrated in Fig. 1, serves the purpose of eight old forms. In a similar way, study was made of each and every different kind of molding and each and every pattern and the list was finally reduced to some 149 forms, as compared to 253 forms in the old Universal list. The following table shows the moldings required for all ordinary purposes and compares the service in the way of numbers of patterns offered by the new list with the old:



Cross section of Fig. E

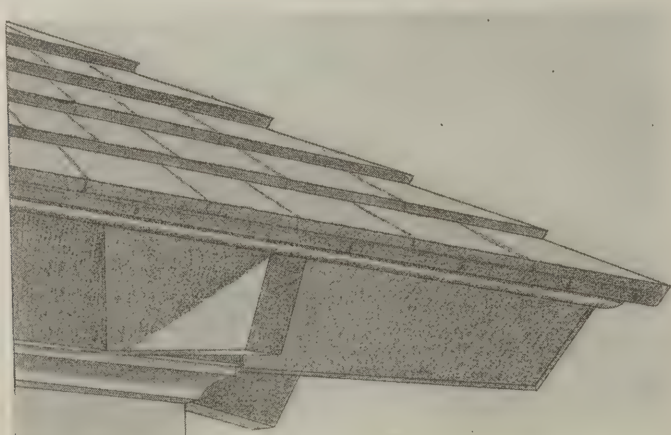
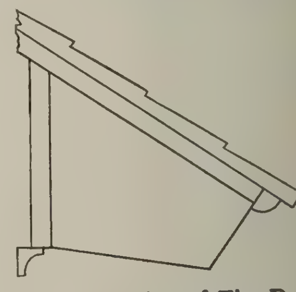


Fig. D—An open cornice for a Western or Southern house. See cross section. It employs two simple moldings, quarter round C-1562 and cove C-1566



Cross section of Fig. D

Form	New List	Universal List
Aprons	7	3
Apron Molding	1	1
Astragals	1	3
Back Bands	5	7
Base	10	14
Base Molding	5	8
Base Shoes	5	2
Battens	2	1
Bed Moldings	6	15
Bed or Crown Moldings	1	4
Blind Stops	1	0
Brick Moldings	2	4
Cap Moldings	2	6
Casings	16	22
Chair Rail Caps	5	0
Cornice Moldings	4	2
Coves	4	6
Crown Moldings	12	14
Drip Caps	3	5
Fillets	1	3
Friezes	1	4
Half-Rounds	3	6
Jamb Linings	1	3
Lattice Strips	2	3
Parting Stops	1	1
Plaster Molding	1	0
Picture Molding	2	3
Plinth Blocks	9	0
Pulley Stiles	1	2
Quarter-Rounds	5	4
Screen Moldings	4	7
Screen Stock	2	3
Sprung Cove Moldings	1	4
Stools	8	5
Stops	13	26
Water Tables	2	1
	149	192

Of the remaining 61 forms comprising the Universal list, substitutes are to be found in other stock items of woodwork manufactured as units, as for example, window frames, which include blind stops, sill courses, extension jambs and the like; and in door frames are to be found thresholds, door banding, etc. Hook strips and shelf cleats are to be found among regular trim forms, while such items as return beads, corner beads, and other miscellaneous forms are omitted as unnecessary.

But will a shortened list serve the contractor's purpose, is a fair question to ask. Yes!—better than the old list, is the answer. Better, because it contains more needed moldings and fewer that are not needed, as the table shows. With a shorter list, the dealer can carry more needed designs in stock, and so give his contractors better service on their molding requirements. For example, if his molding bin provides for carrying as many as 149 different forms he can stock the entire new line; whereas, he could stock only a little over half of the old list.

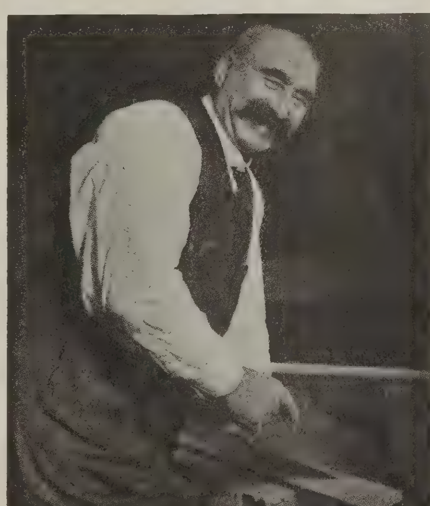
The important point then, is for those contractors who are accustomed to using the old Universal list and who are familiar with the old Universal numbers, to study the patterns in the new list and to familiarize themselves with the new numbers. New numbers have been assigned the moldings of the new list, because it was impossible to use the old numbers when the patterns were changed. Furthermore, the new numbers are in logical order, according to the "family" of trim to which the different members belong, or according to the purposes which they are to serve. This list should prove much less confusing than the old one, in which the numbers appeared in such confused order as to make an index necessary in every catalog in order to find them.

The Human Equipment

A WISCONSIN contractor who has carried on business successfully for many years, in discussing dull times said: "Dull times or good times do not worry me, for I know I will get my share of all the work there is going. I have the equipment—the men—and I know I can get the work, for the men stick by me; they have stuck by me for more than twenty years, some of them."

The quality of men that characterizes a contractors' organization as a big asset is not fully recognized as it might be. Advertising operatives in a general way is used more or less in various industries, but even here the direct personal touch is seldom given, and even less so in the building industry.

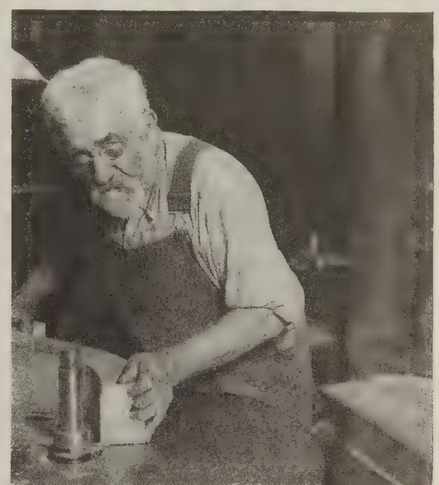
Just what force such advertising indicates is admirably shown in the *Bank Builder,* the house organ of A. Moorman & Co., St. Paul and Chicago, in which the various "stand-bys" of that progressive company are "introduced" in full page illustrations with sprightly text describing their accomplishments. The articles are headed "Moorman Master Workmen," and three of them with the accompanying test are exhibited herewith:



Introducing "Pete"

We are showing Pete on the job because that is where he always is. It is twenty-seven years now since Pete came to work for Mr. Moorman and Mr. Moorman says he was almost as big and fierce-looking then as he is now. Pete never seems to grow any older; bigger—yes; fiercer—yes; but no older. With that big black walrus mustache, Pete has a forbidding, buccaneer look that creates sort of a timid feeling until you know him or see him smile and then you find that Pete is pure gold all through and that his bark is much worse than his bite.

Pete is a building foreman and a mechanic through and through and when we have a difficult job where there are problems hard to overcome, we give it to him and worry no longer. If he needs anything that we haven't provided for him, he lets us know in emphatic language; in fact, we have to tie up your purchasing manager once in a while so that he won't go after Pete with a gun.



Moorman Master Workman

Bankers never forget Pete and on many jobs where he superintended the work years ago, they have requested that we let Pete superintend their work when they give us their job the second time.

Without such dependable representatives as Pete on the job, we could not hope to carry on our work efficiently and honestly. These foremen of ours are the direct representatives of the company in the town where we are constructing a building and we depend upon them a great deal to see that the work is completed according to the high standard which we have set up as our ideal.

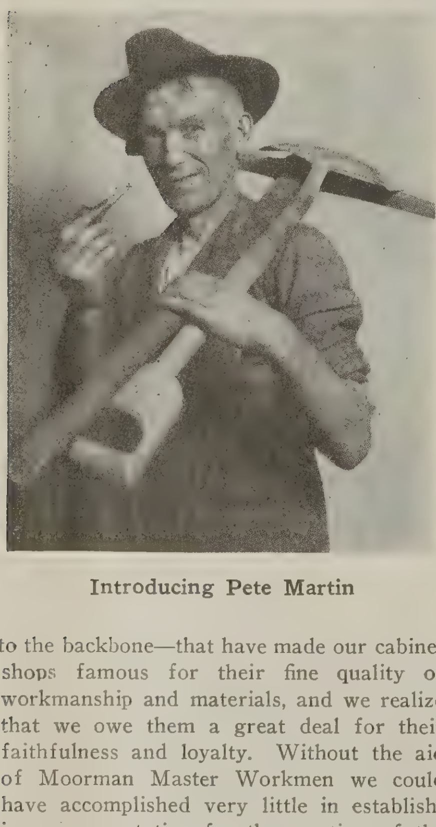
Old Morschauser is our master shaper man. We call him old Morschauser because he is our oldest employee. He says he started to work for Mr. Moorman at 7 a. m. on the 15th of August, 1881, and there are none to deny it for he was old in service when the oldest of us was the office boy.

His shaper is nearly as old in service as he is and although we have tried several times to install a new one Old John won't have it, for he knows his shaper's every mood and is closely acquainted with its every bolt and nut. Perhaps sometime we will get a new shaper but it won't be until Old Morschauser leaves us—we hope not for a long time.

John plays on his shaper like Paderewski plays the piano—he uses it with consummate skill to turn out the difficult contours and shapes in the woods with which we work.

Twice in recent years John has decided to retire but he only stayed away two days each time. Those two days showed us how much we depend upon him for certain parts of our work, and he found out that he isn't the retiring kind.

It is such men as this—true mechanics



Introducing Pete Martin

to the backbone—that have made our cabinet shops famous for their fine quality of workmanship and materials, and we realize that we owe them a great deal for their faithfulness and loyalty. Without the aid of Moorman Master Workmen we could have accomplished very little in establishing our reputation for the erection of the finest types of Bank Buildings.

When we started this series of articles, introducing our master workmen, we had a vague idea that we would show our foremen and other men who are directing our work; but one day Pete Martin came in from a job and we realized that here was a master workman in his particular line, if ever one was born.

Pete Martin is one of our "master mud mixers." In the vernacular of the bricklayer "mud" is mortar and a good "mud mixer" is the joy of a bricklayer's life.

Pete Martin is a working, fighting, roaring Irishman of the old school, and when he is on the job the bricklayers are not continually waiting and shouting for "mud." When there is no mortar to mix, Pete is a general handy man, ready to undertake any job that no one else wishes to tackle. He is of the type that, we are sorry to say, is fast dying out—a husky, able man who is willing to do a hard day's work for a good day's pay.

Specialties and the Architect and Builder

By Charles Cressey

THERE are signs that pre-war methods for introducing specialties by personal calls on the executive heads of building work, are being resumed, with the prospect of many pleasant reunions and new friendships, no less welcome to the architect than to the man of grip and sample. As a system, however, I doubt if any other feature of salesmanship can match the average promiscuous call on architects, for sheer waste of time and effort, hard thoughts and at times occasional hard words, where the caller butts into the called-on when he is "not at home." After many well meant efforts to do justice to the traveling man, the happy-go-lucky way of interviews prevails and most likely will continue. Set reception times seem to restrict the freedom and range of the agent's movements and the architect rarely finds it possible to stay with the schedule. There can be no question that the personal explanation of new or improved products is a desirable thing well appreciated by the architect, and the welcome to well posted specialists will be increasingly spontaneous, as the business missionary becomes recognized for educational work distinct from order seeking. The fact remains, however, that the man most desirable to be seen is the one with least time to spare. Few callers know the many expedients forced upon the busy architect in the effort to get pressing work done, or appreciate that this profession does a scandalous amount of overtime in meeting the urgency of most modern building projects. I was several years in discovering that a friend of mine had a cunningly contrived "padded cell" for retreat at busy times and another man systematically worked all night hours preparing for his draftsmen, devoting only a little time of each morning to his office. For reasons similar to these, this is the day of indirect advertising, to which the personal introduction is supplemental. In fact nothing insures a reception for representatives so readily as the informative features of current advertising, particularly if the man also can be expected to carry a progressive message unrelated to pure boosting for the goods of his firm. One of the perpetual problems of an architect (and others, too, probably) is to secure *uncolored facts on specialties, particularly in the way of limitations.* The architect is peculiarly placed in spending another man's money in a way which must in the end entirely satisfy that other man. This brings me to a picking from my peck of potted paragraphs—not so very youthful at that—which gives the emphasis of the law to a common-sense fact, "that the architect has no right in law or reason to *experiment* with the money of his client." That answers clearly the accusation that architects as a class are against new things. The humorous side to this, is the fight with himself that the poor man must go through to avoid using attractive but comparatively unproven specialties. The human brain seems to be incapable of complete foresight, and the record of new specialties for buildings is a stream of unexpected imperfections (and some perfections) which only time and practical use can uncover. Answering the obvious question as to where and on whom shall new things be tried, I can only suggest some place where the responsibility for the unexpected, rests squarely on the shoulders of the firm behind the product. It must be the future phase of business to back new things with an easily negotiated guarantee, not merely on the product itself, but in making good the incidentals affected, which are often of far greater moment than the specialty. Take defective special plasters, paints, waterproofing, roofing and so on, where the return in full of the cost of material guaranteed is trifling in comparison with the replacements, inconvenience, friction, and side issues developed in making good the defects. The building interests are tremendously indebted to the pioneers who have in the past and are now refining and proving the worth of new products. Within the past decade there has been no small tendency to disparage time honored ways of building in the enthusiasm for something different, just as at present there is perhaps a reaction running towards old effects and finishes, with the specialty man cheerfully helping to prove that beauty may be only skin deep. Our real work therefore is to check false tides and fashions, and aim at permanent design and progressive building irrespective of ancient or modern classifications. The specialty man can, I am certain, go ahead with assurance in his efforts to modernize old or develop new products.

Strength and Deterioration in Concrete

TESTS conducted by the Agricultural Engineering Section and the Agronomy Section of the Iowa Agricultural Experiment Station at Ames, Iowa, to determine the practicability and durability of concrete fence posts, reported in the *Concrete Builder* for March and April, issued by the Portland Cement Association, included laboratory tests and service tests. In general, the posts having reinforcing of ¼-inch bars gave the most satisfactory results. The placing of the reinforcing had a marked effect on the ability of the post to withstand loading. Other things being the same, the posts with the reinforcing nearest the surface proved to have greatest strength. In general, the report suggests, that reinforcing should be placed at an average distance of from ⅝ to ¾ of an inch from the surface. The posts made from graded aggregates, although using less cement, possessed greater strength than posts made from bank-run material. After more than six years' service the posts showed no evidence of deterioration.

The tests are indicative of what may be accomplished by carefully measured quantities and skilled supervision in concrete construction.

In the ordinary commercial practice, with reinforcing placed near the surface and the concrete mixtures made in the prevalent manner of approximating the quantities and variability in the mixing time, there is opportunity for such an irregularity in product that a large proportion of failure results. In the case of fence posts these failures are in the main due to rusting of the reinforcing and consequent bursting of the concrete.

In this regard Dr. Charles Catlett, chemist and geologist, of the Cal Chemical Company Laboratories, Staunton, Va., in response to an inquiry from the editor of NATIONAL BUILDER as to the effect of Cal on corrosion, says: "The question of corrosion is one of the most important before builders and it will be many years before we can hope to reach standard conditions and conclusions because in each case much depends on so many factors."

The results of a series of experiments and tests on the effects of Cal on corrosion made for the Cal Chemical Company by Dr. J. C. Witt, chief research chemist of the Portland Cement Association, is submitted:

Cal is a compound manufactured from calcium hydroxide and calcium chloride, and is used to accelerate the setting time of cement. The fact that it contains a chloride usually brings out the question, "Will it not cause corrosion of reinforcing steel?" The manufacturers are of the opinion that it will not cause corrosion to any harmful extent, and have planned to carry out a comprehensive series of tests to demonstrate this. The series of experiments described here are, of course, to be considered only preliminary because a great many factors, such as the nature of the concrete, the percentage of Cal, the nature of the steel itself and the like, must be taken into consideration before any definite answer to the question could be given. However, the results of this preliminary series of experiments serve to indicate in general what may be expected.

A number of ordinary 8-penny wire nails were cleaned with ether and two of them were placed in each of a number of 4-oz. bottles. One end of each nail rested against the bottom and the other end against the side of the bottle. Into each bottle was placed 100 cc. of distilled water, and the chemicals indicated in Table 1. The liquid completely covered the nails in each case. Each bottle was stoppered with an ordinary cork.

The substances were chosen in order to

Of 85 posts placed around a campus seven years ago under prevailing commercial conditions 47 show the typical corrosion failures illustrated compare the effect of Cal with a number of corrosive agents and also with some chemicals known to have an inhibitive effect. Numbers 15 to 22, inclusive, were chosen in order to see if the inhibitive agents will protect steel from corrosive agents.

The specimens were placed in the solutions on June 17, 1920, and were inspected on November 28, 1920.

The following results were noted:

1—Rust ½ in. thick on the bottom of bottle; specimens completely covered with rust. 2—A thin layer of rust on the bottom of the bottle; specimens partly covered. 3—Rust ½ in. thick on the bottom of bottle; specimens covered with rust. 4—About the same as No. 3. 5—About the same as Nos. 3 and 4. 6—Specimens partly covered with rust; thin layer of rust on bottom of bottle. 7 to 13—Specimens perfectly clean; no rust visible. 14 to 18—Specks of rust at points at which specimens were in contact with the glass. 19 and 20—Specimens covered with rust; thin layer on bottom of bottle. 21 to 23—Specimens absolutely clean.

In these tests not only was no rust caused by Cal, but the substance acted as an inhibitive agent in protecting the specimens against the corrosive effects of other substances.

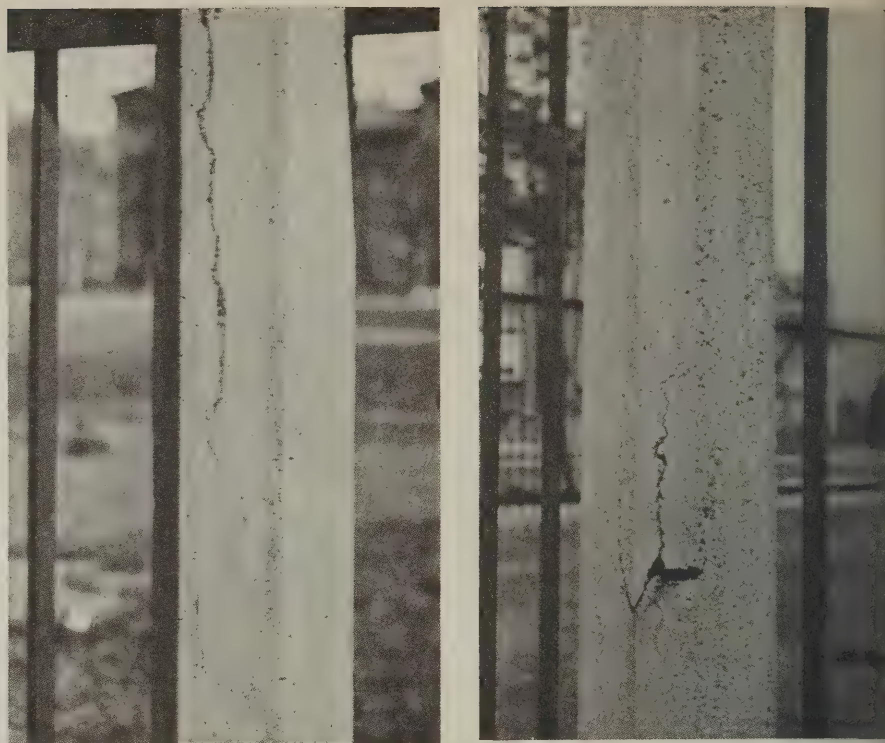
The probable explanation of this is that considerable uncombined calcium hydroxide is present, which more than offsets the corrosive effect of the chlorides.

TABLE 1

No.	Chemical	Grams Present
1	Tap water (only)	......
2	Distilled water (only)	......
3	Calcium chloride	1
4	Calcium chloride	5
5	Sodium chloride	1
6	Sodium chloride	5
7	Sodium hydroxide	1
8	Sodium hydroxide	5
9	Potassium chromate	1
10	Potassium chromate	5
11	Potassium dichromate	1
12	Potassium dichromate	5
13	Cal	1
14	Cal	5
15	Cal	5
	Sodium chloride	1
16	Cal	5
	Sodium chloride	5
17	Potassium chromate	5
	Sodium chloride	1
18	Potassium chromate	5
	Sodium chloride	5
19	Potassium dichromate	1
	Sodium chloride	1
20	Potassium dichromate	5
	Sodium chloride	5
21	Sodium hydroxide	5
	Sodium chloride	1
22	Sodium hydroxide	5
	Sodium chloride	5
23	Calcium hydroxide	saturated solution

Dr. Catlett adds: "As Dr. Witt's brief tests have shown under certain conditions, Cal appears to inhibit corrosion. I have carried Dr. Witt's tests a step further and have compared the corrosive effects of Cal with the corrosive effects of calcium sulphate, which to a certain small extent is added to all cements. Under the conditions of the tests Cal produced no rust, while the calcium sulphate produced a great deal.

"Cal tends to produce a rather denser concrete and to that extent, also, it tends to protect the reinforcement against the effect of external agencies."



Typical corrosion failures in body of the posts

The illustrations showing typical failures of reinforced concrete posts are from photographs made by NATIONAL BUILDER of posts surrounding a college campus in Chicago. The fence was built about seven years ago. Of 85 posts 47 show failures of the character illustrated, indicating that a loose concrete and reinforcing within a ¼-inch of the surface permit corrosion and expansion of the reinforcing, bursting the concrete. Frost will complete the disintegration.

Another test of Cal to show its comparative effect on cement under rapid drying conditions is given in the synopsis of a report by Professor John R. Lapham, professor of civil engineering, George Washington University, Washington, D. C.

The samples tested were two inch cubes. 1-3 river sand. Cements: Tidewater; Lehigh. Water in mix: Tidewater 12.5 per cent; Lehigh 12 per cent. Cubes removed from molds at end of 12 hours and stored in electric oven at 100 degrees F. Treated and untreated samples were broken at 1, 2, 4, 7 and 28 days. Cal used had been

COMPRESSION STRENGTHS OF PLAIN AND TREATED MORTARS

Days	1	2	4	7	28
No. 2-1 (Plain)	891	1864	1930	2050	2110
	882	1633	1845	2038	2232
Average	887	1749	1887	2044	2171
No. 2-2 (Cal)	1351	2375	2807	2705	2845
	1347	2240	2627	2585	2990
Average	1349	2308	2717	2645	2918
Grain in Treated Specimens—Lbs.	462	559	830	601	747
Per Cent	52.1	32.0	43.9	29.3	34.4
		1679			
No. 2-3 (Plain)	937	1844	2202	2289	2165
	967	1532	2200	1988	2255
Average	952	1685	2201	2138	2210
No. 2-4 (Cal)	1447	2525	2957	3232	3775
	1480	2472	3060	2835	3610
Average	1464	2499	3009	3034	3693
Gain in Treated Specimens—Lbs.	512	804	808	896	1483
Per Cent	53.8	47.7	36.7	41.8	67.2

ı storage about three months; 5 per cent f Cal by weight of cement was added to ıch batch Cal-mortar.

The manufacturers point out that this ›ndensed summary from Professor Lapım's report fully bears out the suggestion ›ntained in Technical Paper No. 174 of ıe U. S. Bureau of Standards that the ddition of Cal would probably prove of ›ecial value under conditions when the ɜment mixtures were submitted to rapidly rying out conditions, which represent such large part of all concrete work, as disınguished from the ordinary laboratory ɜsts where a special effort is made to proıuce standard and favorable conditions.

Under the conditions of the above tests, which seek to produce conditions which are so commonly met in practice, particularly in hot weather, and when the concrete is in slabs and thin sections, the strength attained by the Cal portland cement mortar in two days exceed the strength of the untreated mortar in 28 days. The Cal mortar, by increased rapidity of hydration attained a high strength before evaporation had greatly reduced the available water, and next it appeared to retain more of the water required, thus permitted the hydration to continue more actively at the longer periods.

An examination of the figures will show that if one of these cements continued to increase in strength at the same rate as it did between 7 days and 28 days, the plain mortar would have to be 51 days old before it would be as strong as the Cal mortar when 2 days old.

In the other cement the difference is even more striking. The plain mortar would have to be 113 days old before it was as strong as the Cal mortar at 2 days old.

These tests prove that Cal is of special value where cement mixtures are subjected to rapid drying out action. It is of special value in hot weather, particularly in pavement, floor, and thin slab work, and in the manufacture of concrete products.

A Colonial Bungalow*

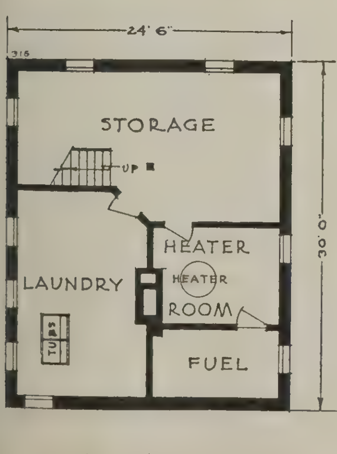
HERE is a plan which has all the rooms on one floor, offers every desirable feaıre of a modern home, and the abiding charm of the Colonial style. Dignity and simplicity are the distinguishing features of the exterior; the gabled roof and the artistically-designed but inexpensive trellis, combined with the excellent proportions of this bungalow make it stand out distinct from the ordinary small house.

Every inch of space is utilized. Each room has two exposures, thus insuring sunny, well-lighted and well-ventilated chambers. The house is of frame construction with siding walls, shingle roof, brick chimney and brick-arched top, and can be accommodated on a 34-foot lot. The plan provides a full basement under the house, but this may be omitted in mild or southern sections where cellar and heating plant are not needed. The second floor affords space for an additional bedroom to be furnished off if desired.

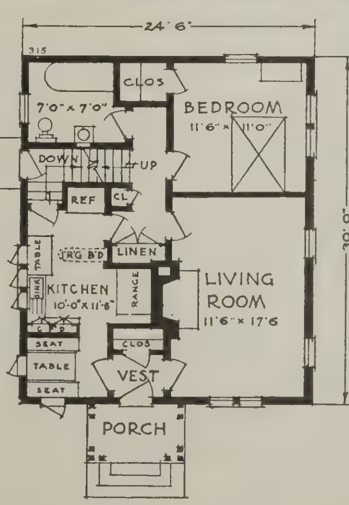
Opening from the entrance porch is a good-sized vestibule equipped with a coat closet, and with doors opening directly into both the living room and the kitchen. This arrangement saves many steps for the housewife. The big living room has a brick fireplace and is bright and airy with windows on two sides. The bedroom is provided with a large closet and has excellent cross ventilation. In the bathroom there is a built-in medicine cabinet, and a built-in linen closet and a broom closet in the hallway. The stairs open into this hallway, those to the basement under the ones leading upstairs.

The kitchen is compact and most conveniently arranged with reference to lighting and routing of work. Note the built-in cupboard in close proximity to the sink and draining board, and also convenient to the dining alcove.

The dining alcove with its compact arrangement of built-in seats and table is becoming more and more popular in the modern small house, affording as it does the advantages of a dining room, yet taking up very little space and cutting down both building expenses and housework.



BASEMENT
CEILING HEIGHT 7'0"



FIRST FLOOR
CEILING HEIGHT 8'6"

*Reproduced by permission from "How to Plan, Finance, and Build Your Home," published for the Southern Pine Association by the Architects' Small House Service Bureau of Minnesota, Inc.

Announcements and Publications

Housing by Employers in the United States, by Leiful Magnusson, issued as Bulletin No. 263 of the United States Bureau of Labor Statistics, Washington, D. C.; 282 pages with index. Procurable from the superintendent of documents, Government Printing Office, Washington, D. C.; price 65 cents. The object of the investigation reported in this bulletin was to study the best and most representative work being done by employers to provide housing accommodations for their employees. Two distinct types of communities were studied; the manufacturing and the mining towns. The report is freely illustrated.

Industrial Housing, by Morris Knowles, an engineer who has been the directing official in a large number of the more important state, national and town planning and engineering works in various localities, a member of the leading engineering associations, and director of the department of municipal and sanitary engineering of the University of Pittsburgh. Published by the McGraw-Hill Book Company, Inc., 239 West 39th Street, New York; price $5. This is the first edition of a work that is of particular timeliness, and coming from an authority of ripe experience is an important contribution to a subject which will demand increasing attention as the United States develops to meet the competition of the foreign manufacturers. The economic importance of adequate housing is largely appreciated, and to the requirements for such housing, town planning, water supply and sanitation, street systems, and all the related engineering and construction features, the work under consideration gives in its 408 pages authentic and verifiable data.

Downing's Landscape Gardening, Tenth Edition—Revised by Frank A. Waugh, M.Sc., professor of landscape gardening, head of department and head of division of horticulture, Massachusetts Agricultural College. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York City. 439 pages, 6 by 9 inches, 48 illustrations; price, $6 postpaid. As the tenth edition indicates this work is a standard in its class, telling in a most interesting way how to choose a site for a country place; the management of the large country place; the mistakes of citizens in country life; how to arrange country places; shade trees; transplating of trees, and many other topics that will be helpful to the builder in making a suitable setting to his houses, a consideration of which has made many builders successful in residential work where others have failed.

"How to Plan, Finance and Build Your Home."—Under this title The Architects' Small House Service Bureau of Minneapolis, Inc., issues a work of 155 pages, 11 by 16 inches in size, bound in stiff boards and buckram back, engraved and printed with taste, skill and care, as a fit medium to set forth one of the most comprehensive aids to better housing of modern times. While it is unfortunately true that many small houses designed by high-grade architects have been from the point of appearance very successful but quite otherwise in meeting the needs of those who have to live in them, the work of the Architects' Small House Service Bureau is designed to overcome that particular defect as well as to show where economy and taste go hand in hand to provide the "practical" small house suited to the needs and manner of living of the family that is to occupy it. More than one hundred small houses in types and variations suitable to various sections of the country are shown, the working drawings, specifications and contract form sof which are obtainable at minimum charges. Elsewhere in these columns representative matter is shown reproduced by special permission. The work itself is sold for $2.50 net.

Trade Unionism and Labor Problems, by John R. Commons, professor of economics, University of Wisconsin. Published by Ginn & Company, New York and Chicago; 838 pages; price, $4. The distinguished author of this work, the second edition of which is before us, in his preface notes that this is a new edition, not a revised edition of the work bearing the same name published in 1905, and like that book is planned for use not only as a collection of reprints but also as a textbook, providing raw material, theory and discussion. It draws upon men of affairs and students. It is intende dto give concrete cases and generalizations, and the introduction and index are intended to bring together from all these cases the items on which generalizations may be made.

The builder, craftsman, financier, or other citizen going into conferences on labor matters will find a wealth of suggestive and informing material to aid in arriving at conclusions and determining the economic conditions on which such conclusions may safely rest.

Landscape Gardening, by O. C. Simonds, published by the Macmillan Co., 64-66 Fifth Avenue, New York City, retails for $6. To quote the words of the author, "The purpose of this book is to help make *our country* more beautiful." His scope is large, the treatment general and suggestive, rather than detailed. The duties, requirements and opportunities of the landscape gardener are explained enthusiastically. National parks, forest preserves, county parks, highways are discussed in relationship to him. The preservation and right use of natural features and resources are urged, and the desirability of utilizing native trees, shrubs and wild flowers wherever possible. An interesting feature is a discussion of the possibilities of landscape work in the arid and semi-arid regions where rocks and vast distances and sunlight and sky are the only materials at hand. The proper planning of a farm layout is given, and there is a chapter on "School Grounds" and "Home Grounds." The book is full of stimulation and suggestion and will be of interest to the student who considers taking up landscape gardening as a profession, as well as to the land owner or builder who wants some suggestions along that line.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912,

Of National Builder, published monthly at Chicago, Ill., for April 1, 1921.

State of Illinois, County of Cook, ss.

Before me, a Notary Public, in and for th state and county aforesaid, personally appeare Geo. P. Miller, who, having been duly swor according tc law, deposes and says that he is th Manager of the National Builder, and that th following is, to the best of his knowledge an belief, a true statement of the ownership, man agement (and if a daily paper, the circulation) etc., of the aforesaid publication for the dat shown in the above caption, required by the Ac of August 24, 1912, embodied in section 443 Postal Laws and Regulations, printed on the re verse side of this form, to-wit:

1. That the names and addresses of the pub lisher, editor, managing editor, and business man agers are: Publisher, Tradepress Publishing Cor poration; Editors, N. C. Rockwood and A. H McQuilkin; Managing Editor, N. C. Rockwood Business Managers, Geo. P. Miller and N. C Rockwood, all at 542 South Dearborn Stree Chicago, Ill.

2. That the owners are: (Give names an addresses of individual owners, or, if a corpora tion, give its name and the names and addresse of stockholders owning or holding 1 per cent o more of the total amount of stock.) Tradepres Publishing Corporation, individual stockholders W. D. Callender, T. J. Sullivan, Geo. P. Mille N. C. Rockwood, W. B. Mayor, D. R. Hick A. H. McQuilkin, H. P. Sessions, Chas. O. Ne son, Forrest O. Poor, all at postoffice addres 542 South Dearborn Street, Chicago, Ill., an C. H. Fuller, at 101 West 41st Street, New Yor N. Y.

3. That the known bondholders, mortgagee and other security holders owning or holdin 1 per cent or more of total amount of bond mortgages, or other securities are: (If there ar none, so state.) There are none.

4. That the two paragraphs next above, givin the names of the owners, stockholders, and se curity holders, if any, contain not only the lis of stockholders and security holders as they ap pear upon the books of the company, but also, i cases where the stockholder or security holde appears upon the books of the company as truste or in any other fiduciary relation, the name o the person or corporation for whom such truste is acting, is given; also that the said two para graphs contain statements embracing affiants fu knowledge and belief as to the circumstances an conditions under which stockholders and securit holders who do not appear upon the books of th company as trustees, hold stock and securities i a capacity other than that of a bona fide owne and this affiant has no reason to believe that an other person, association, or corporation has an interest, direct or indirect, in the said stock, bond or other securities than as so stated by him.

5. That the average number of copies of eac issue of this publication sold or distributed throug the mails or otherwise, to paid subscribers durin the six months preceding the date shown abo is—(This information is required from daily pu lications only.)

(Signed) GEO. P. MILLER.

Sworn to and subscribed before me this 29 day of March, 1921.

MABEL OLSEN, Notary Public.

(My commission expires April 12, 1922.)

Form 3526.—Ed. 1916.

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Vol. 64 July, 1921 No. 7

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NATIONAL BUILDER

/olume 64 | Chicago, July, 1921 | Number 7

The Situation

SOMETHING resembling a general house-cleaning is taking place in building labor ircles in Chicago since the employers and he officials of the building trades council greed to accept Judge Kenesaw Mountain .andis to show the path of justice and quity. The carpenters have held off, and heir final attitude is still to be determined. Vage scales of carpenters compiled by the

Vational Association of Builders Exchanges revailing February 28 and May 31 show vage conditions at the interval of three ionths for the following cities:

	February	May
.lliance, Ohio	1.00	.90
altimore, Md.	.90	.90
.tlanta, Ga.	.70	.70
uffalo, N. Y.	1.00	.80
oston, Mass.	1.00	.90
hicago, Ill.	1.25	Tie up
incinnati, Ohio	1.00	1.00
leveland, Ohio	1.25	Tie up
olumbus, Ohio	.90	.90
ayton, Ohio	1.00	.85
es Moines, Iowa	1.00	.80
etroit, Mich.	.85-1.00	.80
uluth, Minn.	.80	.80
rie, Pa.	.85	.80- .85
lint, Mich	.75- .80	.75- .80
airmount, W. Va.	1.00	1.00
rand Rapids, Mich.	.85-1.00	.85
idianapolis, Ind.	1.00	.92½
ansing, Mich.	.70- .75	.75
ittle Rock, Ark.	.80- .95	.80- .95
os Angeles, Calif., per day	8.00	8.00
ouisville, Ky.	.80	.80
emphis, Tenn.	.70-1.00	.60- .80
ilwaukee, Wis.	1.00	1.00
ewark, Ohio	.90	.75
ew York, N. Y.	1.12½	1.12½
orfolk, Va.	.75- .87½	.65- .75
maha, Neb.	1.12½	.75-1.00
hiladelphia, Pa.	1.12½	.90
ittsburgh, Pa.	1.25	1.00
eading, Pa.	.75- .85	.75- .85
edfield, S. D.	.80	.80
ichmond, Va.	.60- .72½	.60- .72½
ochester, N. Y.	1.00	1.00
iginaw, Mich.	.80	.80
ivannah, Ga.	.50- .80	.50- .80
oux City, Iowa	1.00	.90
Joseph, Mo.	.87½	.75
Louis, Mo.	1.25	1.25
. Petersburg, Fla.	1.00	.70- .87½
ireveport, La.	1.00	1.00
oledo, Ohio	.90	.80
'ashington, D. C.	1.05	1.05
'arren, Ohio	1.15	1.15
oungstown, Ohio	1.15	.92

The National Industrial Conference Board on June 21 announced its estimates of living costs. The report says living costs for wage earners dropped 2.3 per cent between May 1 and June 1. It says cost of living since July, 1920, decreased 20.8 per cent, and that living costs June 1 were 61.9 per cent higher than in July, 1914. The government's figures, standard authority, say cost of living in Chicago on May 15 was 17 per cent lower than in June, 1920, but still 78.4 per cent higher than in December, 1914.

The inequalities in the prices between raw and manufactured goods and wages is illustrated in the bulletin of the National City Bank of New York by quotation from a correspondent in a small town in a good farming district in Minnesota:

"Personally I am looking forward to much better conditions, but until the price of raw material is somewhat increased or there is an enormous reduction in the price of the finished products, there is bound to be a great deal of discontent among the farmers, the producers of the raw materials. For instance, the farmer at our market here cannot get 10 cents a pound for his wool; eggs are 15 cents; butter fat, 23 cents; two or three cents a pound for good cow and calf hides; shelled corn does not bring the price that it costs for the labor to shell it and to bring it to town."

These facts, it is declared, ought to be known in every industrial center of the country as showing the folly of trying to maintain the prices of manufactured goods and wages at present levels.

The trend of building material prices is shown in the charts on the following pages.

Stimulating Business

Emblematic of the progressive spirit of the country and as an influence in stimulating a more altruistic spirit the coming months will present to the public elaborate exhibits of building and building material, notably on the occasion of the opening of the new exposition hall and public auditorium in Cleveland, Ohio, and in the exhibition to be held at the Municipal Pier in Chicago.

Exhibits of skill and accomplishment both by contractors and workmen seem destined to become more and more a part of the building business.

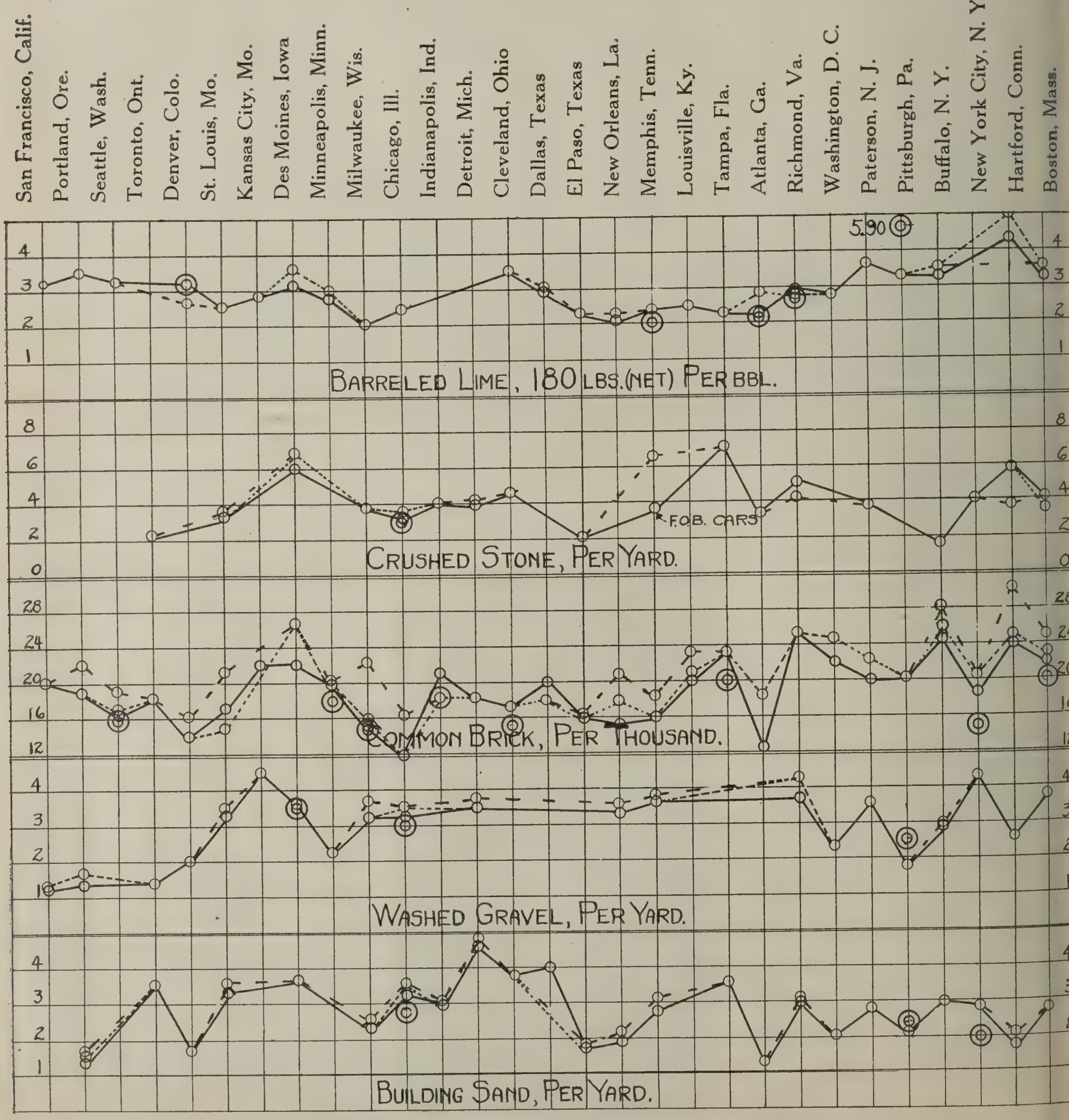
Building Material Prices

THE following charts represent graphically the current retail prices of building materials based on figures taken from various published sources as of June 7, quoting retail, delivered on the job prices, and their variation according to locality.

Twenty-nine representative cities covering the whole country are quoted from. Prices of material are shown in figures as dollars at the right and left sides of the pages. A circle opposite any city represents a quotation, and the amount of the quotation is represented by the figure at the sides of the chart.

No circle, or plotted point, means no quotation from that city. The dashed line indicates March, the dotted line April and the full line May quotations. June quotations are the same as May with a few exceptions. These new changes are shown by two circles. For example: New Orleans, La., shows quotations of $2.25 in March and $2.10 in April and May for lime; no quotations on crushed stone; $20.50 in March, $17.85 in April and $15.00 in May for common brick; and no change in prices for June. Memphis shows a new quotation of $2.00 for lime, while the quotation for March, April and May was $2.40.

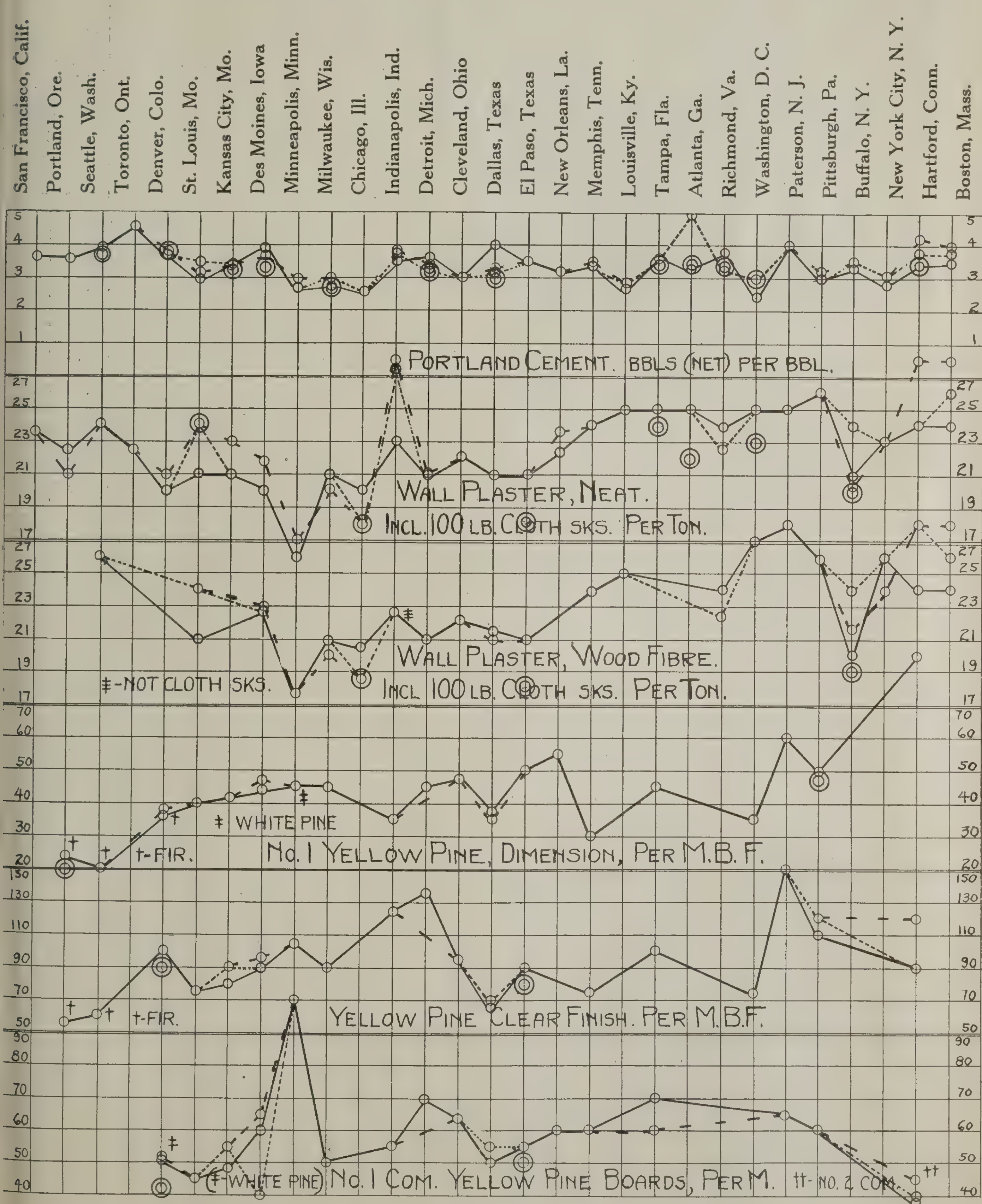
Each month shows fewer changes, which seems to indicate that the market is stabilizing and that prices have fallen about as low as possible under the present conditions.

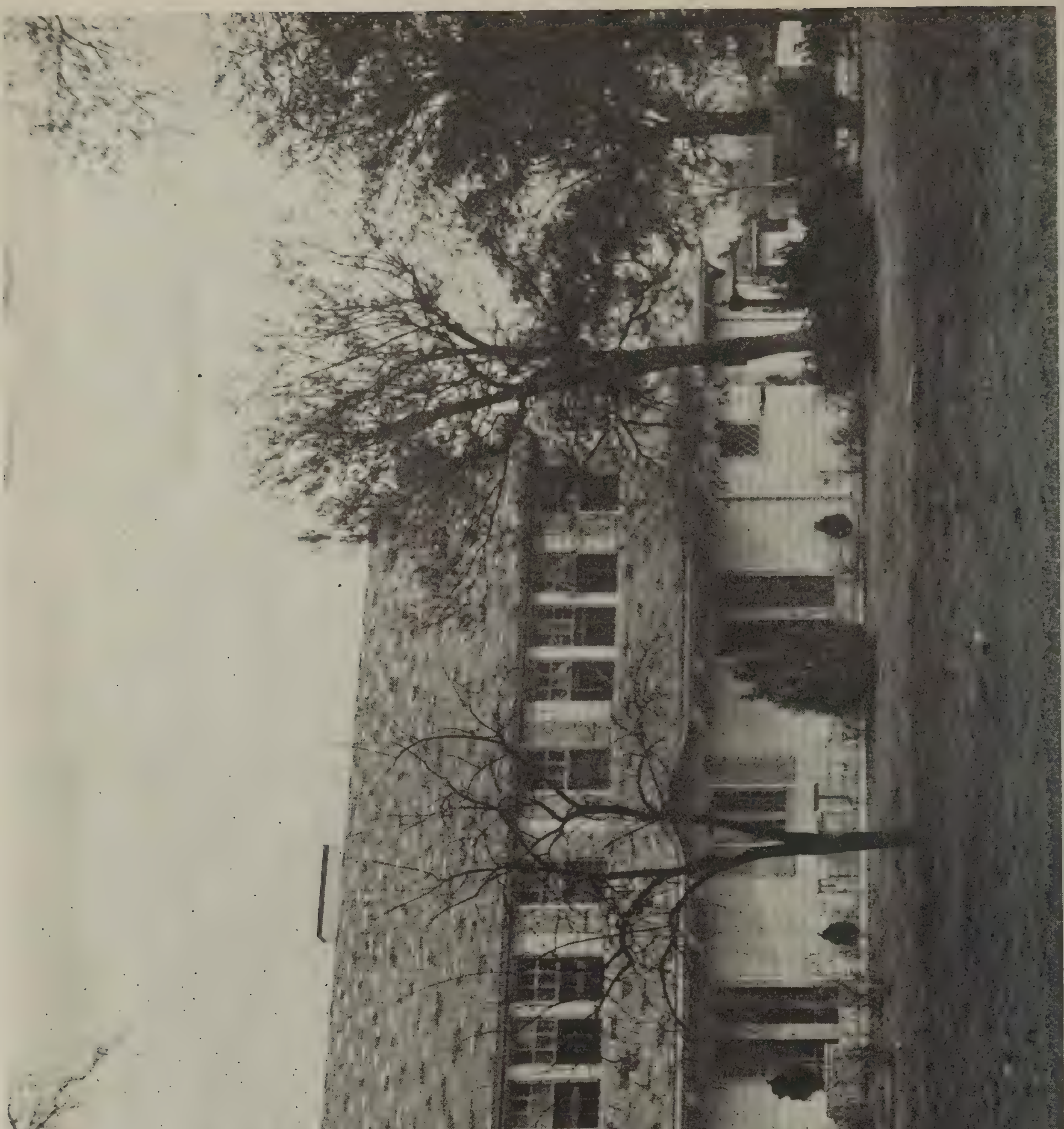


The quotations in some respects are not complete, reliable reports from points included in the plan not having been received. These will be supplied as the charts are developed from month to month and advanced or recessions shown.

Absolute accuracy is not possible under all the circumstances in the preparation of these charts. Their utility consists in their approximate accuracy in disclosing price tendencies and the relative prices in representative points in various sections of the country.

The co-operation of our readers is cordially invited in checking and correcting any inaccuracies in quotations from their localities. While the sources of information are sought from the best authorities—the most reliable is the man who is buying the material. Suggestions looking to making this department of greater utility are also invited.





A Seven-Room House of the New South

RESIDENCE OF FRANK AUSTIN, HIGHLAND PARK, DALLAS, TEXAS
H. B. THOMSON, ARCHITECT

See descriptive article on opposite page and working drawings in detachable blueprint insert in this issue

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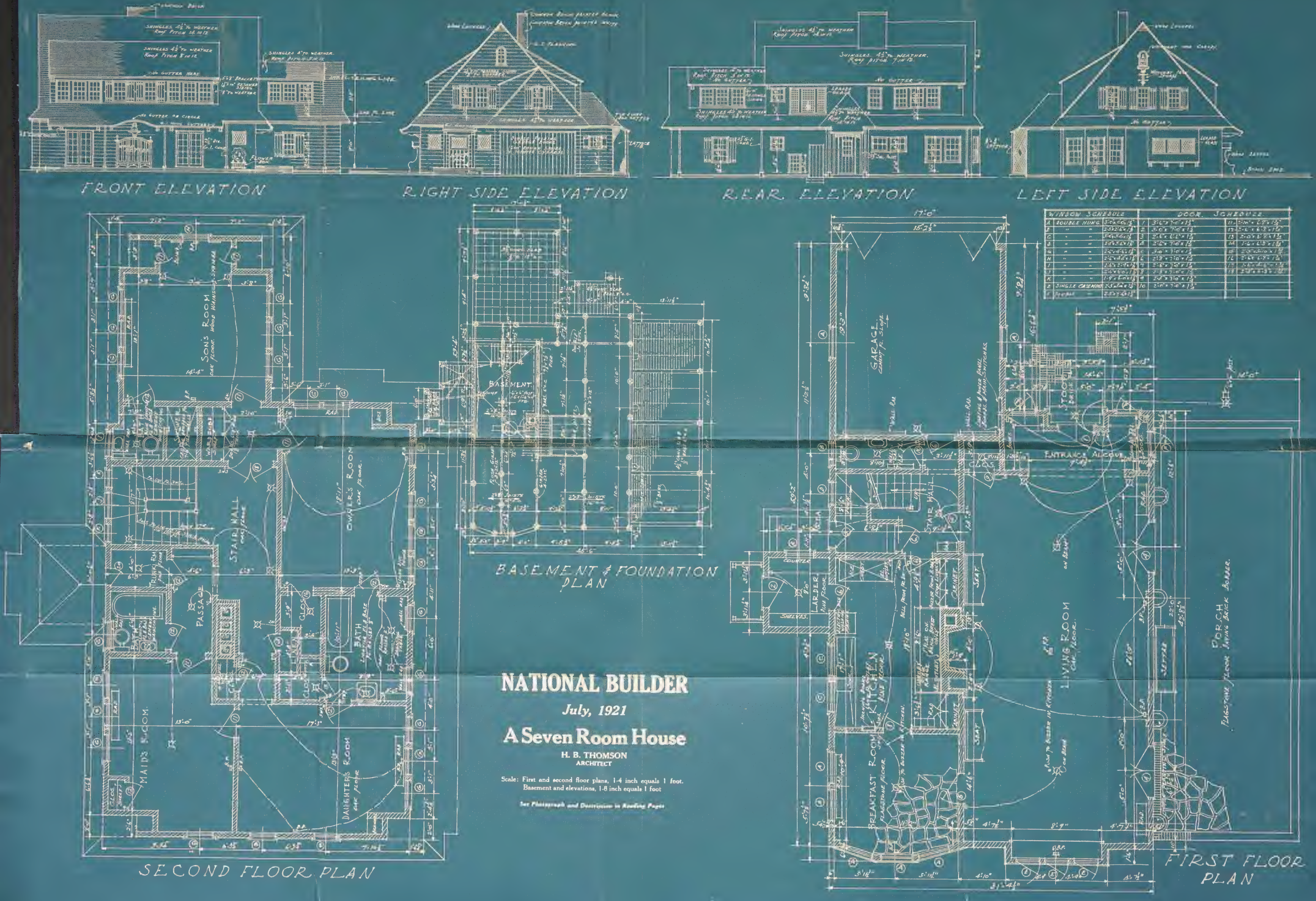
1-4 inch equals 1
inch equals 1 foot

n in Reading Pages



NATIONAL BUILDER

July, 1921

A Seven Room House

H. B. THOMSON
ARCHITECT

Scale: First and second floor plans, 1-4 inch equals 1 foot.
Basement and elevations, 1-8 inch equals 1 foot

See Photograph and Description in Reading Pages

A House of the New South

See Working Drawings in Detachable Blueprint Insert in This Issue

TO do something "different" in house design and yet stay within the bounds of good taste and common sense is one of the rarest accomplishments. Too often a clever design is spoiled by poor planning or more often a good plan is afflicted with an atrocious exterior and interior design. The house which forms this month's supplement, however is an unusually successful design within and without, and offers a logical plan for a southern house.

The architect, H. B. Thomson of Dallas, Texas, has here produced not only a house, but at the same time has added that elusive quality that raises a design above the commonplace, intensifying rather than diminishing the "home" feeling.

The exterior is reminiscent of the old Dutch farmhouses of the East. The high pitched roof and the wide overhang of the hood give the house a picturesque appearance and at the same time aid in protecting the house from the sun's rays. In this regard the first floor rooms are favored, as they are in constant use throughout the day time when the heat is greatest. The first story rooms also contain comparatively few windows in an attempt to keep out the sun's rays.

On the other hand, as many windows as possible are provided for the second story rooms thus taking full advantage of the night air. The rather restless appearance of so many windows in the long dormer is unfortunate, but even so the effect is perhaps better than if the house were full two stories without a break between the first story and the second.

The interior design of the house is influenced by early American examples such as the Capen house, the Boardman house and the other seventeenth century houses of New England in which the walls were finished wholly or in part with wooden wainscoting instead of plaster. This treatment is highly effective and adds immensely to the character of a room. It cannot be used promiscuously, however, and carrying it throughout the house as is here done, seems a trifle forced.

The entrance is at one end in the angle formed by the house and the garage. An entrance alcove is separated from the living room by a wide arch of solid post and beam construction with wooden pins exposed. Bookcases are built into the side walls of the alcove. The bookcases are open, without doors and have adjustable shelves.

The living room is exceptionally large, a feature that is made possible by the omission of a dining room. The walls of this room are typical of the remainder of the house. They are finished with 1 by 12 boards V-jointed on the edges and set vertically. Narrow battens are used at every fourth joint to form a sort of panel effect. The ceiling is finished with the joists and the floor boards above exposed on the under side. The exposed joists are doubled two-by-twelve's spaced about three feet apart. The exposed floor boards are V-jointed, ten inches wide and one and one-eighth inches thick so that they will not sag between the widely spaced joists. A moulded wooden cornice of slight projection runs just under the joists. The doors are built up of three layers of boards with the outer layers vertical and similar to those on the walls. The joints are made with moulded strips flush with the surface. The entrance door is of the Dutch type, in two leaves, with the upper portion glazed with diamond shaped panes. The doors are fitted with wrought iron hardware finished black. All of the living room windows are casements with diamond panes set in metal bars. Two pairs of French doors open onto a wide stone paved terrace which extends across the front of the house. The fireplace is of the ancient type wide and squat in appearance, faced with red bricks and with the firebrick lining stained a dull black. There is a wrought iron crane and even brick ovens, built in at one side and fitted with hammered wrought iron doors. Wide settles or seats are provided at each side of the fireplace.

HOME AND HOUSING NUMBER

The August issue of National Builder will be one of the most notable of the building publications in wealth of practical material and timeliness in stimulating building revival.

The breakfast room opens from one corner of the living room. It has a stone paved floor, and the two exposed walls are filled with windows. This rooms provides enough space for ordinary dining purposes, and on special occasions one end of the living room may be used.

A double action door opens from the breakfast porch into the kitchen which contains built-in cabinets at each side of the chimney breast. The sink is placed along the outer wall with space left for an electric washing machine at one end. A large metal hood connected to a flue is provided above the range space to improve ventilation. A larder or pantry opening onto a latticed porch is placed at one corner.

The stair hall opens from both the kitchen and the living room. The garage, which is a part of the house, may also be entered from this hall, as may the first story toilet. Under the main stair is the stair to the basement. The main stair has turned balusters spaced wide apart, one to a tread, and the newels are square tapered with hand carved human figures (monks, etc.), forming the finials.

The second story has four bed rooms and three baths. The upper hall has French doors opening into the minor halls which lead to the rooms. It seems that the halls require considerable space although none of the rooms appear to be particularly cramped. The closet spaces, however, are unusually small and several of them are of rather inconvenient shape and disposition. All of the bedrooms have cross ventilation, the son's room being particularly favored with windows on three sides. The bath for this room has a shower instead of a tub.

The main bath opens from both the owner's room and the daughter's room. It has a raised floor for running the plumbing pipes, as the under floor is exposed in the living room. The soil pipe is packed in sawdust to reduce the sound when the fixtures are operated. The large size of the bathroom makes it also available for use as a dressing room.

At one side of the maid's bath room is a trunk closet, a practical convenience for storage. It does not, however, take the place of an attic for this purpose and the omission of an attic stair does not seem to be justified.

The basement is quite small, being only large enough for a heating plant. A fuel room is not provided, as the boiler is of the oil burning type.

The construction of the foundation of the house is rather unique, consisting of concrete pieces set in the ground to support reinforced concrete girders to carry the frame walls above grade. The terrace and the garage have concrete slab floors, reinforced to prevent shrinkage cracks.

The principal rooms have oak floors, the others pine. The wainscoting, exposed beams and so forth are also of pine. The bath rooms have composition floors and cement wainscoting.

The exterior walls are of wide re-sawed boards, stained white. All exterior woodwork is of cypress. The mottled effect of the shingles is produced staining them with varied colors. The chimney is of common brick, painted white, with the four-inch coping stained black.

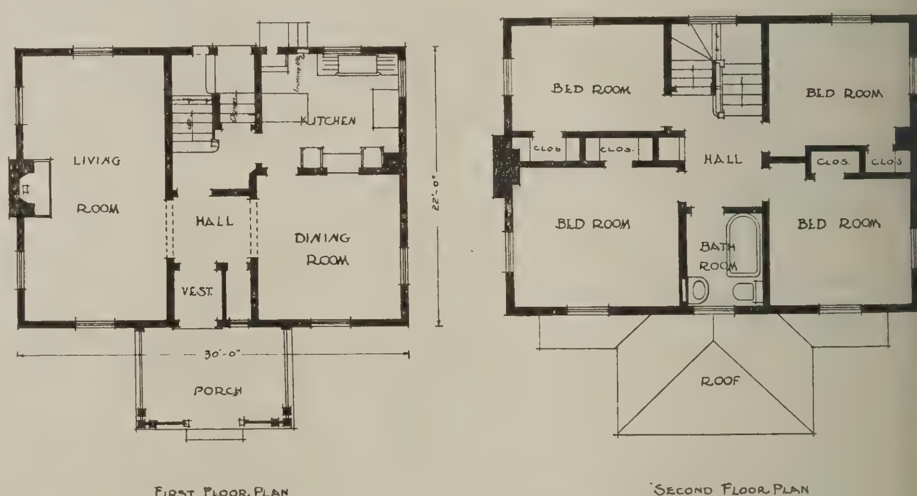
Housing Project at Rochester

A HOUSING development which is proving to be of great public value to the city as well as an aid in the solution of the housing problem confronting its citizens is the one now nearing completion at Rochester, N. Y., promoted by the Brighton Terrace Co. of that city.

James E. and Andrew C. Gleason of the Gleason Works, manufacturers of gears and gear planers, are the principal stockholders in this company. It was their desire to make not an ordinary industrial housing development but what might be termed a middle-class development of a high character. William H. Gorsline, a real estate man of Rochester, was appointed development manager. With him worked Alling S. De Forrest, landscape architect and town planner, and Gordon & Kaelber, house architects. Edwin A. Fisher, superintendent of the City Planning Bureau of Rochester co-operated with these. It was Mr. Gorsline's duty to purchase the land, employ the professional services of the staff mentioned above, prepare plans for the approval of the owners, negotiate contracts, and supervise construction. With the company's attorneys he worked out the mortgage and purchase plans, and with the company has been selling the houses. It is to him that we are indebted for the facts set forth in this article.

The location chosen for the project was a strip covered with large sand hills which lay in the track of the best housing development in the city but so far had remained stagnant because no one had come along of sufficient capital and public interest to go to the expense and trouble of the necessary grading. On the development il-

The houses are of frame construction with stucco or brick veneer exteriors



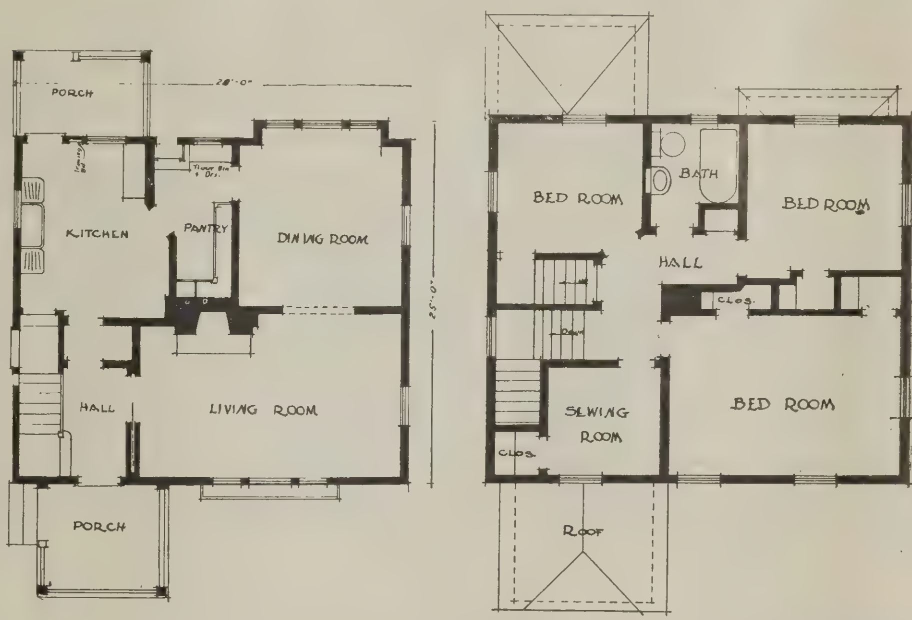
Typical floor plans

Variety is obtained in the way the houses are placed, as well as in details and materials used

Frame and stucco with brick trimmings

lustrated here at least 25,000 cubic yards were moved for grading purposes, while on an adjacent development in which Arthur Ingle of the Ingle Machine Works is interested, 100,000 cubic yards have been moved. As far as was practical the original contours of the hills were retained, and the accompanying grading plan shows how carefully the grades were worked out to preserve these natural lines. By adopting this method, each house was carefully located and plumbers and other contractors were able in advance to figure accurately their contracts.

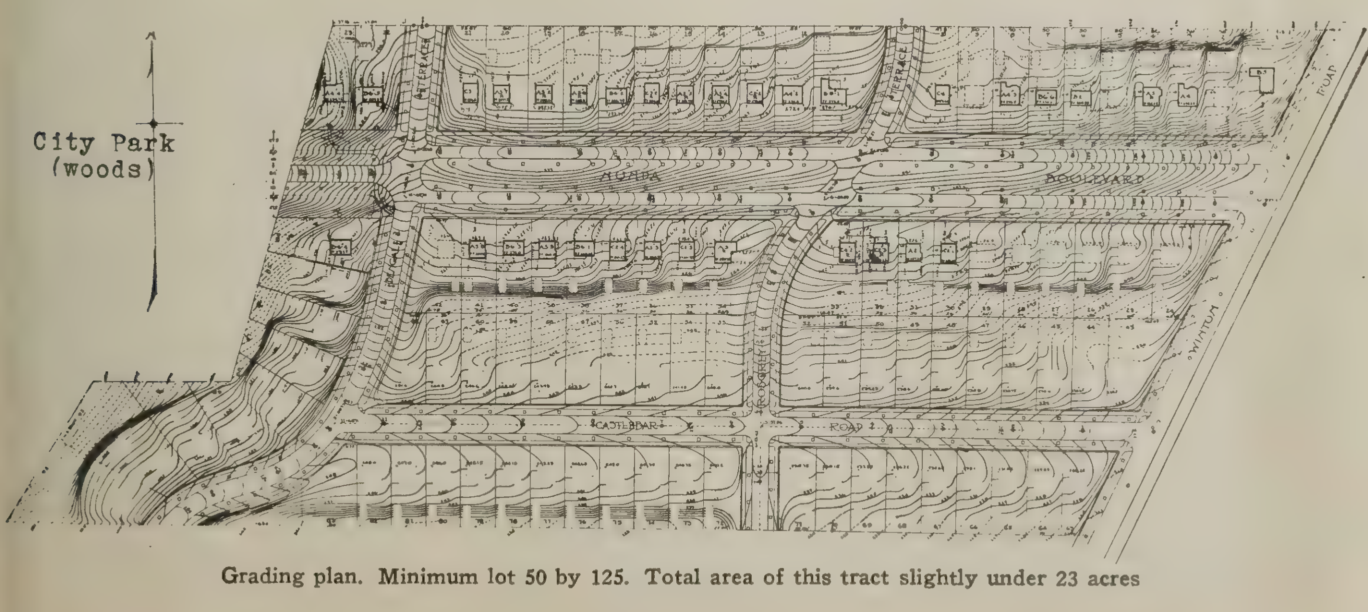
The principal tract has a capacity of 92 lots, the smallest being 50x135. The main thoroughfare is 125 feet wide from curb to curb, there being two 19-foot roadways with a parkway between. The two intersectiong streets are partially completed, and Castlebar Road, paralleling the boulevard on the south, will be finished early in the summer. The entire development is embellished with shrubs and trees, and at one end of the boulevard is a city park, en-



FIRST FLOOR PLAN

SECOND FLOOR PLAN

Typical floor plans



Grading plan. Minimum lot 50 by 125. Total area of this tract slightly under 23 acres tirely wooded. This affords not only a beautiful perspective but a permanent protection and playground. While on the very edge of the city the development is yet within city limits and all utilities have been provided, including asphalt pavement, stone curbs, electricity, gas, and water.

The houses are of frame construction with stucco or brick veneer exteriors. Every house has a slate roof, hardwood floors, a bathroom, hot-air furnace, fireplace, gas, a hot water heater with thermostatic control, laundry trays in the basement, closets off from every bedroom, a refrigerator, and ample pantry capacity in the kitchen which has received special attention. There are three to four bedrooms to a house. The cost of the houses ranged from a little over $8,000 to a little over $13,000, according to size and location. The majority of them averaged around $10,000. This cost includes the land and is the basis on which the houses are sold. The selling terms are 15 per cent down, 50 per cent bank mortgages, and 35 per cent second mortgage, held by the Brighton Terrace Co. and payable in five years by monthly installments. Thirty-three houses have been built to date.

Possession is not limited to employes of the Gleason Works, though a number of the executives and department heads of that firm have bought. Should any of these men leave the employment of the company it would in no way affect the transaction as to the house. Others not connected with the company have purchased, among them the local secretary of the Y. M. C. A.

The stimulating effect of this development is already noticeable in the city. Pavements leading up to the tract have already been arranged for, and a $250,000 school will be started nearby.

Auto Service Stations

By John Anson Ford

AT the present time owing to the tremendous growth of the automobile business there is a great demand for service stations of pleasing, attractive design. The first unsightly structures which sprang up on vacant lots are giving place to a variety of pleasing buildings which vary in cost according to the material used but are an ornament rather than a detriment to adjoining property.

The four service stations shown herewith represent solutions of four different service situations—each differing from the other in the amount of service it can render at one time. Station A is provided with a single pump and can serve but one car at a time although, having a two-way drive, a second machine can be in position for service the moment the first car has received its fuel supply. This station, built in Mission style, finished in stucco and ornamented with bells hung in the arches is particularly well suited to high class residence districts. It will be found that objectors to ordinary service stations will find little to complain of in this truly artistic station.

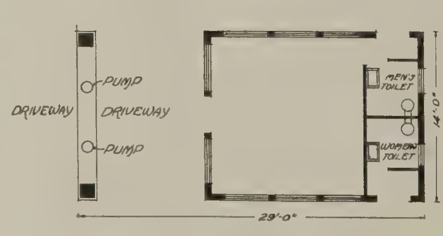
Station B while less expensive, being merely of frame, painted a pale grey and white, is equipped to serve two cars at once, there being two fuel pumps on the concrete foundation dividing the two parts of the driveway. It will be observed also that

Station A

Station B

Station C

Station D



Typical plans

at the rear of the building there are toilets, opening on opposite sides of the structure. The foundation and floor are of concrete and the roof is flat, covered with prepared roofing.

Of the same capacity as B but with more shelter is Station C which has both parts of the double driveway covered. This building is larger in every respect, there being more space set aside for supplies of lubricants. At the rear is a private office for the person in charge of the plant.

The station with the largest capacity of the four is D which is located on a lot affording ample room for two driveways so that a total of four cars can be served at one time. The dimensions of the structure are not as great as those of C and the cost is a trifle less except for the cost of the two extra filling pumps. This type of station is adapted to a busy boulevard site where the available ground is of sufficient dimensions to permit the laying of a double driveway. It will be observed that this station is not located on a corner. C and A occupy corner sites.

Second Story of Business Block Divided Into Bungalows--By J. A. Ford

ONE of the most unusual methods of utilizing the roof space of business buildings for residence purposes is to be found in Santa Ana, Calif., where a group of bungalows forming a typical California bungalow court has been incorporated into the top story of a two-story structure. Thus instead of making flats over store rooms as is so often done, this builder has divided the space into real bungalows sacrificing a portion for a pleasing court yard. This sacrifice, however, adds so much to the attractiveness of the adjoining apartments in the matter of appearance and lighting that their value for rental is greater than if all the space had been used for rooms.

A particular feature which distinguishes the novel structure from ordinary roof dwellings on office buildings is that the outer wall serves as the outside wall for the various bungalows and the windows are so placed in it that from the street the building looks like an ordinary office building. Not until one stands at a point above the top of the building does it become apparent that the treatment of the upper floor has been unusual. Then the gabled roofs, with downspouts, etc., are apparent. The drainage into the court is cared for by large inside pipes as in the case of office buildings of the ordinary sort.

View of one of the courts on the roof of the Spurgeon Building, Santa Ana

The arrangement is one which is worth consideration by the architect or builder who is endeavoring to provide attractive living quarters above stores or ground floor offices.

View of the Spurgeon Building roof showing the gables marking the different bungalows in the group

The second-story windows and the outside wall give no suggestion of the bungalow treatment. An ordinary stairway leads up from the street and opens onto the court

An Early Housing Development

By Charles A. Beck

THE housing work which the Woodlawn Trustees, Inc., of Wilmington, Delaware, has done is not an employers' enterprise, nor is it the result of public agitation for better housing. While having some connection with philanthropic work, it has been carried on as a strictly business proposition, with the object in view of helping to provide small houses with attractive surroundings for those who are not able to pay high rents, and in the belief that it would prove a moderately profitable investment.

At the time this building project was started most of the small houses which could be obtained at low rents were in sections of the city where the surroundings were anything but pleasant and where cleanly people, even though they were poor, did not want to live.

The land owned by the company is within the city limits, and the street lines were already established, therefore no effort was made to lay it out in any other way than in rectangular blocks. Some of the street lines were adjusted to make all blocks a uniform depth of 150 feet between building lines, thus fixing the depths of the lots at 75 feet, which seems to be ample for houses such as these.

Parts of the tracts were set apart for park or recreation spaces. These spaces aggregate about five acres. They were deeded to the city, and are now under the care of the Park Commission. This layout provided for twenty rows of houses.

Beginning in 1903 with the erection of one row of fourteen houses, the work was carried on year after year until in 1913 the last operation was completed, providing in all accommodations for 390 families, or a population of between 1300 and 1500 people.

This work of building was begun before matters of this kind were receiving the attention and study which they are receiving in these days; before the organization of the National Housing Association and kindred bodies, from which, more recently, valuable information may be obtained before a project of this kind is launched.

The houses built during the first few years were in a measure experimental; some contained four rooms, some five, some six, and some eight; some had porches and some had none; some had furnaces and some had none; some had one kind of plumbing fixtures and some another; some were finished in natural wood and some with painted work; and so on, nearly every house differing from the others in some way. By the time we had finished the fourth row of houses we had reached some conclusions as to what was best suited to our local needs and conditions.

Our plans and methods are probably not suited to all localities, but in this special case, judging from the demand for the houses, our efforts have helped somewhat in supplying what people needed.

It should be borne in mind that these houses were not built for sale, as many of the features of our scheme would not work out well unless the whole district were to be kept under one ownership, as it is in this case.

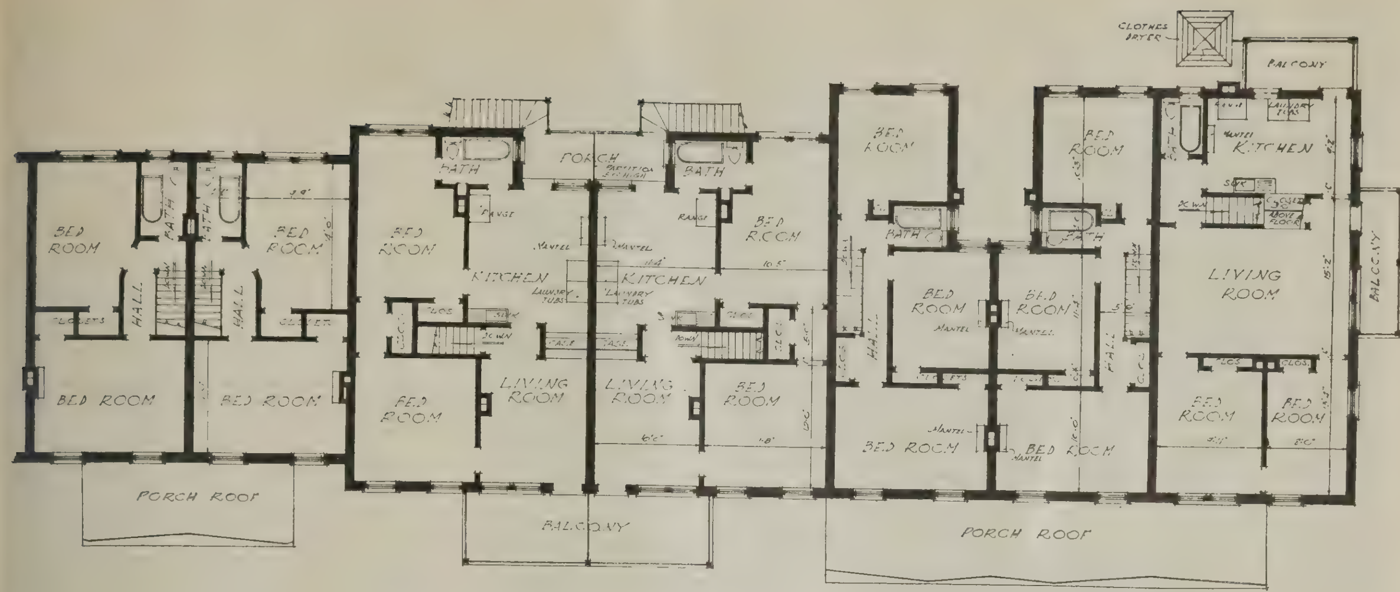
Fig. 1—A typical view of one of the blocks of which there are twenty

We found that for the great majority of wage earners a six-room house is large enough and a four-room one is small enough. Most of the rows contain four six-room houses, four four-room houses, and six two-family houses.

Placing several different kinds of houses in one row not only provides for families of different sizes, but it varies the appearance of the rows, and contrasts not unfavorably with the unbroken rows of houses of uniform size, of which we see too many.

Another way we have broken the straight front line is to set some of the smaller houses back two or three feet farther than the others, giving them a little deeper front yard.

The six- and four-room houses have a



·SECOND·FLOOR·PLAN·

frontage of 15 feet 7 inches. The former rent now for $22.00 a month, and the latter for $18.00.

The frontage of the two-family house is 23 feet. These houses contain two apartments of four rooms and bath each, and are so arranged that the two families are entirely separated, each having its own entrance, front porch, cellar, and front and back yard. The first floor rents for $15.50 and the second for $16.00.

The first houses of this type were erected with some misgivings, as they were a radical departure from the customary method of building in Wilmington; but they have proved very popular, and there is a constant demand for them.

The fear, which is sometimes expressed, that the introduction of two-family houses will result in the erection of houses for three or four families does not seem well founded. They are in a different class entirely from the regular tenement house, and a third apartment could not well be added, without going beyond the limit of economy in building, or else doing away with the features which now make possible the complete separation of the families.

In the construction of these two-family houses, there has been no sound deadening material used between the two apartments, and while we have some complaints about noise, they are comparatively few, considering that there are 240 families living in such buildings.

In the matter of construction, the aim, of course, has been to get good substantial houses at the lowest possible cost. Cellar walls below grade were built of stone, walls above grade of bricks of local manufacture. Flat roofs are of slag and steep roofs of slate. Plastering was the regular two-coat work white coat finish.

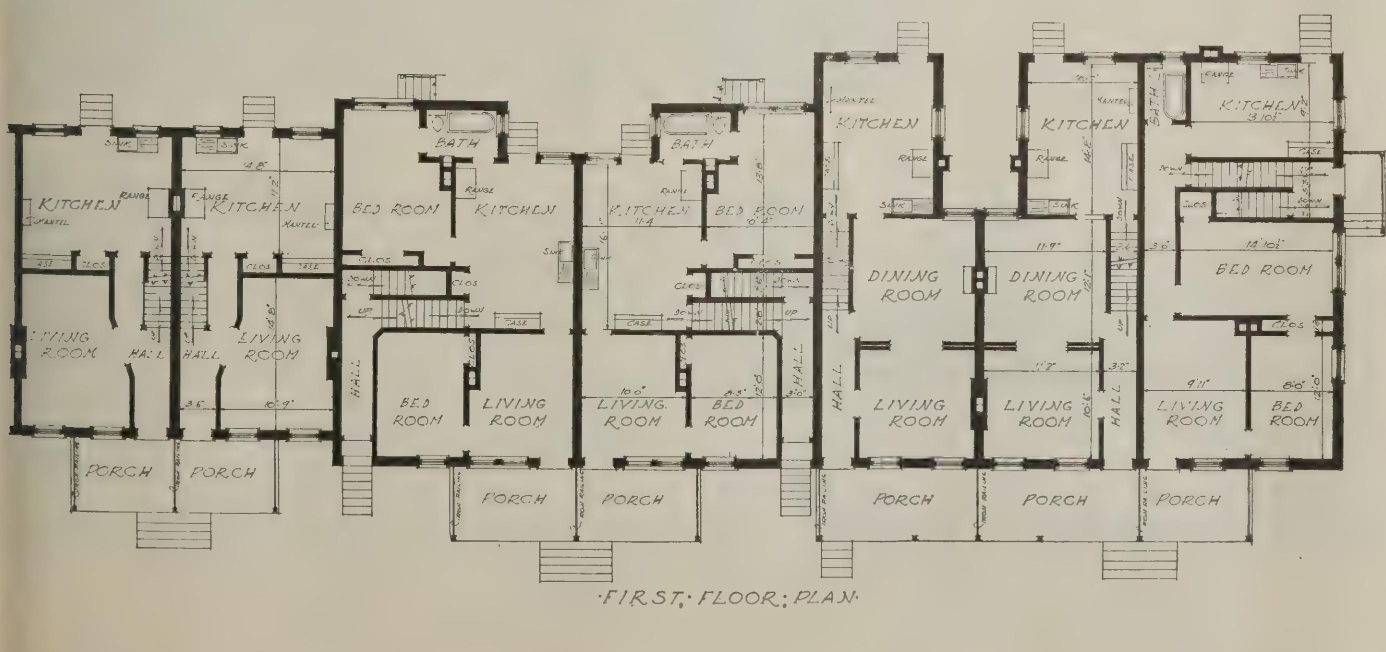
While some attention was given to symmetry and proportion in designing the houses, ornamental details were entirely excluded, utility and convenience being considered of more importance than mere ornamentation.

Coal ranges with boilers attached have been installed in all kitchens. All houses have gas, and some are wired for electricity.

Bath tubs and kitchens sinks are of enameled iron, and all other plumbing fixtures and materials are of a good quality, there being no economy in using cheap plumbing goods. Stationary laundry tubs have been placed in the second floor flats.

Both front and back yards are enclosed with iron fences about three feet high. We have found the use of these open fences an effectual way of preventing the unsightly conditions often found inside of tight board fences. While some of the yards are not as neatly kept as might be desired, most of them are kept in good order, and in many cases flower beds give evidence of the care and pride of the tenants.

The back yards open into a cemented alley three feet wide. Ashes, which must be placed at the curb for collection, are



·FIRST·FLOOR·PLAN·

Fig. 2—Rear view of a typical row showing the three-foot alley for the removal of garbage

taken to the side streets, at the ends of these alleys, thus avoiding the placing of ash cans in front of the houses. Each tenant is provided with an ash can, with the number of his house marked on it. As it is used here this alley arrangement has worked well, but it could not be used where there is a divided ownership.

A building for the company's use, and the use of the community, has been erected in the central part of the district. There is an office in this building, with a man in charge to attend to the renting business and matters in general relating to the houses.

Connected with the office is a workshop and store room, where the repair men work, and where all sorts of supplies needed for repairs are kept.

Three men are usually kept busy attending to repair work, and they do nearly all the work required, except wall papering and exterior painting. Four rows of houses are painted each year, by which plan all the houses are repainted every five years.

The work of building was carried on under the direction of the officers of the company. That is, instead of making a general contract, a superintendent was employed, and contracts for the different branches of the work were made directly by the company. This method proved very satisfactory, and we believe has given us better work at a lower cost than would have been the case if we had given it out in a general contract.

When having building work done in this way it is very important that the specifications be carefully prepared, that each contractor shall understand just what his contract covers, so that there shall be no conflict between the different contractors as to where the responsibility of one ends and that of another begins.

The average net profit on these houses has been about five per cent on the investment.

In our methods of management I do not believe there is anything unique or unusual.

We have tried to make rules and regulations as few as possible. We do not have a system of what might be called official inspection, but our employees, in the course of their duties, have occasion to visit perhaps all the houses at more or less frequent intervals, and in giving attention to plumbing fixtures, ranges, etc., have the opportunity of observing conditions and reporting anything which needs investigation.

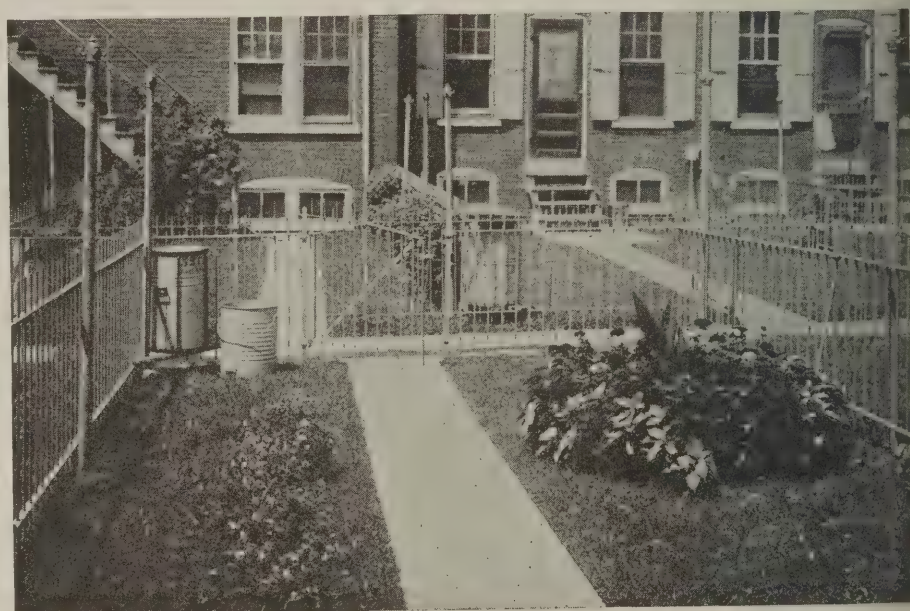


Fig. 3—A back yard which reflects the personal pride of the tenant

Fig. 5—Views of two of the playgrounds

Building Stone Arches

By John Y. Dunlop

THERE is an historic saying that "arches never sleep." This quaint view is partly explained when we understand the principles of spanning openings by blocks of stone, the disturbace of any one of which might cause disaster to the whole structure.

In stone arches the joints radiate to the center of the curves, and a template, pattern, mould or shape, as it is variously called, is made for each different stone.

Keystones are not essential although they are frequently made architectural features of the opening.

The method of setting out and the jointing of the various forms of stone arches are shown in plate number 1.

All those arches would be built on centers, a rough sketch of which is shown.

In these arches all of the joints are drawn to pass through the center of the arch curve, and if the arch has more than one center—that is, if the soffit is a compound curve—then each joint will be drawn to its own centre.

In the three arches at the top of the drawing, the side arches are shown built with outer and inner rings equal, while the center arch has each block extended upward to joint with the horizontal courses of the ashlar wall. This is called an arch with square bonding.

There is also shown a cambered arch with joggled joints and a straight arch with rebated joints. In each of these flat arches the method of setting out is to describe an inverted equilateral triangle on the soffit and take the lower point as the common center for the line of joints.

The semicircular arch which is shown in the middle of the drawing bar has chamfered joints in which the front arris of the joints are cut back for a distance of one inch at an angle of 45 degrees. This is a type of rusticated jointing which is used often for the base of public buildings, but it requires large stones both for the arch blocks and the walls.

The semicircular arch is no doubt one of the most popular forms of arch construction and in its use it is elaborated in a great variety of ways. In the halftone illustration of the entrance door to a school this type of arch is shown with a square jamb on the inside of the walls while the arch on its outer arris or cornea is moulded. The moulding being carried around the soffit and down the jamb to finish on a splayed base.

Another very interesting piece of stone cutting is involved in the building of Gothic arches which are often of the type shown as an equilateral arch in drawing number 1.

The treatment of the opening is generally one of the most strongly marked points in Gothic architecture and no one would think of a design for such a building without this prominent feature.

The openings in their simplest forms are generally built in one of three distinct ways; with mould jambs and moulded arches; with plain jambs and moulded arches, or with plain jambs and plain arches. Each of these are interesting designs but the third type being such a simple method we will leave it out of account.

In the halftone illustration of the first type a very good example is shown in which the jambs are formed with semi pillars wrought in the door rybats.

The plan of the solid of the jambs is made up of two square checks with moulded arrises. The working of those jamb stones is much the same as any moulded stone for an opening, the courses being arranged with out-bond and in-bond to strengthening the opening as much as possible. The capital and the neck moulding of the two adjoining pillars are cut in one stone.

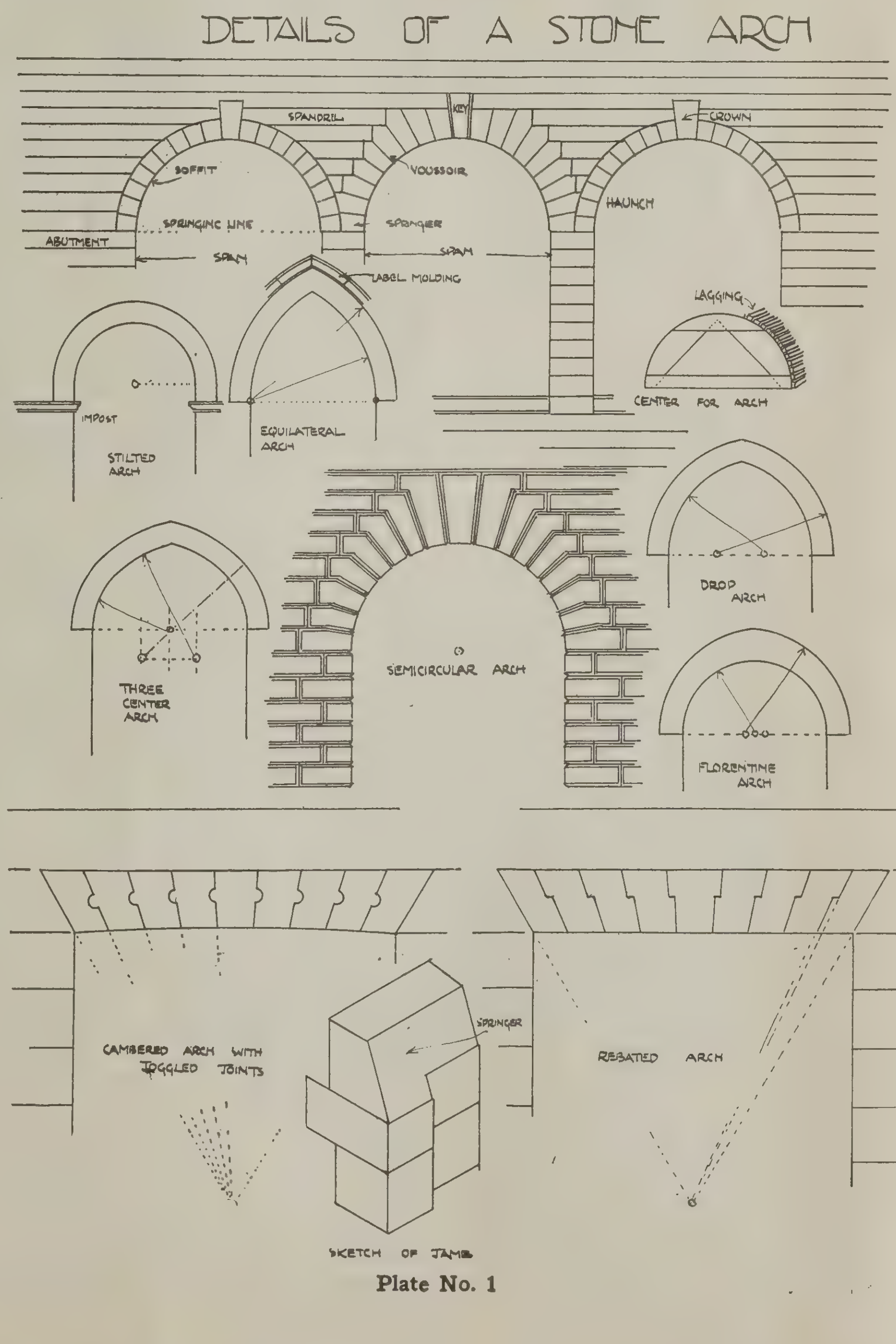


Plate No. 1

In cutting a stone of this kind three moulds would be used, a bottom bed mould, a top bed mould and a reverse mould for the profile of the capital.

The arch is built in two rings with the label moulding on the top. The inner arch has fourteen voussoirs and is arranged with a straight joint at the apex. On the top of this ring the outer arch is set and consists of sixteen blocks. In this way the face joints of the two rings are "broken bonded" on the face. The label moulding is in five stones on each side.

In constructing an arch of this kind the arrangement of the voussoirs is drawn full size and a face pattern is made for each vouissoir of the same size. Then there is the joint pattern which since all of the vouissoirs are of the same size and all the joints are drawn to pass through the centre of the curves of which the arch is formed, is in this example, a single pattern, making all the stones the same shape and size. The only joints which are not normal to the curves are the joints at the apex. Here the common pattern has to be extended on to a line equal to the increased length of the joint at the apex with the result that the joint for the apex is increased in depth.

In setting the head of this doorway a checked center is built and as each vouissoir is set on the lagging, the stone is wedged up with small blocks of wood driven between the soffit and the top of the centering.

With an arch built on plain jambs and with an elaborately moulded head such as the one shown in plate number 2, the method of construction is somewhat similar. In this opening, which is also shown in a photograph, the pointed arch is only formed on the outer thickness of the wall, and the inner thickness is built with a segmented stone arch to avoid having to form the half doors with long pointed acute angles at the upper corners.

In setting off an arch of this kind there is a very nice problem in interpenetration. That is, to find the intersection of the moulded arch with the curved smooth jamb. Some architects in having a doorway of this kind built would supply a full size detail of that particular part but very often this interesting problem is left to the stone cutter.

In drawing number 2 a plan of one jamb, a front elevation of the top of the opening, and a vertical section is shown. That is usually the most which would be supplied to the foreman mason for such work. From these would be set off the full size drawing of the arch on the floor.

Of course the planning of the joints in the arch would, comparatively speaking, be child's play, for the drafting is very simple. But to determine the shape of the moulds and the intersection of the haunch voussoirs will require a special piece of drawing which is not needed in the first arch described.

The method I have used for such work will now be applied to the inner ring of the pointed arch.

Entrance to a school. Moulded semicircular arch with moulded jambs

The plan has already been drawn to get the face pattern for the first or lower voussoir. Figure 5, plate 2. Now we set off the plan of the jamb directly underneath and draw on it the normal profile of the moulded arch. Curved line number 1, Figure 4.

Take any convenient height on the soffit of the arch and divide it into any number of equal parts (eight points in this case) Figure 5.

Then project each of those points to new points even with the upper end of the plan of the arch. Figures 4 and 5. At each of those new points draw the normal contours of the voussoirs. So that now we have on the plan eight moulded profiles. Figure 4.

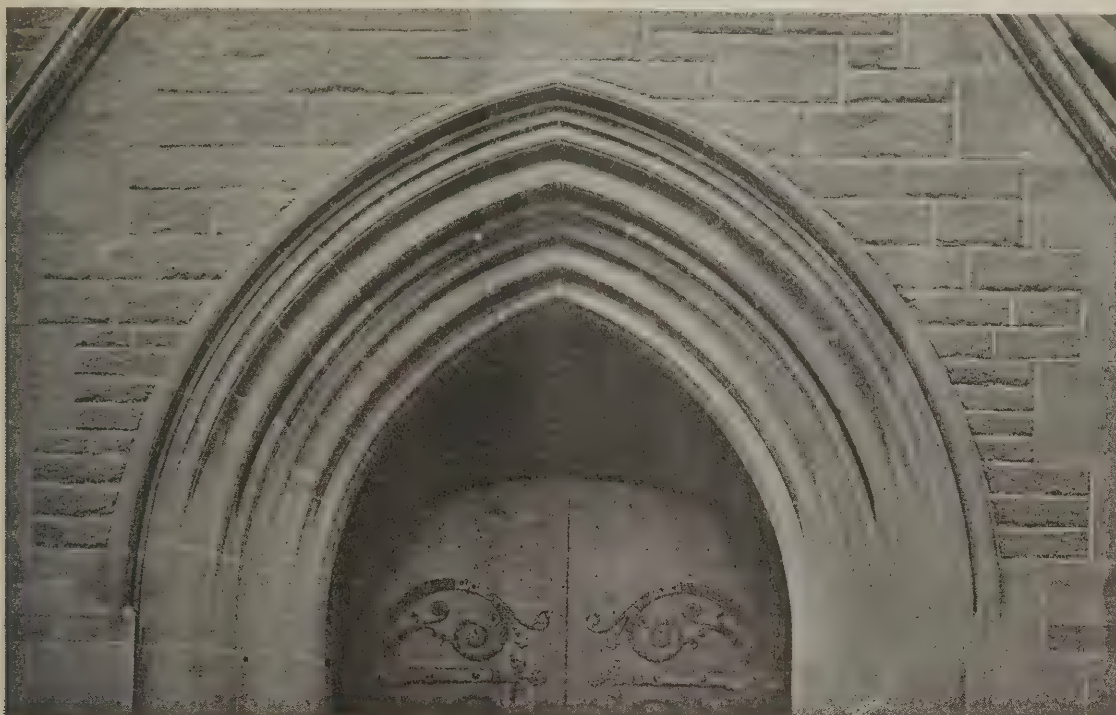
At the eight points on the soffit of th arch draw radial lines to pass through th depth of the ring. Figure 5.

We now go back to the plan and tak each member of the moulding on the arc singly. In Figure 4 I have traced on th plan the points where the cavetto of th different profiles passes through the jam and by numbering those points 1, 2, 3, 4, 5 and 6 I am able to project them up, numbe 2 point of Figure 4 onto number 2 norma line in Figure 5, and in like manner I ar able to find the points 3, 4, 5, and 6.

Above this height the moulding has passe clear of the straight jamb of the side o the door and therefore has become a ful member in the arch. All the members i the moulding of the archway are treated in the same way to obtain the intersection of the mouldings as shown at Figure 5.

This so far gives us only the front view of the lower part of the arch, but to work tain the mould for the top joint refer to Figure 2 and take number 5 profile which in this case is the moulded outline at the top of the block and compare it with the plan of the jamb. It will be seen that only from these constructing the drawing shown in Figure 9, plate number 3.

The top bed mould of block number 1 and the lower bed mould of block number 2 are of course the same.



Gothic doorway with plain jambs and moulded arch

Gothic arch with moulded and column jambs and moulded arch

those stones we require the upper and lower joint mould or bed of each block until we reach the blocks which contain the full mouldings.

The jamb mould is the joint mould of the lower bed of number 1 voussoir and to ob- part of the profile projects past the line of the jamb.

Thus the top bed of number 1 block is made by taking the projecting parts of the mouldings referred to and the portions of the jamb mould which fills the gaps and

To obtain the top bed for number 2 block the same method is adopted as for number 1. If the profile mould is drawn as last described it is seen that all the mouldings or the template are outside of the jamb of the doorway therefore the joint mould

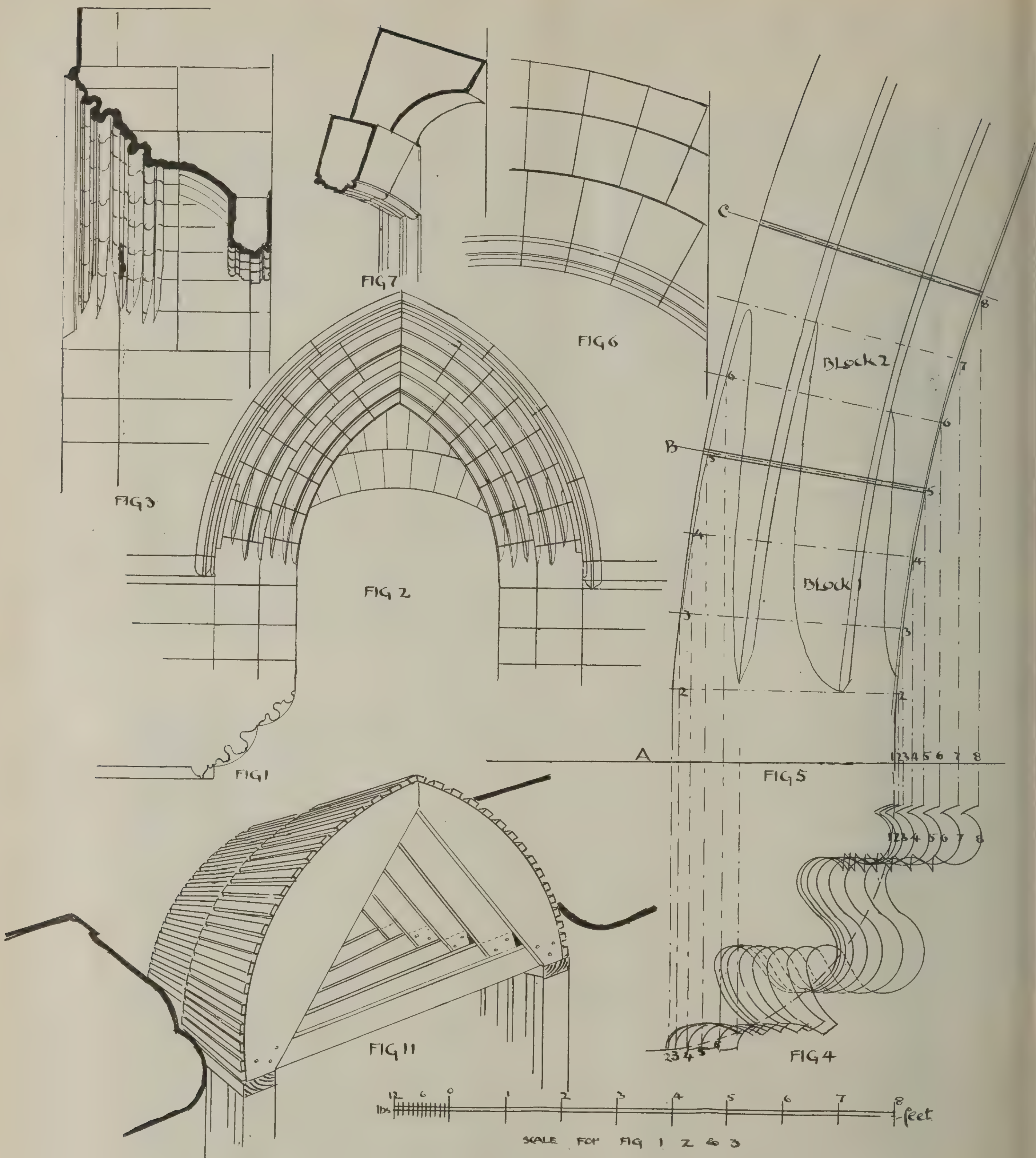


Plate No. 2

for this part of the stone is the same as for those nearer the apex of the arch. Figure 10, plate number 3.

In working the vouissoirs for the arch both the joint patterns and the face patterns are used for laying out the blocks.

In each case the rough block of stone is first faced and the face pattern applied, then after the joints and the extrados and the intrados have been cut, the blocks are cut to a shape that will receive the joint patterns. After that the joint patterns are applied, and in worwing the mouldings through, small reverse patterns or templates are used to ensure proper depth and correct line of curvature. Points in the height of intersecting mouldings such as those we have just discussed are usually taken from the drawing board so that they can be traced on the rough block.

The centres for an arch such as this are shown at Figure 11. In this case two centres are used one for the outer ring and another for the inner one. Blocks that are moulded require additional supports (short blocks of wood are usually used) placed between the top of the centering and the moulded portion of the arch. A trainer is always used in determining the correct position of each stone.

Specimens of Precast Concrete Trim

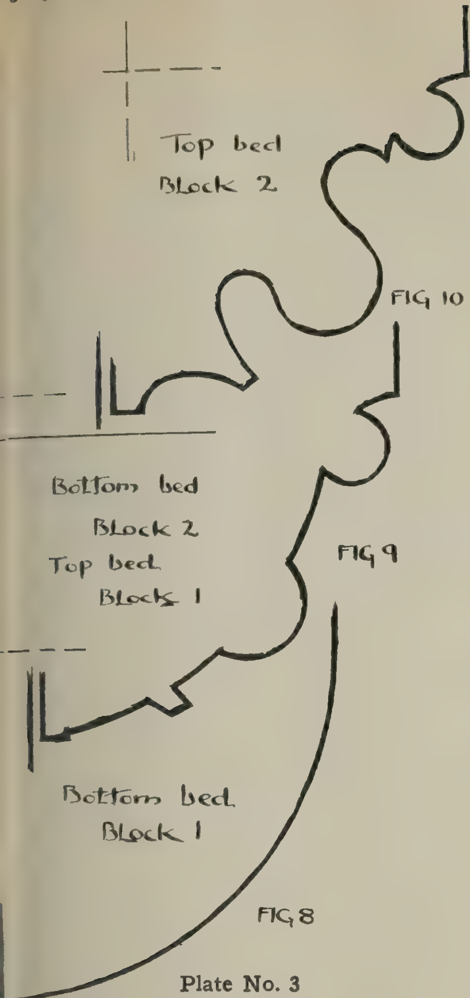
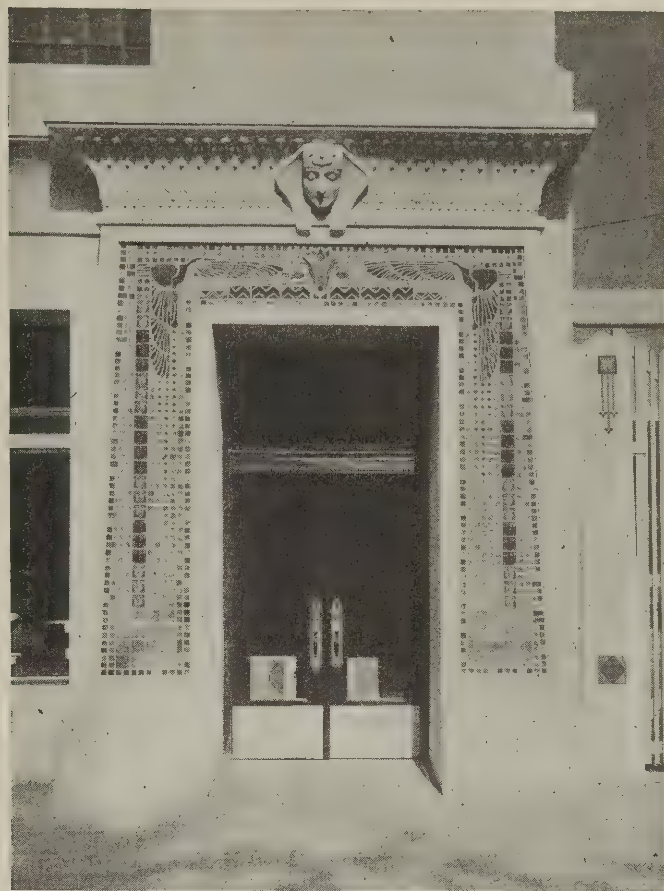


Plate No. 3



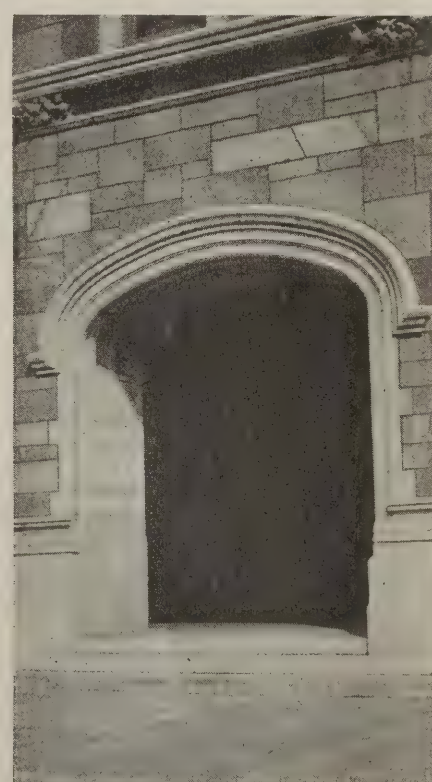
Entrance to Dawson Storage Warehouse, Stockton, Calif.

Part of the segmental arch that forms the door bead is shown at Figures 6 and 7, plate 2. The centering for this type of arch is usually a narrow segmental form just sufficient to receive the lower arch ring, leaving a clear space between the outer and inner centering.

This space is absolutely necessary, for when the workman begins with the upper ring he wants room to get his hand in underneath to feel if the joints on the curved surface are flush. In thick walls there is often sufficient space to allow him to get in to polish and flush the joint immediately after the stone is set.

Small window in the Normal Park Methodist Church, Chicago, principal lines of which are in white granite and marble mixture, with background of blue-gray granite

Main entrance detail, Church of the Ascension, Lakewood, Ohio, considered one of the best examples of concrete architectural stone in ecclesiastical structures in America. Plans by J. W. G. Corbusier



Entrance, Albany Evening Journal Building, Albany, N. Y.

Concrete Block and Tile Construction

This Is the Third Article of a Progressive Series Begun in the February Issue — Questions in Regard to Concrete Block and Tile Construction Will Be Answered by Mail and Also in This Department

THE following recommended practice for the manufacture of concrete building units is tentatively in use by the Portland Cement Association and is now before the proper committees of the American Concrete Institute and the Concrete Products Association for adoption:

GENERAL REQUIREMENTS

These recommendations are intended to cover general practices for the manufacture of concrete block, tile or brick that will meet the current test requirements of the standard specifications of the American Concrete Institute, as outlined in the preceding paragraphs.

Cement—Cement should meet the requirements of the current standard specifications for portland cement of the American Society for Testing Materials. Cement should be stored so that it will not be exposed to dampness.

Aggregates—Fine aggregate should consist of natural sand or screenings from hard, tough crushed rock or pebbles. It should be well graded from fine to coarse particles and pass through a screen having four (4) meshes to the linear inch. Fine aggregate should not contain injurious vegetable or other organic matter as indicated by the Colorimetric Test, nor more than seven (7) per cent by volume of silt, clay or loam.

In no case should fine aggregate containing frost or lumps of frozen material be used.

Coarse Aggregate—Coarse aggregate should consist of clean, durable crushed rock or pebbles, well graded in size, free from vegetable or other organic matter, and should be practically free from soft, flat or elongated particles. The maximum size of coarse aggregate should be one-half inch but in no case should it exceed one-third the thickness of the minimum wall section of the product for which it is intended. Coarse aggregate should range in size from one-half inch down to one-quarter inch. In no case shall more than five per cent pass through a screen having four meshes to the linear inch. Coarse aggregate containing frost or lumps of frozen material should not be used.

Mixed Aggregate—Crusher-run stone, bank-run gravel or mixtures of fine and coarse aggregate prepared before delivery on the work should not be used, because the ratio of fine to coarse material varies so widely as to lead to mixtures of greatly varying proportions.

Fine and coarse aggregate should not be piled so near each other that the edges of the piles overlap. Aggregates should preferably be stored on a floor so that the material in the bottom of the pile will not become mixed with dirt.

Water—Water should be clean, free from oil, acids, strong alkalies or vegetable matter.

Coloring—When artificial coloring materials are required, only approved mineral colors should be used.

Measuring—The methods of proportioning the various ingredients should be such as will secure separate and uniform proportions of cement, fine aggregate, coarse aggregate and water at all times. A bag of portland cement ninety-four (94) pounds net should be considered one (1) cubic foot. When cement in bulk is used, the cement should be accurately measured preferably by weight, in such manner as will insure that the measured amount of cement used as the equivalent of one bag, shall be ninety-four pounds.

Mixtures—For the body of concrete block in which no coarse aggregate is used, concrete should be mixed in proportion of one bag of portland cement to not more than three cubic feet of fine aggregate. 1:3 mixture requires 9.6 sacks of cement and 28.8 cubic feet of sand per yard of mixed concrete. A one-sack batch of this mixture has a volume of about 2.8 cubic feet.

For the body of concrete block in which coarse aggregate is used, concrete should be mixed in the proportion of one bag of portland cement to not more than 2½ cubic feet of fine aggregate to not more than four cubic feet of coarse aggregate. 1:2½:4 mixture requires 5.6 sacks of cement, 14 cubic feet of fine aggregate and 22.4 cubic feet of coarse aggregate per yard of mixed concrete. A one-sack batch of this mixture has a volume of about 4.8 cubic feet.

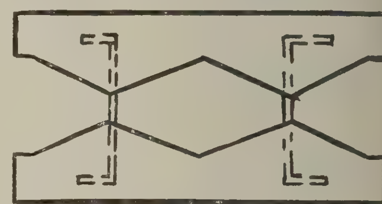
Mortar Colors—If artificial mortar colors are desired (already noted under Materials), they must not exceed in amount 10 per cent of the weight of cement in the mixture. Coloring matter should be thoroughly mixed with the cement to a uniform color throughout before either the aggregate or water is added.

Consistency—For concrete block made by hand or power tamping, concrete should be mixed as wet as practicable to employ in the machine used and allow immediate removal of the finished piece from the mold box without sagging or distortion.

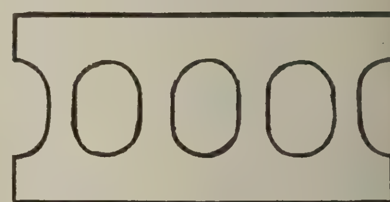
For concrete block made under pressure, concrete should be mixed wet enough so that a slight excess of water will be ejected from the block when full pressure is applied.

For concrete block cast in place concrete should be mixed with just sufficient water to produce a plastic or quaky mass that will fill all parts of the mold when thoroughly vibrated or puddled.

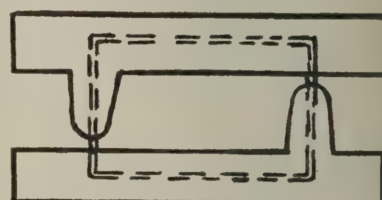
TYPES OF CONCRETE BLOCK



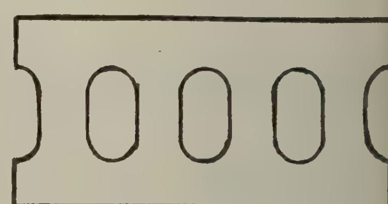
Anchor



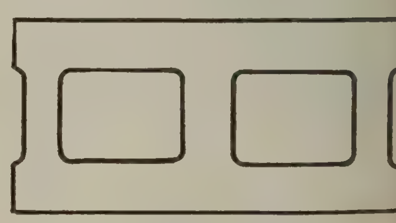
Besser



Bragstad



Brandell

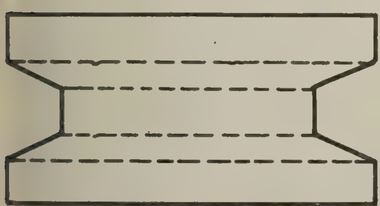


Burrell

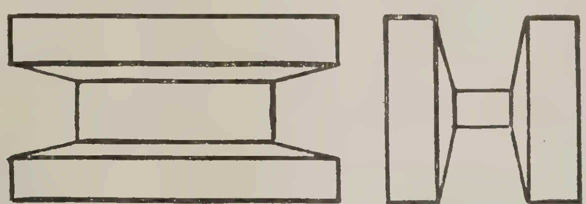
STANDARD TYPES AND SIZES OF CONCRETE BLOCK

Trade Name	Process of Manufacture	Type of Block	—Dimensions of Block Exclusive of Mortar Joints— Height	Width	*Length
Anchor	Power tamp	Two piece	7 11/16	8-9-10-11-12	15 11/16 and 23 11/16
Besser	Power tamp	Elliptical air space	7¾	7¾-9¾-11¾	15¾
Bragstad	Hand tamp	Two piece	7¾	10	23¾
Brandell	Power tamp	Elliptical air space	7¾	4-6-8-10-12	15¾
Burrell	Power tamp	Rectangular	7¾	8-10-12	15¾
Climax	Wet molds	Special "H"	7¾	8 and 12	15¾ and 23¾
Davidian	Hand tamp	Two piece			
Dunn	Hand or power tamp	Rectangular air space	7¾	8-10-12	15¾
Eclipse	Hand tamp		7¾	4 to 12	4 to 16
Flexo	Wet molds	Special "H"	5⅝ and 7⅝	8-10-12	15⅝ and 23⅝
Francis	Hand tamp	Rectangular air space	7¾	8-10-12	15¾ and 23¾
Hayden	Power tamp	Rectangular air space	7¾	4-6-8-10-12	15¾, 19¾ and 23¾
Helm	Power pressure	Two piece	7¼	10	23¼
Hercules	Hand or power tamp	Rectangular air space	4 to 16	4 to 20	4 to 72
Hobbs	Power tamp	Elliptical air space	3 to 12	3 to 12	3 to 24
Hydrostone	Power pressure	Two piece	8⅝ and 11⅝	4½ to 17	3 to 23⅝
Ideal	Hand or power tamp	Rectangular air space	7¾	4-6-8-10-12	15¾ and 23¾
MacArthur	Wet molds	Special "H"			
Miracle	Hand or power tamp	Double staggered air space	7¾	9 to 12	23¾
Multiplex	Hand pressure	Modified rectangular air space	3⅝, 5⅝ and 7⅝	8-10-12	19⅝
Perfect	Hand or power tamp	Rectangular air space	7¾		
Pettijohn	Hand tamp	Rectangular air space	7¾	7¾	15¾, 19¾ and 23¾
Republic	Hand or power tamp	Rectangular air space	7¾	2-4-8-10-12	15¾
Stewart	Hand tamp	Modified rectangular air space	7¾	8 and 10	15¾
Synstone	Wet Molds	Special	11⅝	8 and 12	23⅝
Viani	Wet Molds	Special "Z"	5¾	11	11¾†
Waterloo-Perfection	Hand or power tamp	Rectangular air space	{ 5⅜ 7⅜	8 and 12 8-10-12	23⅜ 15⅜
X-L-All	Hand tamp	Rectangular air space	7¾	8	15¾
Zagelmeyer	Wet Molds	Rectangular air space	7 5/16	8-10-12	15 5/16 and 23 5/16

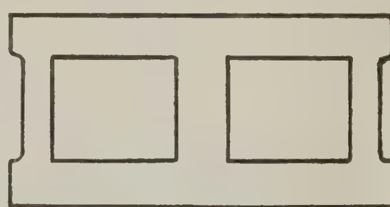
*In addition to lengths given, equipment makes all required fractions of these lengths. †Extreme diagonal length, 30 inches.



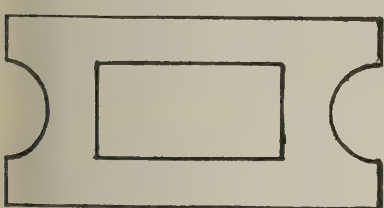
Climax



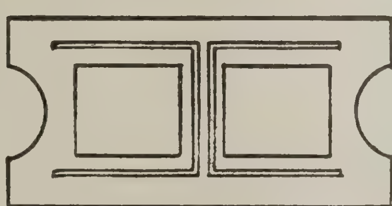
Flexo



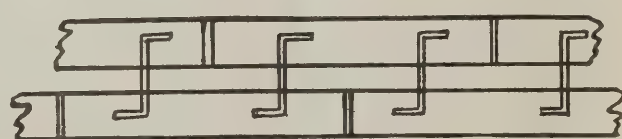
Francis



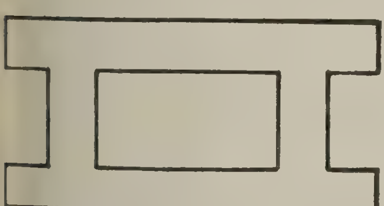
Dunn--Type A



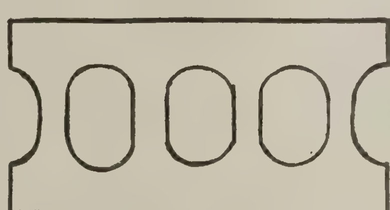
Hayden



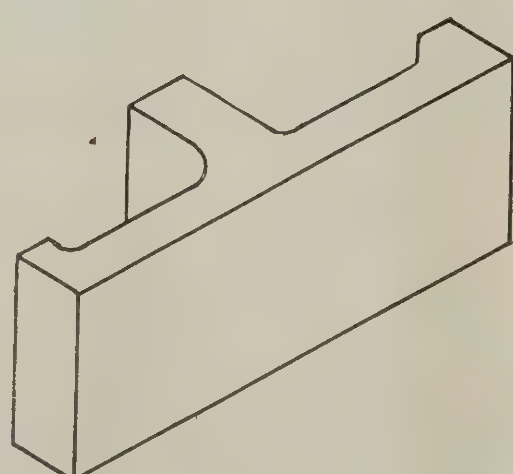
Helm



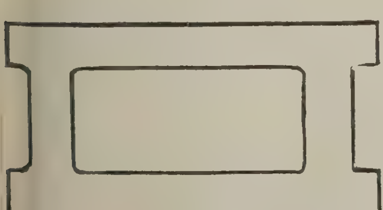
Dunn--Type B



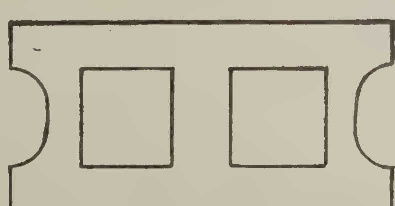
Hobbs



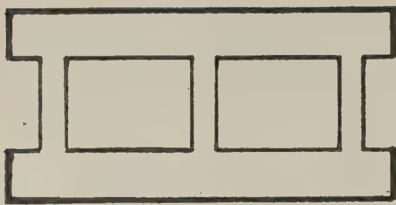
Hydrostone--Single



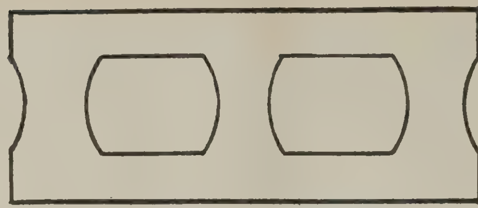
Hercules



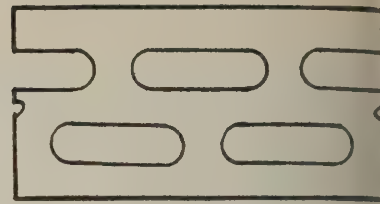
Ideal



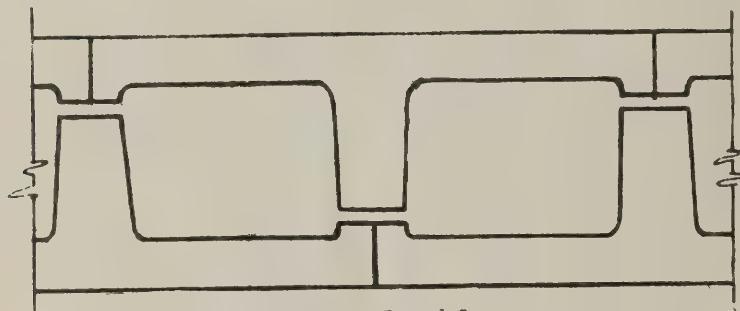
Republic



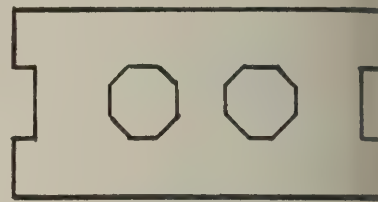
Multiplex



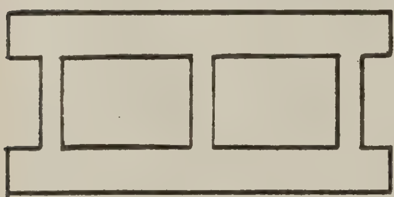
Miracle



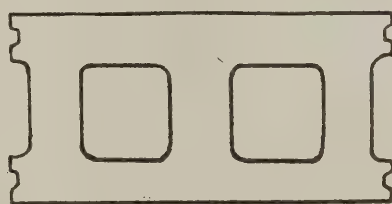
Hydrostone--Double



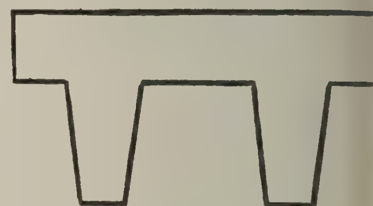
Stewart



Pettijohn

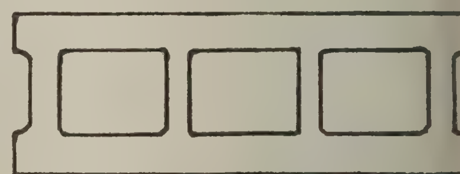


Perfect



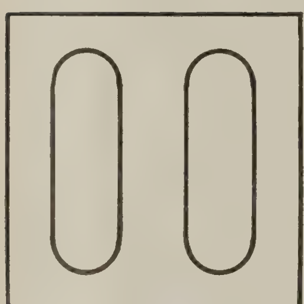
Synstone

Viani

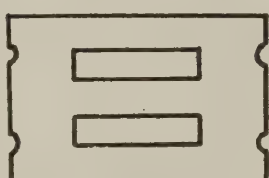


Zagelmeyer

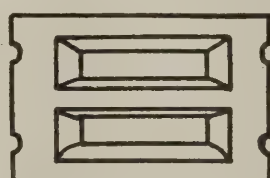
TYPES OF CONCRETE BUILDING TILE



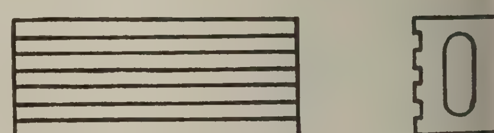
Besser



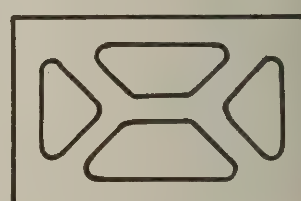
Blystone Tile --Top



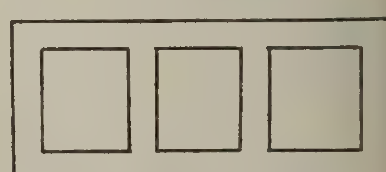
Elystone Tile --Bottom



Eberling



High Test

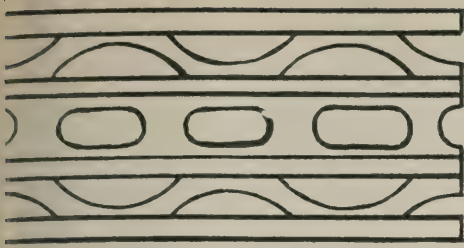


Wightman.

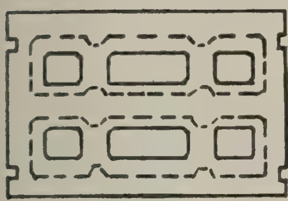
STANDARD TYPES AND SIZES OF CONCRETE BUILDING TILE

Trade Name	Direction of Air Spaces	Dimensions
Besser	Horizontal*	5 x 8 x 12 inches
Blystone	Vertical†	5 x 8 x 12 inches
Bradt		6 x 12 x 12 inches and 8 x 12 x 12 inches
Eberling	Horizontal*	4 x 5 x 12 inches
High Test	Vertical†	5 x 8 x 12 inches
MacIntyre	Vertical†	5 inches high, 4-6-8-12 inches wide, 8-10-12 inches long
Mouck	Horizontal*	4¼ x 5⅞ x 12⅛ inches
P-I-C-A-B-B-S	Vertical†	6 x 10 x 20 inches
Wightman	Horizontal*	5 inches high, 4-8 and 12 inches wide, 20 inches long

*Air space is parallel to long dimension. †Air space is parallel to short dimension.



P-I-C-A-B-B-S



MacIntyre

CHARACTERISTICS OF TYPICAL CONCRETE BLOCK AND TILE

Trade Name	*Dimensions of Ordinary Full Sized Block in Wall	Per Cent Air Space to Cross Sectional Area of Block	Average Weight of Block in Pounds	Cubic Yards Concrete Per 100 Block	Number of Block Per Cubic Yards of Concrete
Block—					
Anchor	8 x 8 x 16	30	56	1.45	69
Besser	8 x 8 x 16	31	54	1.4	72
Burrell Block	8 x 8 x 16	33⅓	48	1.24	80
Brandell	8 x 8 x 16	22	64	1.66	60
Climax Block	8 x 8 x 16	41	48	1.24	80
Flexo	8 x 8 x 16	33⅓	54	1.4	72
Hayden	8 x 8 x 16	33⅓	54	1.4	72
Helm	4 x 8 x 24	20	58	1.50	66
Hercules	8 x 8 x 16	22	64	1.66	60
Hobbs	8 x 8 x 16	33⅓	54	1.4	72
Hydrostone	12 x 9 x 24	50	64	1.66	60
Ideal	8 x 8 x 16	34	53	1.37	73
Perfect	8 x 8 x 16	33⅓	54	1.4	72
Republic	8 x 8 x 16	35	52	1.35	74
Zagelmeyer	8 x 8 x 16	42	43	1.15	90
Structural Tile—					
Besser	5 x 8 x 12	45	21½	.55	180
Eberling	4 x 5 x 12	32½	12½	.32	309
High Test	5 x 8 x 12	50	19	.49	203
MacIntyre	5 x 8 x 12	56	18	.47	214
P-I-C-A-B-B-S	6 x 10 x 20	50	50	1.29	77

*Trade or laid up dimensions.

A Country Bank Building

By Charles Alma Byers

ILLUSTRATED herewith is the attractive, well-planned and substantially-constructed building expressly designed and

erected as a home for the First National Bank of Ocean Park, California, a small beach town near Los Angeles. Two stories in height, the first floor is utilized in its entirety by the bank, and the second floor is devoted to business offices of various kinds.

The building is of brick construction, with an outside finish of white glazed brick, and the consequent porcelain-like exterior, together with the manner of laying the brick, produces a particularly neat and pleasing street effect. An especially interesting feature of the building, to be discerned from the exterior illustration, is comprised of the liberal introduction of large windows, by which the various divisions of the interior are given abundant natural light.

The flooring throughout, both floors, is of tile, and the walls are plastered and painted and finished with a marble base, while the woodwork is principally of mahogany. The counter and other partitioning walls of the banking quarters, on the main floor, are surfaced with marble, and the ceiling is finished in massive beam effect.

The building, occupying a corner, is 40 by 80 feet in ground dimensions, and possesses, in addition to the two stories above ground, a basement of the full foundation area, which is of concrete with a cement finish. It was designed by A. S. Barnes, of Los Angeles, Cal.

Lamps in Concrete

Chas. Cressey, architect, Los Angeles, Calif., writes: "Recently when passing several miles of pipe trench, I noticed a neat and effective treatment for maintaining a line of warning lamps in place. Each lamp base had been dropped into a square wood form and the oil container then surrounded by concrete to the height of the filler cap. This not only prevented overturning, but no doubt will add considerably to the oil-tightness and general life of the lamp without making the weight unduly cumbersome."

Beach Front Foundation Construction Revolutionized

By Mathias Krenn, C. E.

Well-Point Method of Lowering Ground Water Big Factor—Excavation Without Sheet Piling—Material Removed From Building Site Without the Use of Trucks or Wagons—Semi-Dry Excavation by Hydraulic Dredge

IN the construction of the new 17-story Ritz-Carlton Hotel, located directly on the beach-front in Atlantic City, now nearing completion, the long-established practice of founding every structure of size and consequence on piles has been abandoned and the structure is being carried on spread concrete footings poured directly on sand.

The "Ambassador" Hotel from the site of the Ritz-Carlton. The foundations of the Ambassador were excavated on the same principles as here described

The recently completed Ambassador Annex, constructed by the same company, was the first of the large beach-front hotels having its wall and columns supported in this manner. Both of these structures have basements 17 to 20 feet below boardwalk level and the elevator pit footings are carried to 31 feet below boardwalk level.

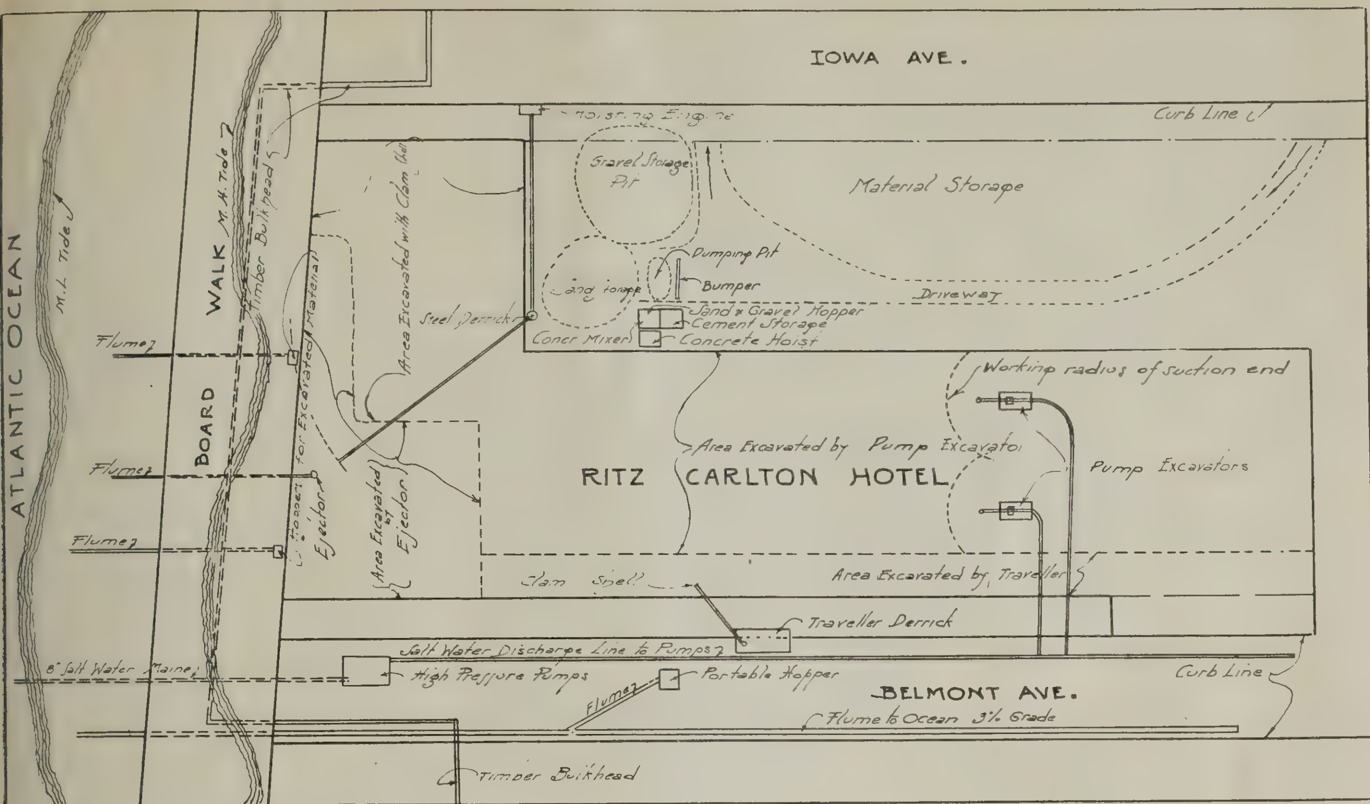
For a number of years in the past a contractor specializing in deep sewer construction used a patented well-point system for the lowering of ground water in fine sand. This method was used on the Ambassador Annex and is now being used successfully in a more highly-developed manner in excavating and placing the foundations of the new Ritz-Carlton Hotel.

On or near the beach-front the method of construction followed in the past, was to excavate to ground-water level, which was from three and one-half feet to four feet below street level, and then support the structure on piles. The well-point method demonstrated that ground water can readily be lowered 15 to 20 feet and kept at that level. After this is accomplished the whole process of excavation under water is reduced to the process of dry excavation and the work progresses as in ordinary dry soil, piling being eliminated, a whole basement story is added to the structure practically without any additional cost.

The test borings show that the soil is sand to a depth of 400 feet. The upper section is fine beach sand (passing through 50-mesh sieves), excavated banks standing on a slope of one in two and one-half, sometimes, almost vertical, without crumbling. (See slope of excavation, Fig. 2.)

The city building code specified piles to be driven for all beach-front structures. However, during the progress of the excavation, the compactness of the sand became apparent and the building authorities permitted the elimination of the piles after the bearing power of the sand was established in the following manner. A box about eight feet square was built (see Fig. 1), supported by four legs resting in sand, each leg having an area of one square foot. The load used was sand added in increments of about 3,300 pounds. Points were established on each corner, their elevation determined before the application of any load and observations were continued after the addition of each increment until the total load amounted to 47 tons, or 11¾ tons per square foot. The load applied the first day amounted to 42,500 pounds, producing a compression of seven-sixteenths inch. The following day 51,500 pounds was the load applied, which produced a further compression of one inch. The morning of the third day of the experiment observations were taken, but no further settlement had occurred. The area on which the bin rested was then flooded as the soil in its final conditions will be under water, no settlement occurred under these conditions. The total compression produced under a load of 47 tons was 1½ inches.

Essentially, the well-point outfit consists of the following: The suction end is a 1½-inch pipe 30 inches long, the whole surface of which is perforated by ⅜-inch holes; the inside lining being lined with 60-mesh screen and the outside wrapped with a protection screen of ⅛-inch perforations.

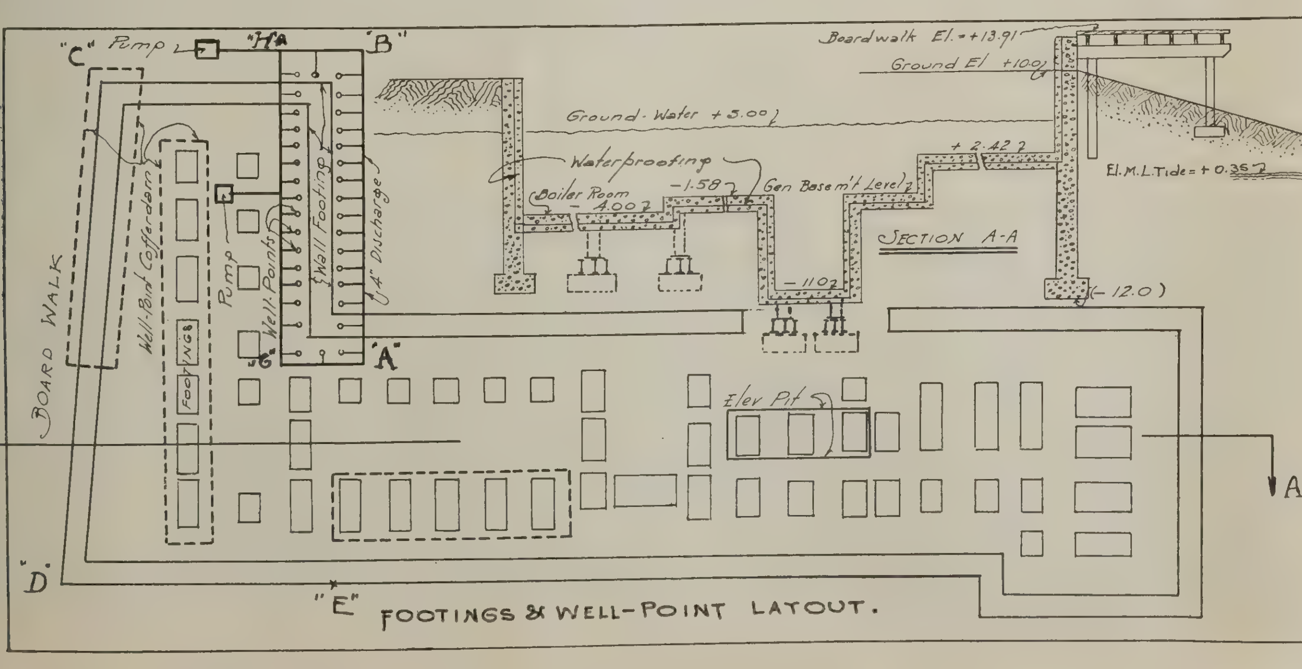


The lower end of the pipe terminates in a sharp point which facilitates its placing. The well-point is attached to a 1½-inch pipe 8 feet to 20 feet long. These lengths are then jetted to the required depth by means of a 1½-inch jet pipe supplied with water at 40 pounds' pressure in a manner similar to that employed in jetting a pile. The well pipe is then attached by means of a wire-covered 1½-inch flexible hose to a 4-inch steel pumping main, which in turn is attached to electrically driven pumps discharging by pipeline to the beach. In spacing the pipes the main factors considered were the area to be kept dry and the depth to which a given footing was to be excavated.

In the construction of the Ambassador Annex a single ring of well-points encircled the whole building site. After excavating by means of a guy derrick and clamshell bucket to about 4 ft. below street level, the 4-in. steel main was benched and the well-points jetted into place, allowing sufficient working space between the well pipes and the exterior footing line. The excavated material in this case amounted to 13,000 cu. yds., all of which had to be hauled by wagons and motor trucks.

Sketch No. 1 shows a general view of the building site and plant layout of the Ritz-Carlton Hotel. Dash lines indicate the areas excavated by each of the methods employed. To prevent the flooding of the basement during construction by high tides, which usually occur during the fall and spring of the year, a timber bulkhead was erected. By means of the wooden flume all the material excavated by the traveler derrick and by the two-pump excavators, was discharged to the beach. The high-water line shows that ordinary high tides encroach beyond the building line.

On sketch No. 2 are shown footings, arrangement of well-point layout and a longi-



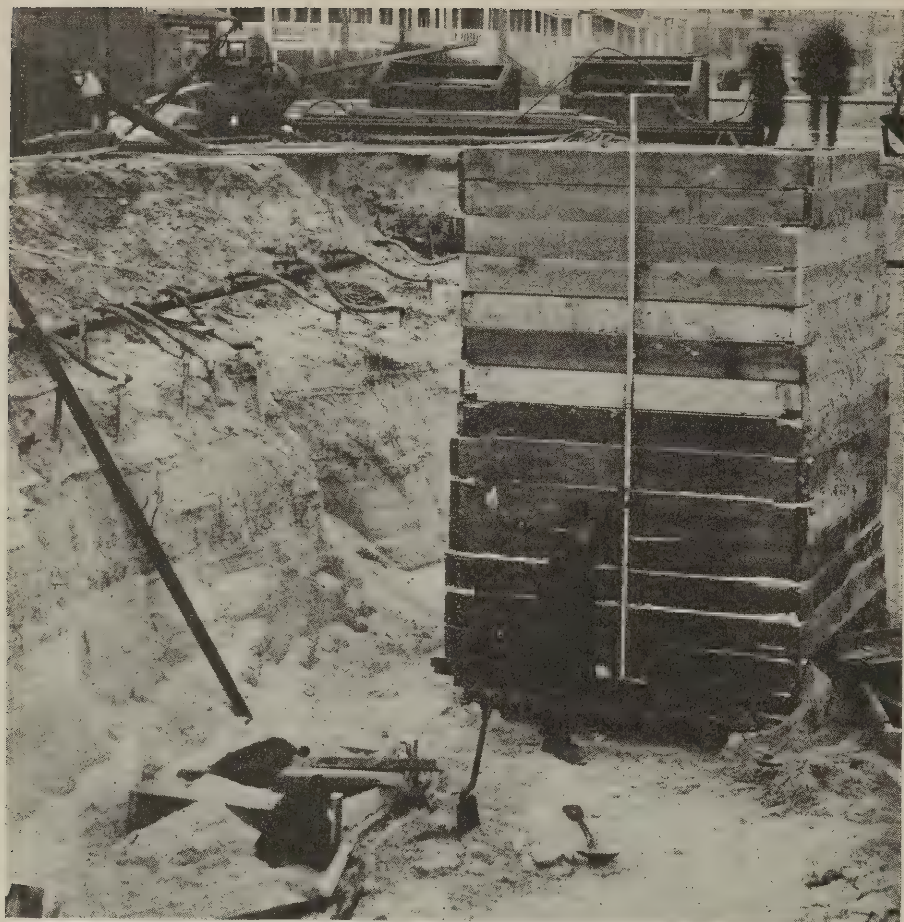


Fig. 1—Showing test-box and part of the ring of well-points in floor around the whole perimeter of the Ambassador-annex site

tudinal section through the foundation showing method of construction and the difference in elevation existing between points of completed basement floor and original ground elevation.

In contrast to the single ring of well-points used on the Ambassador Annex, a single footing or a group of footings were taken at a time on the Ritz-Carlton job, as shown in the accompanying sketch. The same course was followed for the footings of the grillage bearing walls, for which a section 50 to 75 ft. long was usually taken when there was no variation in the elevation of the footing. Otherwise, the length of the wall section taken was governed by the change of elevation in the footing. After the site had been excavated to general basement level, work was started on the wall and pier footings, starting at "A" sketch No. 2, thence working to "B", "C", "D" and "E."

The 4-in. main (A B G H) was put into position first; then the well-points were jetted down at intervals of about 4 ft. and to depths varying from 8 to 16 ft. However, no definite standard of spacing the wells was adopted since the system is flexible to a high degree. For example, if one unit were not sufficient to lower the water fast enough, another 4-in. main was laid alongside the first and well-points placed between those already in position. In several cases where the footings were exceptionally deep, several tiers of points were usd. The rate of lowering the water necessarily varied with the number of points put into operation and with the head governing the level of the ground water. Two and one-half feet per hour is possibly the best which was accomplished when the lift was from 10 to 12 ft. and the total height from discharge to foot of well was 28 ft.

EXCAVATION

General excavation of the site was started at a point approximately in the center of the lot and work progressed towards the beach. The base of the "EL" was completed first. The excavated material amounted to 20,000 cu. yds., of which 17,000 were removed from the building site without the use of trucks, the remainder being used for back-fill. Of the 20,000 cu. yds., 60 per cent was excavated by dredge pumps, 30 per cent by ejector excavator and 10 per cent by traveler derrick with clamshell bucket. See Fig. 3.

The excavator pumps (see Fig. 4 and sketch No. 1) consisted of electrically driven centrifugal pumps mounted on platforms. The sand near the suction end was constantly churned up by two 2½-in. fire hose jets, using water supplied from a motor-driven high-pressure pump. The suction end being set below sea level was always primed and discharging at the rate of 1,200 gallons per minute at a 160-ft. head. The sand was discharged through a 4-in. steel main into a V-shaped wooden flume emptying on the beach. The flume was carried on a trestle along the Belmont Avenue curb. The grade of the flume being only 3 per cent it was necessary to play additional streams into it in order to keep the discharged material moving.

The traveler derrick discharged into a portable hopper (Fig. 3) into which a 2½-in. fire hose was constantly discharging, washing the sand into the flume already

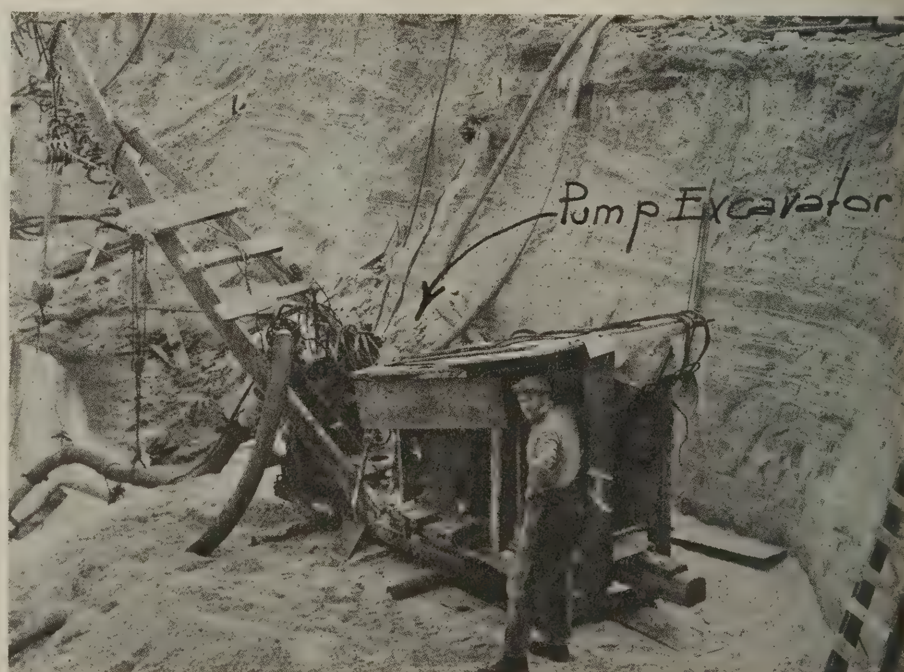


Fig. 2—Note condition of bank as indicated by the slope of the ladder

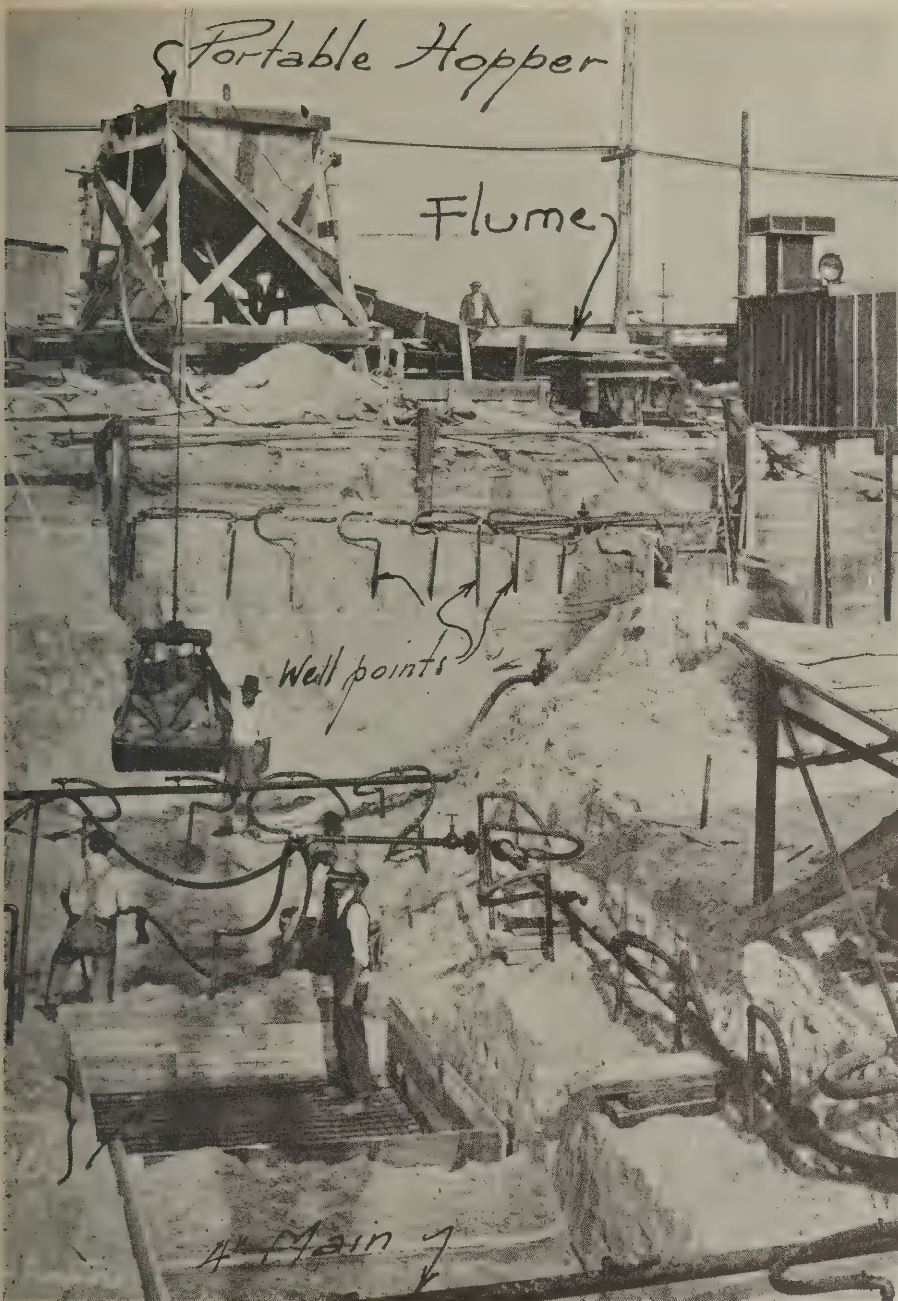


Fig. 3—Excavation for footing

mentioned. Two hoppers built directly on the Boardwalk received all the material excavated by guy derrick and clamshell bucket whence the short flumes carried it directly to the beach.

About 30 per cent of the excavation was done by an ejector (see sketch No. 3). The arrangement consisted of a 4-in. riser pipe a 2-in. jet pipe attached to the riser, the lower end of the jet pipe being turned up in such a manner that it discharged directly into the riser. A 2-in. horizontal jet pipe was inserted into the tee head of the riser and facing in the direction of the discharge. A booster pump drawing from the 8-in. salt water main supplied the two streams at 160-lb. pressure. The ejector outfit proved to be very simple and efficient. It was jetted down to a distance of 15 to 20 ft. (see sketch 3) and sand washed to the suction end by means of a 2½-in. fire hose. After the area surrounding it was excavated, the outfit was pulled up and jetted in anew and the process continued. The volume excavated was probably about 15 cu. yds. per hour.

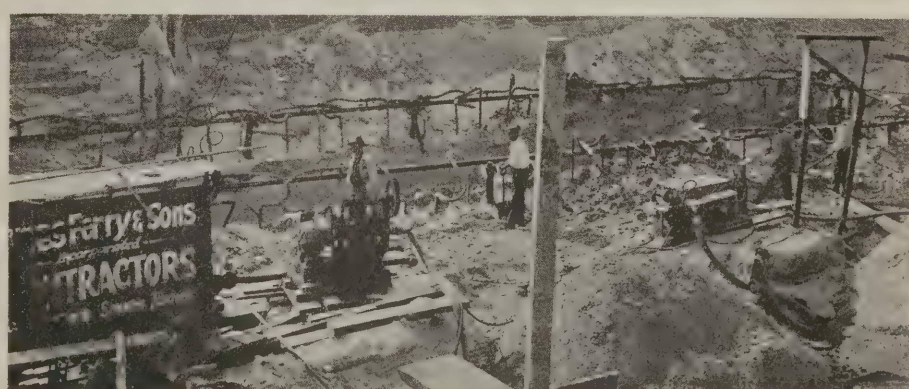
After completing the footings in the area (A B C D E) and carrying the concrete walls to grade (sketch No. 2) sub-drainage was installed in that portion; sub-floor, waterproofing and finished concrete floor placed, and work was started on the rear portion of the building.

For the reception of grillage beams, a concrete receptacle was built on top of the footing to a point which was level with the waterproofing of the adjacent floor. Copper pans were placed under all interior grillages and waterproofing applied in such a manner that it could readily be joined to the waterproofing of the basement floor. It is intended that the water collected in the sump pit from the underdrains will be used for service purposes in the hotel. Drinking water will probably be obtained from an artesian well driven to a depth of 800 ft. to which depth it is necessary to go in this locality to find sweet water bearing soil.

Both the Ambassador Annex and the Ritz-Carlton hotels are being erected by the Thompson-Starrett Co. as general contractor. Warren & Wetmore are the architects. The excavation work and the installation of the foundations was handled by James Ferry & Sons as sub-contractors, under the supervision of James V. Ferry.

Offers $1,000 for Lumber Saving Machinery or Method

A prize of $1000 is offered by the National Lumber Mfrs. Association, Washington, D. C., for the best new method, new machinery or new device which in practical application or use will result in an appreciable saving of labor, time, material and expense when applied to present manufacturing processes in the lumber industry. The purpose of the contest is to promote the reduction and elimination of preventable waste in the production of lumber and to develop more efficient utilization of unpreventable waste in the lumber industry.



Well-point ring in position for wall section

Fig. 4—General view showing banks with surcharge standing without sheeting

Year-Round Occupation in Building

Proposed by D. Knickerbacker Boyd

IN addressing the recent conference called by the Industrial Relations Committee of the Chamber of Commerce of Philadelphia, D. Knickerbacker Boyd in the Bulletin of the Master Builders Exchange of Philadelphia, writes that he stated that the first and foremost need in the building situation is a real co-operation that should include everybody connected with the construction industry. Mr. Boyd refers particularly to Philadelphia, but his suggestions are applicable to the entire country, and the verbiage of his article is changed accordingly from the text in the Bulletin. A group congress or tribunal, says Mr. Boyd, should be organized at once in every city to consider all the problems connected with building and related construction as we ought to get under action without delay. Mentioning them in their order of appearance on the scene, the group would include realtors, architects, engineers, builders, sub-contractors, material men, working men, and the final owners or tenants.

The prices of materials and the wages of labor should first be stabilized on a sound and fair basis. The wages of workingmen should be worked out not by them alone, but by the group in unison and all wages should bear a proper relation to one another, taking into fullest consideration the periods of unemployment in each building trade during an entire year as well as the required training and the acquired skill.

Fig. 5—1, elevator pit; 2, arrangement to receive grillage beams

Fig. 6—Showing well-points in place for walls and footings

The easiest way to overcome the great amount of unemployment in the building trades would be to so arrange it that employment would be nearly continuous. That would mean a building construction program that would be carried on as far as possible throughout the entire year. We should not allow such a condition to exist longer as has prevailed up until the present moment, when, after the first of November or December, there is nothing doing until after the following March or April. This has been largely a psychological condition and is a great and vital mistake in the building industry, one which makes for unemployment, holds back construction, decreases the productivity of labor and reflects upon American industry.

We should all get together and discuss these problems and do it at once so as to be able to say to the consuming public, "These are the prices of materials, and these are the wages which will prevail—not next May, but now!" And for the future, I suggest that such matters be taken up by the first of November or the first of December, so that a building construction program can be drawn up applicable to the next calendar year and advantage taken of the fair weather of all winter months. If we do this, it will be possible to decrease the cost of production from every standpoint. It is not generally realized that the workingmen in the building industry do not get what they seem to get, namely, a certain rate per hour, since that rate must take care of the enforced periods of unemployment that actually exist during each year in most of the trades.

The periods of unemployment are not caused solely by weather conditions which, however, are the chief contributing factors. Some others are the lack of co-ordination of structural facilities and lack of co-operation between all those engaged in building.

These causes are due largely to archaic methods, poor management and scheduling of work, materials not being available when needed, lost time in waiting from either cause, men looking for work while employers are looking for men, sympathetic strikes, and others.

Unemployment is one of the discouraging demands which keeps new men from entering the trades and is driving experienced men into steadier occupations who should be every encouragement to stick at building.

I like the following quotations from the progressive program submitted by the Council of the Associated Building Trades to the Trades Relations and Policies Committee of the Philadelphia Builders' Exchange, which are particularly applicable to this brief paper, as well as to another which will follow on "Increasing Opportunities for Employment in the Building Industry."

"The public expects lower building costs and honest building. Builders and building trades must rise to the occasion and put their industry on an efficient basis which will induce an immediate resumption of building."

"Just think over what the loss of real working days mean on a building job. Days which men in continuous employment earn money. Everyone knows that regular full-time pay envelopes mean satisfied workers. A man spends more loafing than when he is *working*. Most building trades lose from

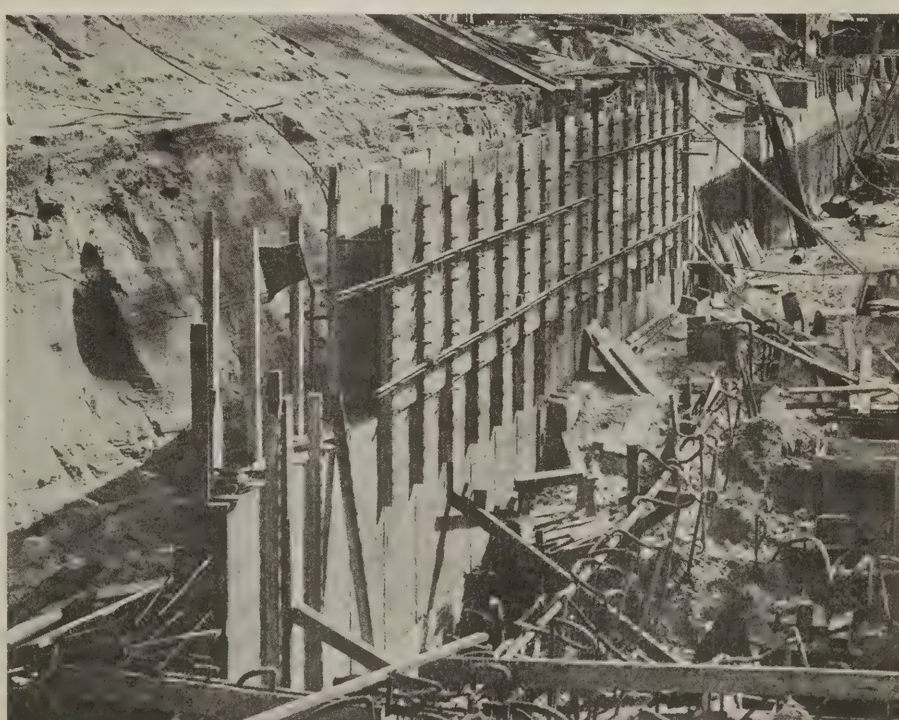
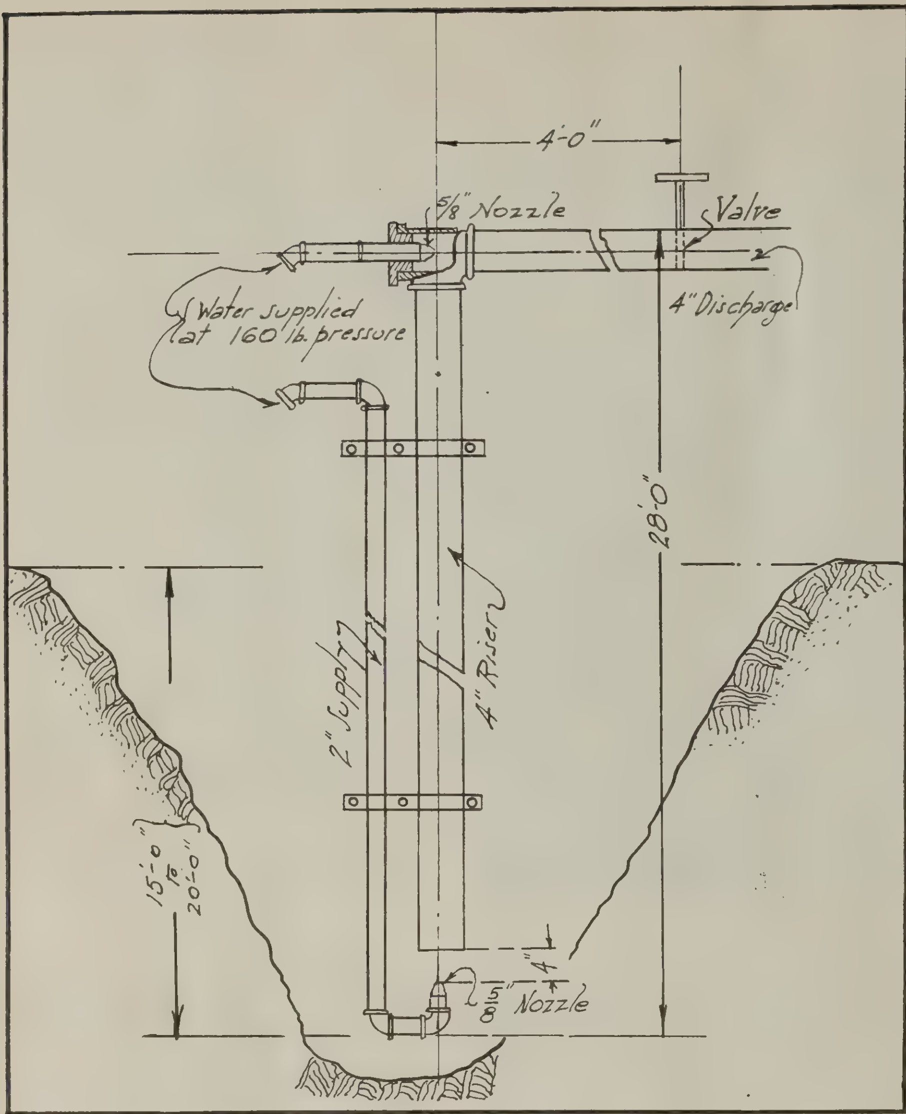


Fig. 7—Showing patent concrete forms in place used for high wall sections



Sketch 3

75 to 100 working days a year. It is our duty to both employer and employee to eliminate some of the causes of this wasted time."

"Our industry has never marketed its service and workmanship along modern merchandising lines. It is up to the industry as a whole to come forth with a constructive selling program and educate the buyer and worker to the best construction, working conditions and safety to the public. Think of the romance of our business. Our men working high in the air juggling heavy materials and how seldom an accident to the public has occurred through carelessness. Many accidents to the worker have happened because of failure of employers to provide safeguards or scaffolds for them. Let us have a real 'safety first' movement on our work."

"A sound, practical program must be worked out to provide for greater activity and demand for our product. Build up the off peak business; the retail end needs intensive developing; the service part, too, has been untouched. After we finish the erection of the monument—time, weather and unforeseen causes hasten depreciation—let us not wait until it falls down and they come to look us up before we recommend maintenance and repair work."

"It is our duty to bring our industry from the most wasteful and poorest paying class into the most efficient class and at least let us make it a good paying business for labor and capital alike."

I offer the following suggestions for consideration in connection with the problem of unemployment.

That the group referred to should act as a central bureau through which, voluntarily, all construction programs should be cleared including national, state, municipal and private work in the territory. Suggestions could be made for co-ordination of activities, allocation of materials and reduction of estimating costs. Local production could be encouraged, rail hauls shortened, traffic congestion lessened, a constant labor survey could be maintained to the advantage of employer as well as employe, good management promoted, efficiency encouraged, apprentices attracted to the trades, educated and properly trained, and increased production would result all around.

In such a program our vital necessity is also to educate the public to a sensible distribution throughout the year, of its construction demands and requirements. This applies equally to city work, industrial construction, semi-public buildings, residences and household repairs and maintenance.

Instead of crowding our main construction work into seven or eight months, that which could possibly be deferred and done during the remaining five months should be so scheduled.

Owners making interior alterations or slight additions to buildings should be encouraged to have such work done in the "off-peak" season. Old buildings demolished to make way for new ones should be torn down in cold weather in advance of the new construction without being done as is so often the case at the time when the new building itself ought to be under way.

Existing office buildings, commercial establishments and similar structures should be painted outside and refinished inside at times when painters are least busy on new work.

The same argument applies to the paper hanging and refinishing of apartment houses where another element enters, namely, the termination of leases. It has even been suggested to realtors that the leases be staggered in dates instead of falling with such unanimity on October 1 of each year.

Householders, instead of having spring housecleanings or fall housecleanings, would find it advantageous to be more constantly and less periodically "cleaned" so that paper hanging, painting, plastering and other needful work could fall on the workers like the gentle steady rain instead of in downpours with subsequent dry spells. Wiring of old residences for electricity might well be done in January, February and March, when electricians are usually out of work on new construction.

Surveys should be made of all structural requirements of the locality and of all trade conditions of unemployment and the two fitted together in the very best manner possible. It will be necessary, as stated, to educate and inform the public as to the needs and advantages of its co-operation in such a program. Civic clubs and others will afford good forums and it may be advisable to advertise. Certainly the necessities of the occasion must be forcibly and frequently presented. The public will surely respond.

After it overcomes some prejudices and breaks some habits it will place orders with the heating contractors in the spring to have its apparatus and flues attended to "some time" during the summer instead of waiting until the last moment in the fall.

The public will appreciate having its attention forcibly called to the fact that by complying with common sense requirements, f not with ordinances, and having covered metal containers for the ashes from every household it will afford employment to the metal workers in their off-building season, while at the same time lessening fire and life losses, street litter and disease.

Other instances might be cited applicable to the carpenter, the slate roofer, the stone cutter and other trades, the most difficult to provide with off-peak employment being the bricklayer. But through proper co-ordination of public and private construction, scheduling of interior work, sewer construction, boiler setting and other vocational opportunities his, with all the other trades, can be greatly benefited.

Let us hope, at any rate, that intelligent and intensive study of the whole building industry may soon be undertaken not only locally, but nationally.

Questions, Answers, Kinks and Discussions--V. L. Sherman, Editor

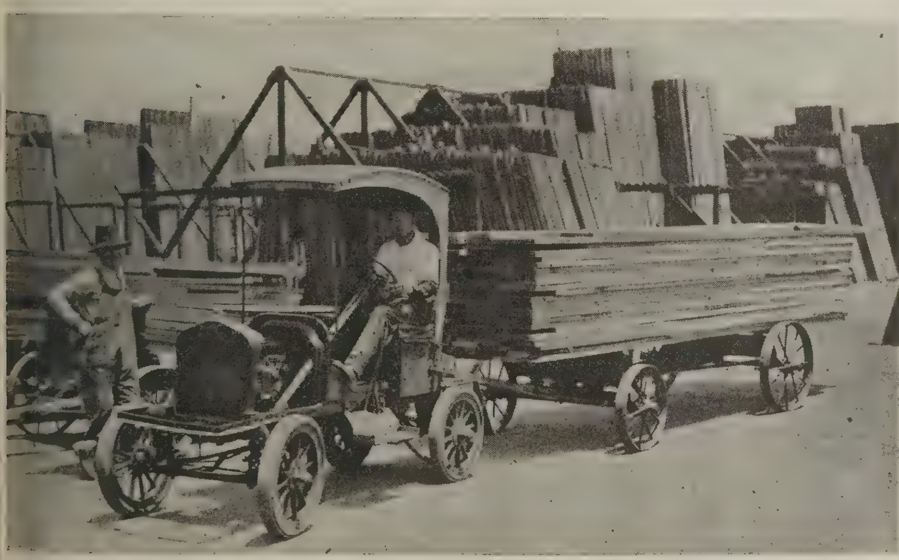
Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

One-Man Trucking Outfit for Hauling Building Materials

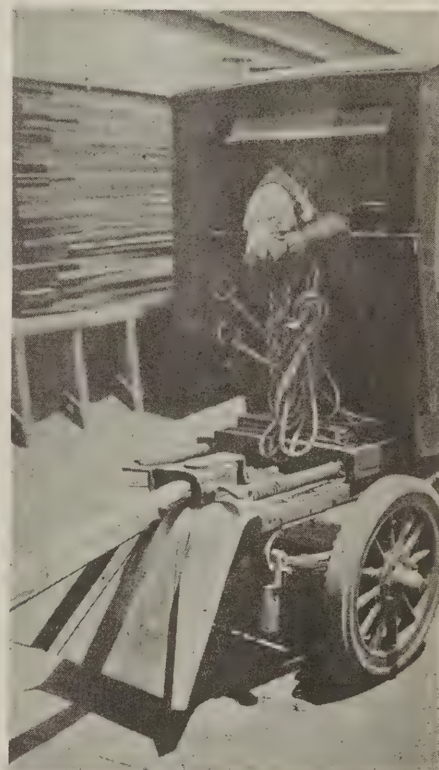
Builders and other handlers of large quantities of building material will find in the carting arrangement used by the Hammond Lumber Company of Los Angeles, a practical means of enabling one man to do hauling by means of a modified Ford and a trailer. What the lumber company has done, and what any concern having considerable short-haul work to do could likewise undertake, is to make over a Ford car into a truck with solid tire wheels, low-gear chain drive and a special coupling device at the rear by which one man can make connection with a trailer without getting out of his seat.

This coupling device consists of a sheet-metal apron attached to the rear of the truck and slanting outward at the lower end, which comes within about six inches of the ground. Angle-iron guides riveted to the apron form an inverted V which is an essential feature as will appear later. The low trailers onto which lumber or other materials are loaded are each provided with a tongue held in a horizontal position by coil springs. When the driver of the power unit desires to couple onto a load ready for delivery he merely backs up to the trailer until the tongue strikes the inclined apron. Then by backing a few inches more the tongue is made to slide up the apron and into a spring-operated catch which locks it securely. When it is desired to disconnect tongue from the tractor the driver has only to operate a releasing lever beside his seat.

The spring-operated catch is mounted on a pivot so that it will turn with the tongue as the vehicles round a corner. Two large coil springs, one attached either side of the pivoted catch tend to hold it in position so that no adjustment is needed when it is desired to connect up with a trailer.—*John Anson Ford.*



One-man trucking unit equipped for trailers to be coupled and uncoupled without driver leaving his seat



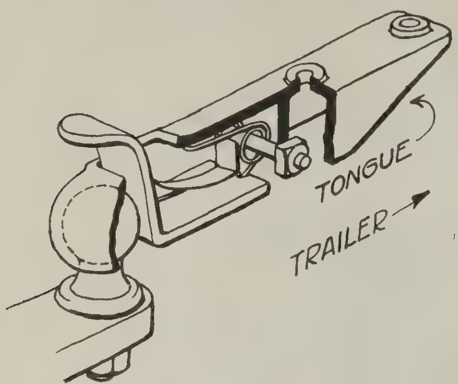
Automatic hitch. Showing apron by which trailer tongue slides into spring catch

The Trailer

After looking over the contribution on trailers from Los Angeles, like all the rest of us, I have to dig up something that I like myself. This is a little ball and socket joint which make about the easiest hitch and unhitch. A friend has used one on his camp trailer, hauling it over the country from one end to the other behind his "big six." The name on the casting is "Bruce Automatic Coupler Co." but while I cannot find it in the current "Chilton" I believe it is made by a Minneapolis firm.

Most users of Henry's car believe they

will pull anything and a close coupled trailer gives the amount of traction necessary to deliver the power to the road. Hence the popularity of two-wheeled trailers. If the two-wheel trailer is properly balanced, a heavy load can be towed with just enough

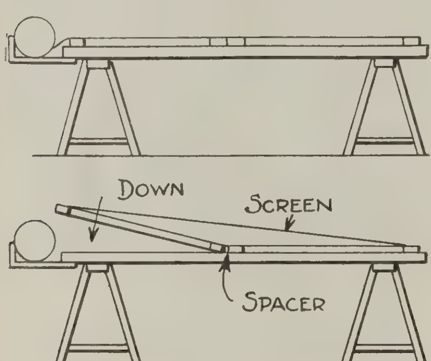


An automatic coupling device

load on the rear axle of the car to give traction. There are also two-wheel pipe and pole trailers. Four-wheel trailers are used with radius axles; with crossed couples that make them track; and some that haul but don't track.

Useful Toggle for Stretching Screens on Frames

"Give me a place on which to stand and I can move the world." Levers are a great thing and here is one that may prevent some cramped fingers and improve appearances. August Mathon, of Grant City, S. I., writes: "It may be of some help to the readers of National Builder to know of the method I have employed with success for stretching wire screens on the frames.



Screen stretcher

"I place two frames at a time on the bench and tack the wire on both ends, tacks being 2 inches apart. Then I raise one end up, say, 18 inches or two feet, and place between the two frames a thin strip, ⅜ or ½ inch usually, and let the end of the frame down again. The result is surprising. The enclosed sketch will no doubt be sufficient to understand how simple this method is and what a time saver it is on a big job.

"It is advisable to lay the frames so that the top rails, usually 2 inches wide, meet, the waste being only about 2 inches in that case."

Framing a Door

S. L. Black of New London, Ohio, writes us as follows: "I am sending you some ideas which I have used and proved good.

"Fig. 3 shows how I set a frame. I make a template ⅞ inch thick and set the frame in the opening and put *X* tight against the casing that makes it line up with the wall. Then bring the jamb against *V*, nail to the floor and there you are. I use 1⅛ inch

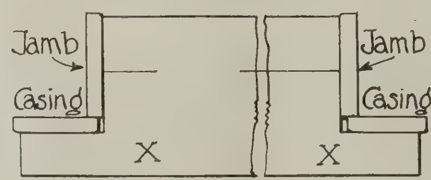


Fig. 3—Setting a door frame

jambs and set the casing back ⅜ inch to clear the hardware, also to give a good hold for the screws.

"I gauge the frame and case one side before setting and sometimes fit and hang the door in the shop. The man who started to set the jambs in the opening would not last an hour with me. Time is money and the man who 'gets results' gets the job.

"I never use grounds in door openings. If studs are bent grounds will be. The mason follows the grounds and casings will not fit. With the temporary jamb all curves are straightened and casings will fit flat. Jambs can be taken out and used again. (See Fig. 4.)

"Fig. 5 shows a corner as I finish it. The

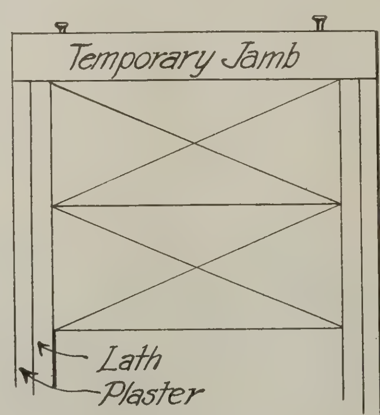


Fig. 4—Temporary door jamb

bead forms a straight guide for the mason and takes all the hard knobs and makes a smooth rowel corner to paper over."

Flashing and Condensation

Mr. Charles Cressey's talk on "Firewalls and Dampness" in last month's issue brings to mind a case put to a builder last spring by the owner of a new house. It was shown that the plaster near the soil pipe (which passed through the roof just above the staircase ceiling), showed dampness for about a foot below the ceiling. The builder fixed the flashing without result. About the

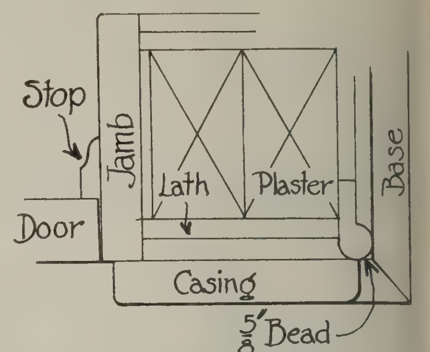


Fig 5—Finishing corners

same time a slight odor became noticeable in the basement. Both basement drains were inspected and one was replaced. Again no good result. Then during a mild spell the furnace was shut down and the basement cooled. It was immediately apparent that while all partitions and walls were supposed to be sealed from the basement there was enough space open around the stack to allow the warm air from the basement to rise and the chilled air from the top to fall, because the odor now leaked into the bathroom. The condensation had caused the moisture on the plaster and any breeze sufficient to produce pressure in the stack had caused a small leak at the upper end to give off the odor below the roof. After repairing the pipe it was insulated for a few feet below the roof, and this proved effective in remedying the dampness.

Diamond Dog Leg Spouts

A recent inquiry as to cuts on th diamond dog leg spout has been turned i for me to bite on. I am sorry no exper enced millwrights have replied to the quer but if my figures prove open to criticis it might start an argument worth while.

Figure 6 shows the three views of spout of short length. In the plan vie swing C-D-H-G around to C1-D1-H1- and drop it to the lower view as show When this is done draw a line throug D1 perpendicular to C1-G, and through H perpendicular to C1-G. From C1 and lay off arcs with radius equal to the si of the hole, that is, equal to G-H, so th they strike these perpendicular lines. No you have D2 and H2, and the parallelogra C1-D2-H2-G is the correct shape of tl side member. The same thing is repeat for the side B-F-G-C.

However, I believe that if the holes a cut a line may be extended between tv corresponding corners (see Fig. 7), and clean board be lined up on the edge of t hole over the cord. A line could be trac

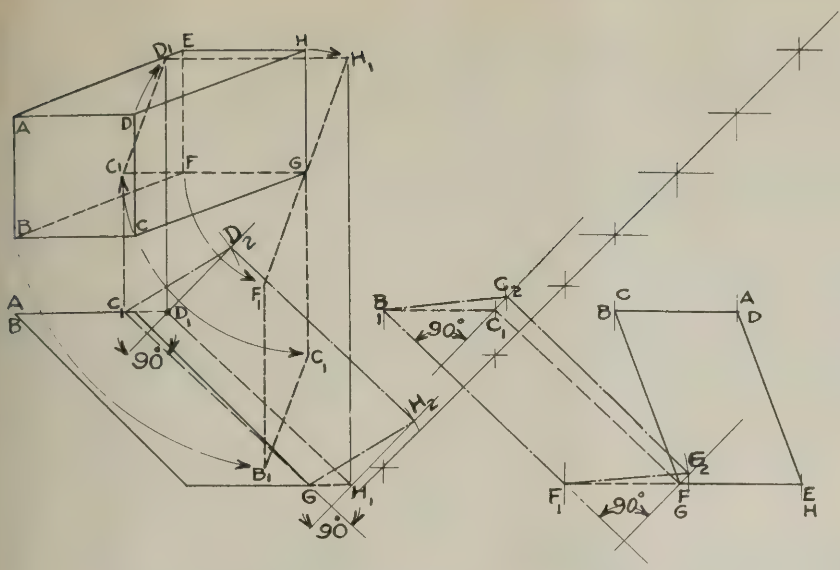


Fig. 6—Cuts on diamond dog leg spouts

and the cut made so as to mark the slant at the lower edge.

While this is a good problem in descrip-

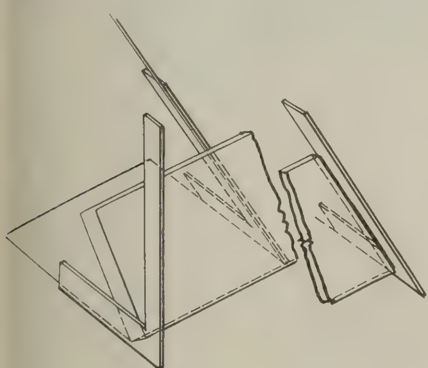


Fig. 7

tive geometry better results should be obtained on a floor layout.

Framing Rafters

A. R. Lougee, Laconia, New Hampshire, writes as follows: "I have read in National Builder from time to time articles on rafters, written by readers. Some are of the opinion that their method of framing rafters is the best way because they have tried it in practice. All of the carpenters will agree that the steel square is the most useful tool in striking out rafters. Opinions differ, however, about the best method of finding the length of a rafter. My method consists in the use of a chart. By the use of the accompanying chart we may obtain lengths of common and hip rafters in a few seconds. The figures at the ends of the oblique lines at the right are the rise of the rafter in 12 inches of run, those at the top of the chart for the hip rafters or the rise in 17 inches. The span of the building is at the bottom of the chart and is scaled to feet and tenths of a foot. Should a building be more than 20 feet, take one-half of the span of the building and double the reading. The scale at the left gives the length of the rafters. A conversion table is at the left of the chart. For a square pitch hip roof 11 feet 4 inches wide, the common rafter is 8 feet long and the hip is 9.8 feet as shown by the dotted lines and arrow heads. From the conversion table .8 equals 9⅝ inches; so the length of the hip is 9 feet 9⅝ inches."

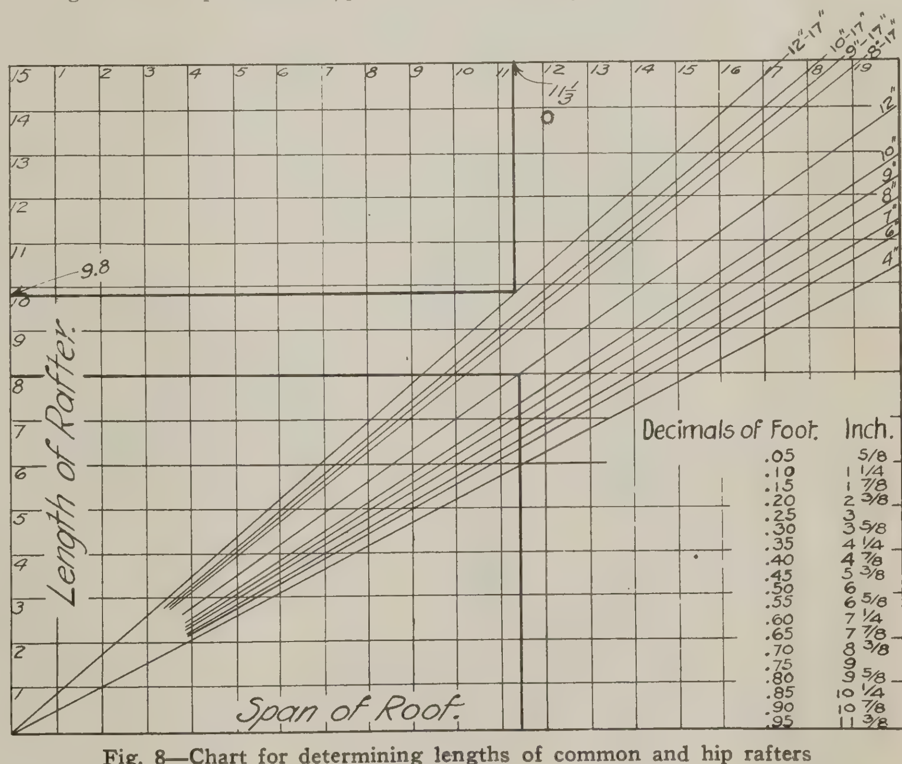


Fig. 8—Chart for determining lengths of common and hip rafters

Diagonal Boarding

C. E. M. of Los Angeles, writes us: "The discussion about "Diagonal Boarding" in the April number, page 43, rather amused me and I must take exception to the idea that because floor nails do not reach much more than through the floor lining they hold as much if driven any old place and do not hit over a joist. If anyone has ever tried to draw flooring together by nailing they invariably discover that a nail over a solid bearing will certainly draw better than if driven between bearings, which proves to me that they hold better. How about it?"

Wants Book on Drafting Room Practice

L. E. Lucas, an architect of Petersburg, Va., sends in the following inquiry: "I want to get a book of drafting room practice, if there is such a book published. I have never heard of such a book, but it occurred to me that some of the old heads had perhaps jotted down some of the little kinks and short cuts, that they have discovered in their practice, and gotten them out in book form."

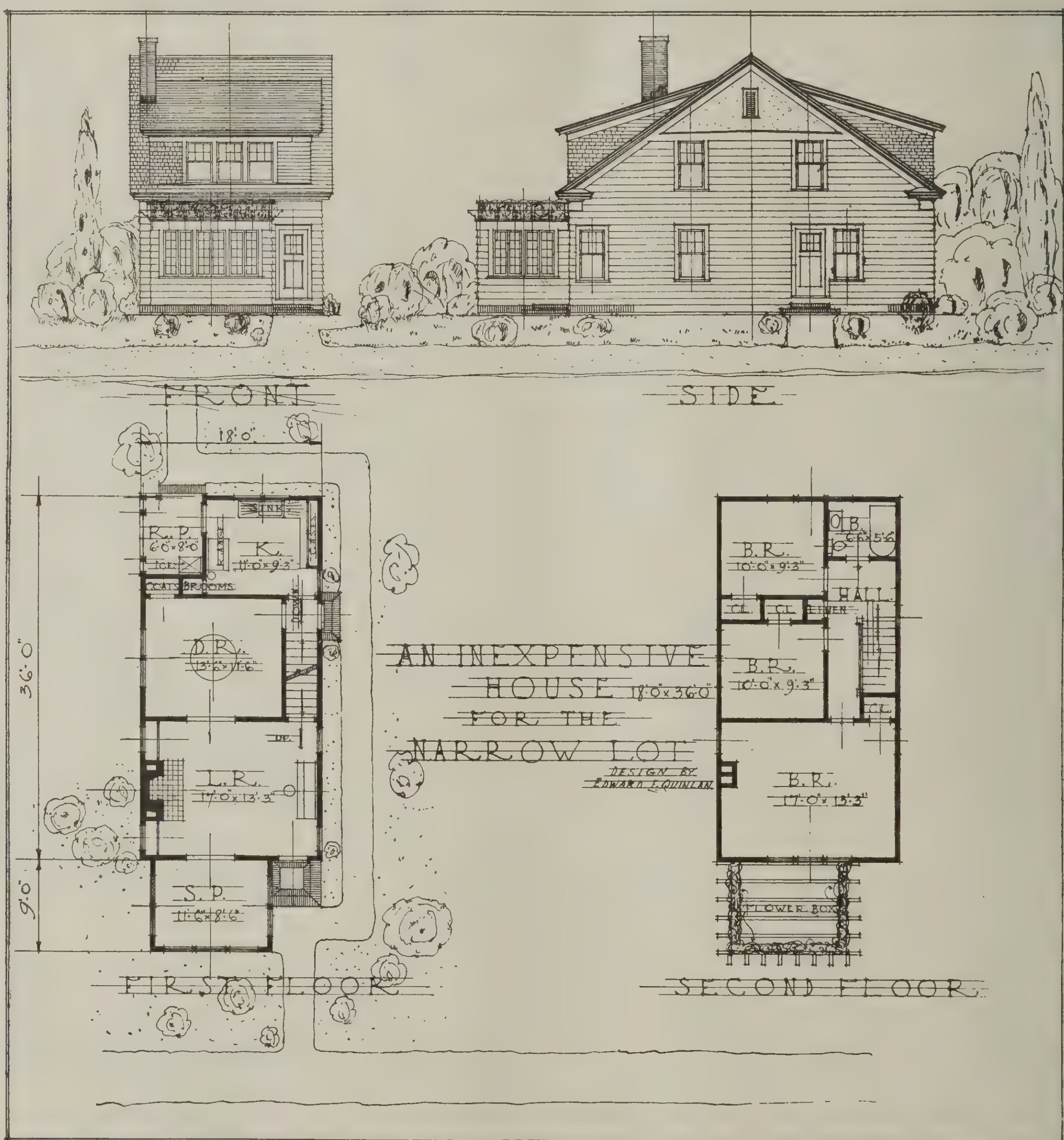
Letters to National Builder

A good many of our readers seem to be afraid that their names will be used when they write their opinions to the editor and therefore sign themselves "subscriber" or give initials but do not give their name or address. It is absolutely necessary, however, that all communications have the writer's name and address appended. That, however, is merely for the editor's information. If you do not want your name or address published, all you have to do is to say so and your story will appear with the name and address suppressed. There may be a great many things you want to know about or express an opinion about, but you may not want everyone who reads this paper to know your affairs, neighbors particularly. Just consider the editor your confidential friend. Your confidence will be respected. Give your name and address and mark "name and address not for publication."

An Inexpensive House for the Narrow Lot

By Edward F. Quinlan

THE house for the narrow lot must be designed especially for it. This means that many of the little conveniences which

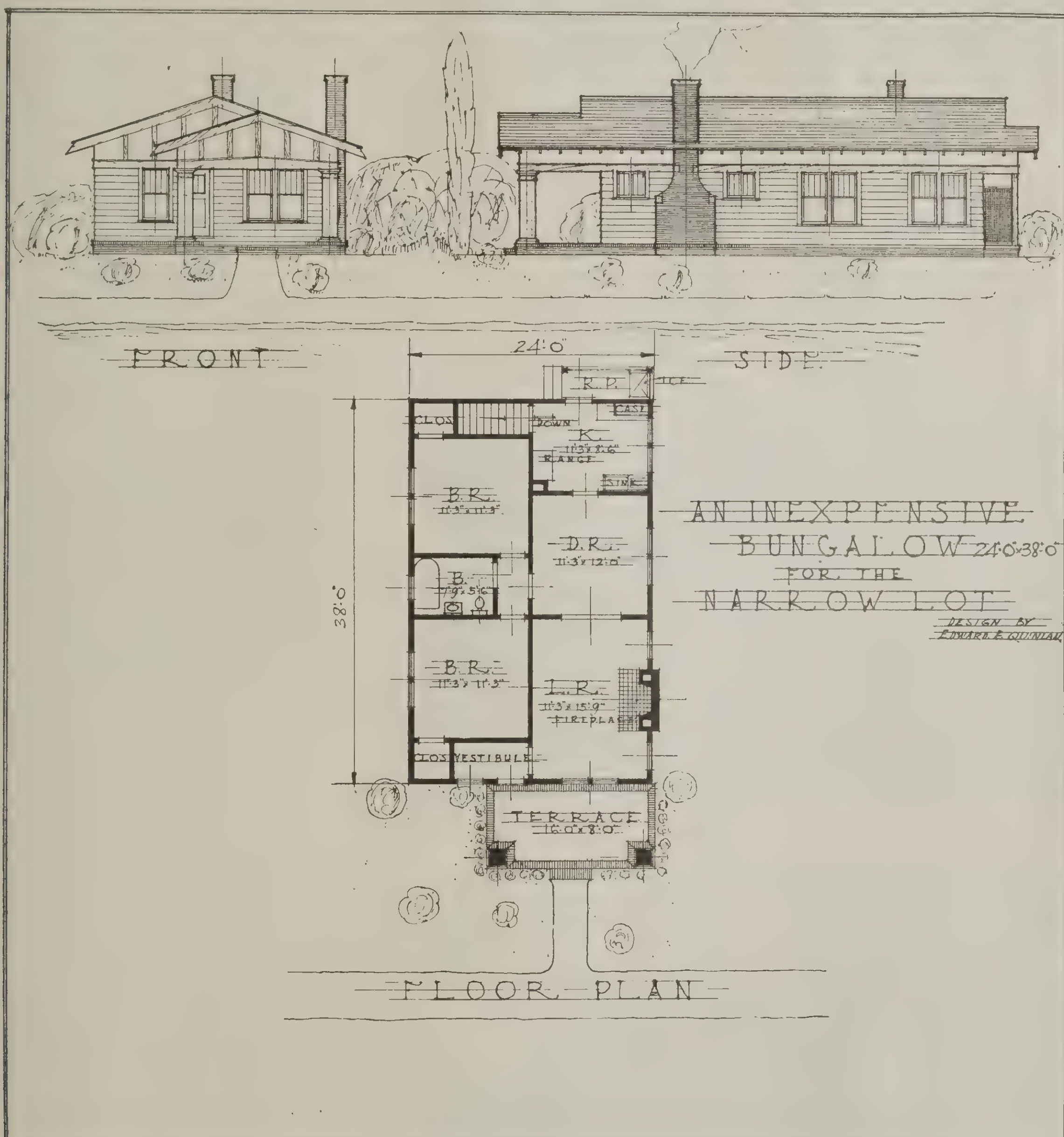


the designer loves to put in must be omitted, but the rooms themselves can be so planned as to be of a comfortable size and livable. In the mind of the writer, an individual house, however narrow, is to be preferred from the standpoint of light and ventilation to a unit in a row of attached houses.

In Fig. 1 we have a dwelling just 18 feet wide. A house this narrow is possible only where two stories are used. The rooms are on a line, one behind the other, with living quarters downstairs and the sleeping rooms and bath upstairs. This house can be placed on a 25-foot lot and still have ample room for passage on either side. The living-room is 17 ft. 0 in. by 13 ft. 3 in., a good-sized room with plenty of space for furniture. There is a large fireplace, with built-in bookcases which are optional with the owner. The sun porch also is optional and can be added at a later date if desirable; it measures 11 ft. 6 in. by 8 ft. 6 in., and has plenty of window space, with French doors opening into the living room. The dining room is 13 ft. 6 in. by 11 ft. 6 in., has a large double window and room for a buffet, with space also for a closet if desired. The kitchen measures 11 ft. 0 in. by 9 ft. 3 in. In this laboratory of the ıome every effort should be made to supply ımple storage space for utensils and sup- ılies, and to eliminate as far as possible ınnecessary steps by the proper arrange- nent of range, sink, table, and cupboards n relation to one another.

On the second floor are three bedrooms vith the bathroom and hallway. Each bed- oom has a clothes closet, and there is a nen closet in the hall. The bathroom is mall but conveniently located and well ar- anged.

Fig. 2 shows a five-room bungalow which an be built on a 25 or 30-ft. lot very com- ortably and still have room for a passage-



'ay at one side. It is 24 feet wide and 38 eet deep. A small vestibule opens into the ving room from the large open brick orch floored with cement. The living oom, 11 ft. 3 in. by 15 ft. 9 in., contains a ırge fireplace and affords plenty of wall pace for the advantageous placing of fur- iture. A wide cased opening or colonnade gives access to the dining room just beyond, which measures 11 ft. 3 in. by 12 ft. 0 in., and contains a large double window. The kitchen is lighted from two sides and has plenty of cupboard space. The cellar stairs open off this room. A latticed back porch affords shelter for the icebox.

The sleeping quarters are reached by a small passageway opening off the dining room. These bedrooms each measure 11 ft. 3 in. by 11 ft. 3 in., and are provided with a clothes closet apiece. The bathroom is located between the two bedrooms and has ready access to the rest of the house.

In addition to the economy of utilizing a small lot in building, simplicity of design and construction should be practiced. This simplicity does not necessarily mean unattractiveness. On the contrary, simplicity with character is the basic principle of good design.

In both houses described here care has been taken in the planning so that standard length lumber can be used exclusively. The moldings, door and window trim, are all universal stock readily obtained in any local lumber yard. They are also designed for either steam or hot-air heating at a minimum cost. The roofs may be either of wood or asphalt shingles. The exterior walls are of frame construction, and the foundation walls are of brick, concrete or concrete block, whichever is most easily obtained and most economical in any particular case.

Building Is a Key Industry—The Committee on Statistics of the United States Chamber of Commerce in a special report estimates the total national wealth of the United States at $288,464,000,000, of which $77,321,000,000, or 26.8 per cent, is represented by the construction industry. Twenty-five per cent of manufacturing is for construction, with an annual output worth $25,-000,000,000.

Standardization of Building Codes*

By D. Knickerbacker Boyd

AT the present time there is a great cry for more homes and for the lower cost of homes. In an effort to encourage building and stimulate interest in house construction, by far the most important and most practical suggestion, not alone in its present influence but in its effect on future building, is to revise building codes and to make their requirements as nearly uniform as possible throughout the country.

In almost hundreds of cities, building codes are now in operation which were prepared or approved a decade or more ago and have not been revised or amended since that time. These codes fail to take into consideration the advances made in the scientific and efficient use of structural materials and, in numerous cases, changes might be made which would reduce building costs while still retaining safe structural requirements.

One of the most obvious of these necessary revisions, relating to wall thicknesses, was brought to light recently in an investigation by the Structural Service Bureau of some 100 building codes throughout the country. These results thus far verified are tabulated as follows:

Code Provisions for Brick Exterior Walls in Dwellings

One-story dwellings,	8-in. walls	63 cities
One-story dwellings,	over 8-in. walls	14 cities
Two-story dwellings,	8-in. walls, both stories	28 cities
Two-story dwellings,	over 8-in. walls, first story	31 cities
Two-story dwellings,	over 8-in. walls, both stories	19 cities
Three-story dwellings,	over 8-in. walls, all stories	6 cities
Three-story dwellings,	over 8-in. walls, first story	10 cities
Three-story dwellings,	over 8-in. walls, first and second stories	21 cities
Three-story dwellings,	over 8-in. walls, all stories	39 cities

Schedules have been prepared which list the variations and give the width, area and height limit of houses in relation to each thickness of wall.

The lists are prepared on a generally comparable basis as to size of house and give the requirements, according to latest available information for a two-story house.

It will be noted that the same city is in some cases included on two lists, apparently contradictory. This is due to the code requiring thicker walls inside the fire limits, or special regulations covering areas or heights. An example of this is Albany, N. Y., where 8-inch walls are permitted in the second story of a two-story dwelling, outside the fire limits, but when inside the fire limits, a 12-inch wall is required—whereas, in New York City, or in Philadelphia, the 8-inch thickness is permitted in both stories within the fire limits.

The first list includes some 29 municipalities permitting 8-inch walls in each story of a small two-story house, as follows:

Baltimore, Md.; Birmingham, Ala.; Boston, Mass.; Buffalo, N. Y.; Cambridge, Mass.; Cleveland, Ohio; Cincinnati, Ohio; Columbus, Ohio; Camden, N. J.; Dayton, Ohio; Detroit, Mich.; Duluth, Minn.; Hartford, Conn.; Minneapolis, Minn.; New Bedford, Mass.; New Orleans, La.; New York, N. Y.; Philadelphia, Pa.; Portland, Ore.; Pittsburgh, Pa.; Rochester, N. Y.; Seattle, Wash.; Syracuse, N. Y.; Tacoma, Wash.; Tampa, Fla.; Trenton, N. J.; Washington, D. C.; Wilmington, Del.; Worcester, Mass.

The second list includes cities requiring the walls in the first story of a small house to be 12 inches or 13 inches thick, but providing for an 8-inch or 9-in wall in the second story. There are 31 cities on this list, as follows:

Albany, N. Y.; Albuquerque, N. M.; Boise, Idaho; Butte, Mont.; Chicago, Ill.; Dallas, Tex.; Davenport, Iowa; Denver, Colo.; Grand Rapids, Mich.; Indianapolis, Ind.; Jacksonville, Fla.; Kansas City, Kan.; Knoxville, Tenn.; Lawrence, Mass.; Los Angeles, Cal.; Manchester, N. H.; Memphis, Tenn.; Milwaukee, Wis.; Norfolk, Va.; Oakland, Cal.; Omaha, Neb.; Providence, R. I.; Richmond, Va.; Salt Lake City, Utah; San Francisco, Cal.; Savannah, Ga.; Spokane, Wash.; Springfield, Mass.; Toledo, O.; Worcester, Mass.

The third list includes those cities which require the walls of each story in every small house two stories in height to be 12 inches or 13 inches thick. There are 19 cities on this list, namely:

Albany, N. Y.; Atlanta, Ga.; Augusta, Ga.; Bridgeport, Conn.; Buffalo, N. Y.; Chattanooga, Tenn.; Des Moines, Iowa; Jersey City, N. J.; Louisville, Ky.; Lowell, Mass.; Nashville, Tenn.; Newark, N. J.; New Haven, Conn.; Paterson, N. J.; Petersburg, Va.; Shreveport, La.; St. Louis, Mo.; St. Paul, Minn.; Wichita, Kan.

Consulting these lists it is plain that in some cities it is possible to construct a two-story dwelling with 8-inch walls for both stories above basement, while in a neighboring city, perhaps not 10 miles distant, 12-inch walls are required throughout. Why should the thicker wall be required if the 8-inch wall is equally safe and is approved by 28 cities, among them some of the largest in the country?

Of especial interest to the home builder, is the fact that the use of an 8-inch wall means a saving to him in money and space. Just how much of a saving in money can be visualized by a specific example:

The following figures are based on two-storied walls, not allowing for half stories, gables or for openings, and disregarding whether the foundations are of stone, concrete, brick or other solid material. In a house 20x30 feet—using that merely as a convenient standard of size for the purpose of calculating—there will be a saving between an 8-inch wall and a 12-inch wall, of 12,500 bricks (in round numbers). Those extra bricks would mean, at the average current price, that from $250 to $300 has been added to the cost of the house for the brick alone, to which a like sum must be added for the cost of the mortar and the time of the bricklayers and helpers necessary in laying of the extra 12,500 bricks. In other words, a house of the same outside dimensions would cost from $500 to $600 more in Albany or St. Louis than it would in Pittsburgh or Seattle.

In addition to safe structural requirements and money savings there are other important features. The difference in thickness of the walls increases the area on each floor by about 30 square feet, or in other words, the 8-inch wall means about the size of a small bathroom or several large closets added to each story.

The coal required to produce the additional material for the thicker wall would amount to six tons for each house. While that means, in the cost of the coal at the place where the material is burned, we will say $50—which amount is included in the money-saving before mentioned—think of the conservation of coal and transportation which an 8-inch wall effects. Six tons and its hauling eliminated with each house built. If we construct the walls in the smaller or isolated houses, hollow, with brick or hollow tiles where hollow material is permissible, there is still a further saving of about 2½ tons of coal.

The Institute Committee on Fire Prevention in its current report says, "Now is the proper time to revise building codes generally and remove from them all unnecessary restrictive requirements." It goes on to suggest consideration of the newly developed hollow wall of brick and other types of construction which if permitted will result in quite materially reducing the cost

*Presented at the 54th Annual Convention of the American Institute of Architects.

of construction of the so urgently needed housing. It further states that if codes were properly amended small houses may be constructed with walls of fireproof or fire-resisting materials at approximately the cost of timber and lumber. The Board of Directors in its report refers to the attention of all Chapters the reports of the Committee on Fire Prevention as presented at this and the last Convention and urges activities along the lines suggested.

The U. S. Housing Corp. adopted for its War Housing Developments, the 8-inch thickness as standard for brick walls of houses. In all localities this thickness, which was only accepted after thorough investigation was used in spite of any prevailing regulations to the contrary. That corporation and the Emergency Fleet Corp. adopted the 8-inch thickness as an amply safe and sound all-time standard for small houses, and not as a war measure of expedient.

As an instance of the effect that wall construction may have upon type of plan—in the City of Philadelphia, 9-inch walls have long been allowed, but this thickness has been limited to a building not over 16 feet wide. The operative builders of Philadelphia found that they could sell much more readily a house that had more light and more air than the old conventional type—a house with an L at the back and a narrow court.

But according to the building laws, they had to make the better-planned wider houses with walls 13 inches thick, therefore many of them stuck to the old type of building; because being narrower it could have 9-inch walls and hence was cheaper. So, the operative builders called on the chief of the bureau of building inspection and explained the situation; and he, thoroughly convinced that a change was desirable, said: "We will prepare and submit an enabling act to the legislature of Pennsylvania." And last year, among them all, they amended the 16-foot act so that houses 20 feet wide could be built with 8-inch walls and the type of plan for dwellings in Philadelphia is now developing into what is called the "air-light" house without any back extension and departing from the old one with a narrow court-like yard.

Thus there is placed squarely before the public one of the most practical means of relieving the housing shortage. What has been proven wise in the past by so many cities throughout our great land should certainly prove wise for all.

Revise building codes to permit a more efficient and scientific use of building materials!

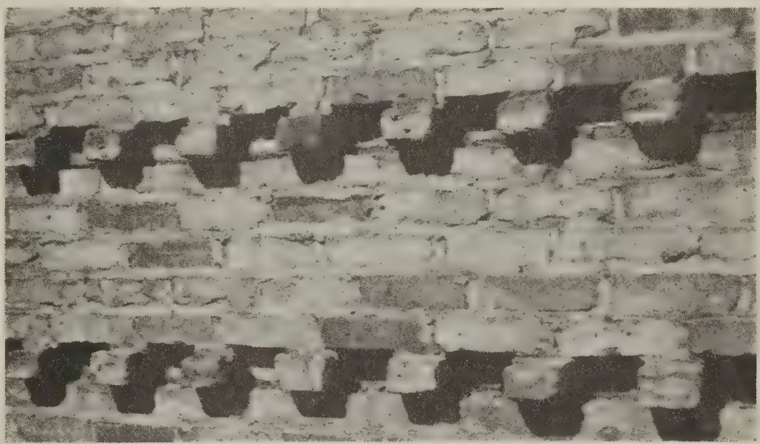
This will mean that a house sufficiently strong, sufficiently fire-resistive and wisely planned to eliminate an unnecessary excess of material may be built at a cost approaching the financial limits of the average home builder. So we will come that much nearer to being a "Nation of Homes."

Firewalls and Wind Protection

Charles Cressey, architect, Glendale, Calif., writes: "Someone with time for the job might interest themselves and others by investigating the effects of windstorms on firewalls, or more particularly, the enclosing walls around flat and low pitched roofs. Following up the experience of having a factory roof three parts stripped of its composition roofing, I found evidence enough to suggest that vacuum and not direct wind action is the cause of this kind of damage. Especially with protecting walls of moderate height, a high approaching wind apparently develops a vacuum behind the firewall of considerable lifting power, which quickly rips light roofing from its flashed edges and allows direct wind action to do the rest, ballooning in the case I mention, the major part of the roof intact, for a considerable distance. Sand bags and so on, are frequently used to prevent the trouble, but that method reflects no credit for skill on the builder. It is possible that a perforated wall is of greater protecting power against wind than the one built solid, and it is equally probably also, that the ancient builders had more sense than we have in this respect, for balustered and open tracery parapets were the rule, rather than exceptions, and we in our shallow thinking and blundering haste, put this down to ornament purely, rather than to practical requirements made beautiful."

Common Brick Wall Treatment

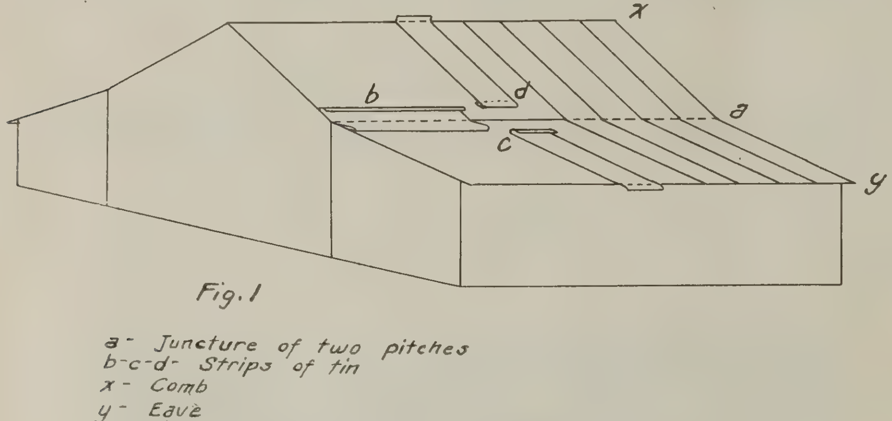
To relieve the plainness of a common brick wall on a building on the Chicago south side the designer has resorted to the treatment illustrated in the photographs, one of which shows a "close-up" of the method employed and the other the general effect.



A Two-Pitch Metal Roof

By L. S. Bonbrake

AN article on roof pitches in NATIONAL BUILDER some months ago reminded me of a two-pitch tin roof laid over a large flour mill some few years ago. Lack of knowing how and thoughtlessness in going ahead with a system which looked as though it would do resulted in the destruction of the whole north side of the roof and the loss or damage of thousands of bushels of wheat, badly crippled the contractor and roofer financially and ruined them as tradesmen in that locality.



"A Two-Pitch Metal Roof"

I cannot give the exact size of the building, but it was a large one, several stories in height, fronting to the east, with side additions extending west for probably 150 feet, the whole covered with a standing seam tin roof. No break was made in the strips of tin at the junction of the two pitches (Fig. 1, *a*) the tin continuing in one piece from the comb, *x*, to the eave at *y*, with nothing more than a snipping of the standing flange at *a* in order to let the seam fit down into the corner and adjust itself to the two pitches. The worst feature, however, lay in the tinner's having made his roof strips the 28-inch way of the tin instead of the proper 20-inch way, thereby giving eight inches more non-resistant surface unprotected between the standing seams, and nearly 50 per cent more width for vibration. I have no doubt but that the cleating or anchorage was nailed in an equally loose, careless manner.

The first heavy wind began to play with the north corner, *a*. In no time it had raised it from the sheeting several feet, and as soon as the standing seams commenced to part the wind got under the tin and the trouble was on. That side of the mill was stripped clean of cover and tin roofing was scattered abroad. The heavy rain poured in through the rent, damaging thousands of bushels of wheat and much valuable machinery. Quick work regardless of quality had had its usual result.

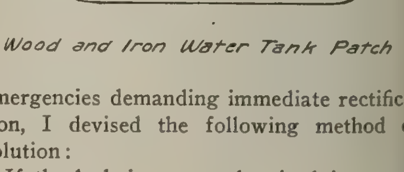
So long as there are men who attempt to prepare the material and apply it to a roof by any method where the stop-watch is involved, just so long will there by a handicap on tin roofing. It is time for the builder and contractor to wake up to the importance of this. The man of unusual speed in his work uses a big notch or notches of variegated size, leaves nail heads exposed, uses few cleats except when watched, skims the solder over the seams, leaves broken seams untouched, cuts his prices and trusts to his speed to bring the profit.

For a building such as the one described above, a roof made from good tin or roofing plate (Terne-leaded) and properly applied is the best roof ever devised for the money. The flat cross seams should be thoroughly soldered, the sheets joined the 20-inch way with not less than a quarter-inch fold, the standing seam should be double-seamed smooth and tight, cleats should be nailed close up to the seam every eighteen inches, and in the type of roof shown in Fig. 1 the strip should not be continuous from comb to eave but should be broken at the corner *a*. The lower, flatter section of the roof, when laid complete, should come to within six inches of the corner. The upper ends of the standing seams should be malleted down smooth and tight with a spiral curve down the roof four or five inches. Then the top edge of the strips may be lined and sheared straight across the full length of the roof, and a half-inch fold back on itself made, *c*, under which the nailing should be close and secure. A strip, *b*, is then taken and formed to fit into the angle between the two pitches with the crease coming in the centre of the strip lengthwise. A fold is made along its lower edge, back and under, to engage the fold *c* made along the edge of the completed section of roof. These two folds are hooked together, malleted down smoothly and secured from leakage by sweating solder thoroughly into the seam with a heavy hot iron. The upper edge of the strip *b* is now bent forward and down upon itself, making a fold under which the nailing again is secure and close. The roof strips used in covering the second, steeper pitch are given a fold at the bottom edge, *d*, which will engage the fold formed in the upper edge of the strip *b*. In this way the junction of the two pitches is thoroughly protected from any such damage as resulted from the careless method described above. A good tin can be laid under almost any conditions, but the builder should see that the tinner makes it a point to display not his speed but his skill.

Repair Patch for Wooden and Iron Tanks

Trouble comes to the farmer in big gobs when his watering tank springs a leak and he has no running water handy or other provision for his stock. And the thresher is in no pleasant mood when his tank fails him eight or ten miles from the nearest repair shop. It is no sinecure to haul a big galvanized iron or wooden tank for miles and then wait for its repair; or perhaps return empty-handed with a second trip in prospect. And very frequently the repair cannot be made at all in the smaller towns.

Having had great experience working in country districts, and having been confronted again and again with just such emergencies demanding immediate rectification, I devised the following method of solution:



Wood and Iron Water Tank Patch

If the leak in your galvanized iron tank has been caused by the cracking of solder at the seams, or by holes cut in the bottom when you were chopping ice out with the axe, you can make it absolutely and permanently water-tight yourself and at home. Get a pound of oxide of iron, one-half pint of coal tar and a pint of boiled linseed oil.

Reduce the oxide of iron to a stiff mass with the coal tar, mixing thoroughly. Add boiled linseed oil until the mass is of the consistency of glazier's putty. Take a small portion of this putty-like mixture and thin it out with more boiled linseed oil to the consistency of paint. Clean the place to be repaired, and paint it over with the thinned mixture. While this paint is drying take a piece of linen cloth large enough to cover the break and extend about an inch beyond in each direction; paint this cloth until it is thoroughly impregnated with the thinned mixture, then coat it with a heavy coating of the putty-like paste. Place it in position over the leak, smooth down the edges to an even and feather edge. (See illustration).

If necessary, the tank can be used an hour or two after the application of this patch, but better results will be obtained if the patch is left to dry until the next day. It will never dry hard.

The material for this mixture can be bought at any regular drug store, and the amount suggested above will last you for years, and be handy for a number of things, such as repairing your leaky porch roof, eave-trough, ice-box, etc.

I shall relate the following experience, which actually took place in Mason County about four miles north of Easton, Illinois, for the benefit of country carpenters and contractors who may have a similar problem to solve. A farmer had a battery of two large round wooden tanks, one of which was kept full of water all the time as a reserve. These tanks worked down on to the ground and both had rotted nearly to the leaking point on one side, though the bottoms were perfectly sound. In addition, the stock had gnawed the top into zig-zag scallops.

The writer was asked to put the tanks in good condition. To the job we took a quantity of the mixture described above, a quantity of linen cloth, two sheets of No. 28 galvanized iron 24x120 inches, two 1x4 inch hard pine boards. The 4-inch side of the strips were tapered to nearly a feather at the top. We dried out the second tank, painted a strip around the edge several inches wide. Linen strips were prepared, with which we covered the bottom edge of the tank. One edge of the 120-inch sheet of galvanized iron was cut to proper length and notched one inch in, and the notches flanged inward so that when the sheet was formed round the edges overlapped one another. As the tank tapered, we set the strip of 1x4-inch board down inside the wooden tank so that when the metal was properly in place in the tank the strip of wood filled in between it and the wooden side and afforded a backing to which we could nail the perpendicular seam of the metal. This seam was covered with strips of the prepared linen cloth also. With the galvanized sheet snugly in place inside the wooden tank we nailed through the metal and into the bottom and side-strip using 3 d. fine and putting them so close together that the nail heads almost touched. The bottom and side seams were recoated, and left to dry. The top edge of the iron sheet we notched and bent over the gnawed, uneven edge of the wooden tank, and nailed it down smooth and even.

The same procedure was followed in repairing the other tank, and in the meantime the finished tank was filled. No leak could be detected. The following Saturday the farmer came to town, and reported that as far as he could see neither tank had leaked a drop. He stated that he preferred them to new galvanized iron tanks because he thought the wood around the iron kept the water cooler. Several years later, when I left the community, those tanks were still giving service and were in good condition.

Iron Pipe vs. Vitrified Pipe

Virgil G. Marani, M. Am. Soc. C. E., Answers a Letter

In answer to your letter in which you state "which is better—iron pipe or vitrified pipe for house connections in sewer work", and assuming that the term "house connection" applies to that part of the underground or lowest horizontal piping of a house drainage system which receives the discharge of all soil waste and conveys the same to the house sewer or main drain not less than 3 ft. outside of the foundation walls, I submit the following:

1. Both kinds of pipe are extensively used for house connections and both have shown good and lasting qualities when so used.

2. Vitrified clay sewer pipe is imperishable regardless of the character of soil in which it may be laid. Cast iron sewer pipe is subject to corrosive action, especially so when used in ground which has been filled with cinders, ashes and the like.

3. Under usual construction conditions vitrified clay sewer pipe is many times stronger than is required for the purpose; this, of course, also applies to cast iron sewer pipe.

4. Properly made joints of portland cement mortar with gaskets are sufficient for the purpose intended, namely, a tight connection for vitrified clay sewer pipe. Also, properly poured joints of lead with gaskets is sufficient in the case of cast iron types of joint.

5. Stoppages have occurred in both types of pipe due to the injection of cement or lead into the pipe due to improper or poor gaskets and bad workmanship, which in the case of the iron pipe is aggravated by the difference in the expansion and contraction of the iron and lead.

6. Economies are in favor of the vitrified clay sewer pipe. It is easier handled and more quickly laid. The materials cost less; the character of labor (sewer builders) is cheaper and the work can be more quickly done. Cast iron sewer pipe, in order to prevent poor castings, blow holes and similar imperfections, is made of greater weight than otherwise would be necessary. The materials cost more, cast iron is costly, lead is expensive, the character of labor (plumbers) is high priced, and the time required is longer.

The above, in brief, are the vital points at issue, remembering of course that vitrified clay sewer pipe has been used successfully for house connections for many centuries and is still to be found in an excellent state of preservation.

There should be no legislation enacted which will prohibit, in specific cases, the choice of either the vitrified clay or cast iron pipe. In tall buildings with high stacks, where volume and impact are a consideration, extra heavy cast iron should be specified for reasons that are obvious. Also extra heavy cast iron pipe should be required under vibratory machinery and when laid in formations of rock or stones, this on account of the undeterminable but possible stresses due to these conditions.

Vitrified clay sewer pipe should be permitted for the house connections of all residences and all buildings not more than four stories in height. Provision should also be made to permit the use of the clay pipe in cases where the use of the sewer would subject the same to the action of acids which would corrode cast iron.

Some existing ordinances permit the use of either clay or iron pipe upon a parity provided the clay pipe is embedded in not less than 4 in. of concrete. This is a wasteful, senseless and unfair provision, and means nothing, since the incidental increase of cost of labor and material placed upon the clay pipe automatically throws it out of competition.

Measures advocating the elimination of clay pipe, or in other words competition, when traced to their source will usually be found to originate from special interests. In my 25 years of experience on engineering construction I have never seen presented, to those interested, logical or substantial arguments which would justify the elimination, by legislation, of vitrified clay sewer pipe for the purpose outlined in this communication.

Much could be written upon this one subject, but what I have stated will be found to be a fair and impartial opinion and is in keeping with the stand I assumed, as Commissioner of Buildings of Cleveland, Ohio, when during 1910 and 1911, an attempt to legislate clay pipe out of consideration was defeated.

A Seven-Room House

By G. E. McDonald

THE one-story, seven-room house here described and illustrated is one of a type designed and built by Edward E. Sweet in Los Angeles, Calif. Mr. Sweet early in life was a printer, but studied architecture and engineering, and now designs, builds and sells houses. The illustration shows him standing in the doorway of one of the five houses he has recently built, all on modifications of the same plan.

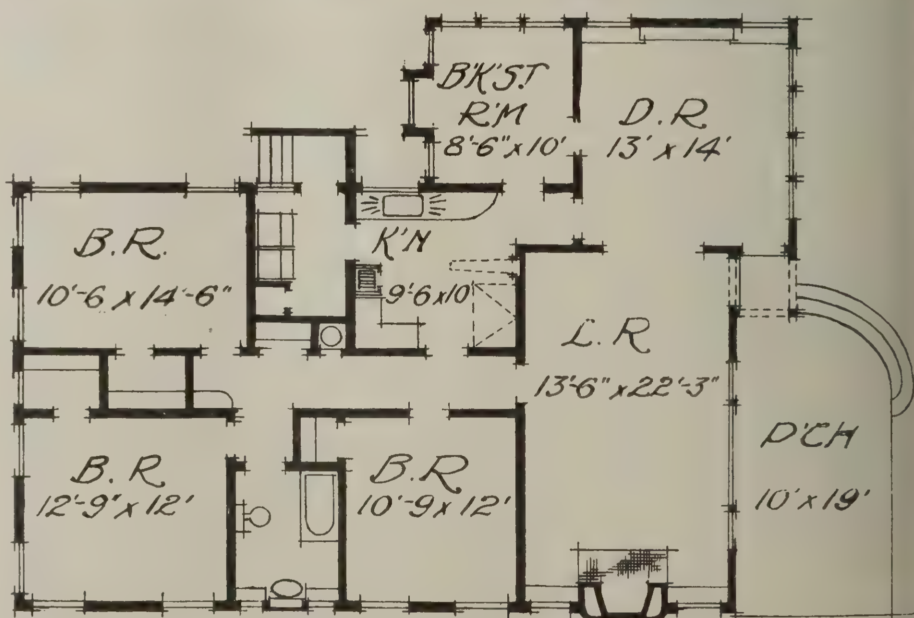
A seven-room cottage of the English-Belgian Type; Edward E. Sweet, designer and builder. Sale price, $11,500

The modifications of the five exterior styles consist of a small variation in the location of the front door or in the relative size of the rooms. The cost and general method of construction is about the same.

The foundations are of monolithic concrete. The floor joists are 2x6 over 4x4 stringers and concrete piers. The exterior walls have 2x4 studding and interior 2x3 studding. The walls are rough plastered for paper, and papered, the woodwork finished in old ivory. Oak flooring, 1½-in. clear oak, is used throughout. Creosote stained shingles are used on some of the houses and vulcanite prepared roofing on others.

The houses finished in stucco over adobe have button lath over wire, with an external finish of silica sand and Medusa cement over a half-inch coat of brown cement. In the case of the Spanish style house care is taken to build the framework of porch and walls so as to give as massive lines and thickness as that style calls for.

Individual gas radiators are in each room, and the living room has a fireplace with upright tiling and a tile hearth, with built-in desk and bookcases on either side to



Plan of seven-room cottage which has been finished as shown in five different exterior styles


Modifications of same plan. Sold on contract for $9,500 each

Same plan finished in Belgian style. Sold at $11,500

Same plan Spanish style, finished in adobe with Spanish porch and garden wall. Sold for $12,500

A built-in buffet

come under the same mantle shelf arrangement.

A built-in buffet occupies the entire end of the dining room. This, with the built-in features already noted, the bathroom cabinets, linen closet conveniences, kitchen cupboards and built-in ironing board, are master cabinet work. French doors separate the living and dining rooms, and dining room and breakfast room. There is a disappearing stairway in the hall to reach the attic storeroom, which has been left unfinished. There is a single garage and well-laid driveway and walks in each case.

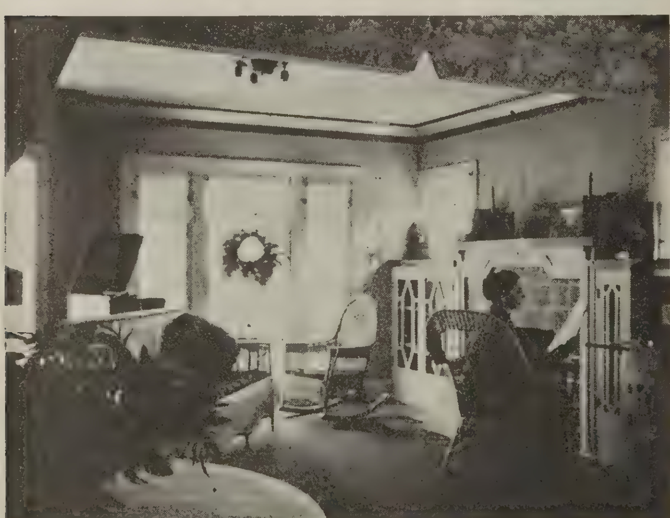
To Fight Ban on Wood Shingles

Protest of Cleveland lumbermen will be lodged with the governor of Ohio at an early date against the proposal of the State fire marshal to eliminate the use of wood shingles in Ohio. Word was received early in June from Columbus that a campaign against the wood shingle would be started by the fire marshal's office. This is generally regarded as unjust discrimination.

A Five Room Cottage

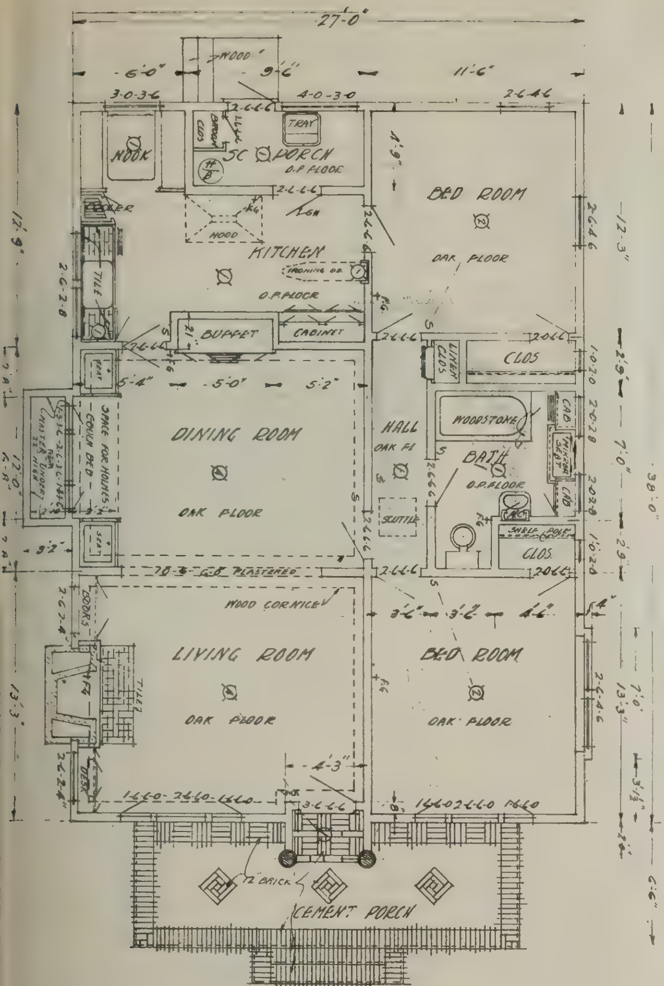
THIS compactly arranged five-room cottage of English-Belgian style, designed by Architect Edward E. Sweet, Los Angeles, is specially planned to meet the approval of the modern servantless woman who is everywhere sharply on the lookout for the latest housekeeping devices to save steps, time and strength and is quite ready to spend upon such equipment the bunch of

A five-room cottage of the English-Belgian type. Edward H. Sweet, architect and builder, Los Angeles, Calif. Note that the porch is reached from the driveway and will thus give greater privacy when the shrubs are grown. This house was sold as soon as completed



View of living room, showing three built-in bookcases and built-in desk, practical fireplace and abundant provision for light and sunshine. The motif of the French window is carried out in the built-in features

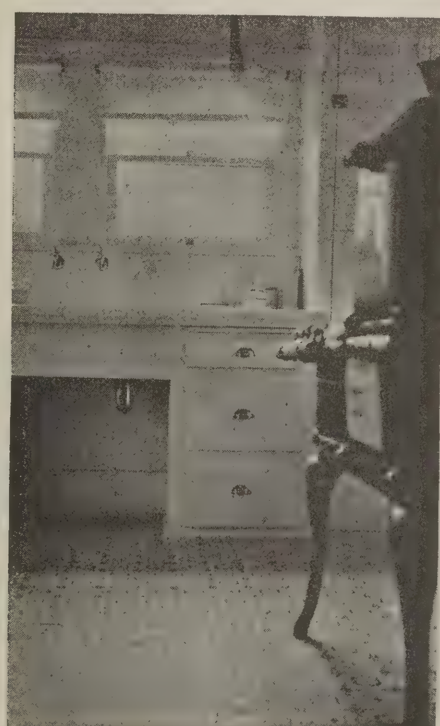
View from near door, showing built-in buffet, the breakfas nook, cupboards and sink; also, the built-in davenport witl chest on either side, and a glimpse of built-in desk in living roon

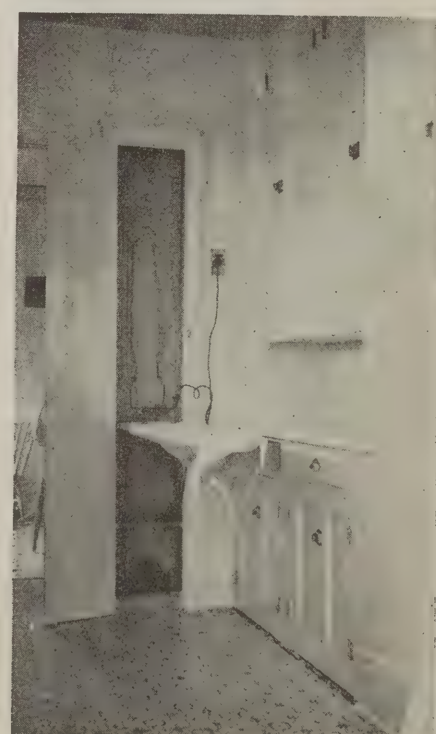



Another view of the five-room cottage


Rear view. Note the way in which the casing for the bed-davenport is cared for in the exterior to the right and counter-balanced by gabled canopy overhead


nterior hall leading from one bedroom o another. Linen cupboards and bath-'oom to left. Gas heater in background

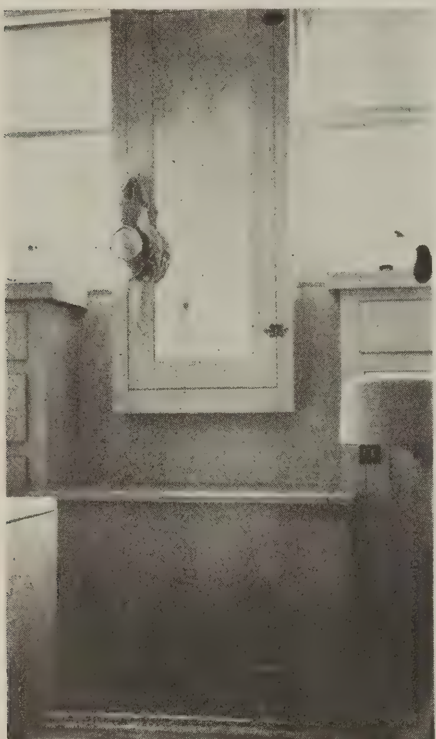

A portion of the tiled sink. Note the window easily reached and operated across the sink


Built-in ironing board and sleeve boards with shelves for irons and appliances, and kitchen cupboards with spice cupboard

money accruing to her by virtue of doing her own housework instead of hiring help.

Before the dwelling was completed its distinctive appearance, small size and convenient layout, as well as its good location, had attracted an appreciative buyer in November last, and the client is now in possession, the purchase price as I understand, being nine thousand dollars.

The pointed roof, gables, chimney-top and the handsome diamond-motif windows differentiate it from the surrounding homes. On being admitted at the front door one is charmed with the light, airiness, warmth and comfort of the interior. The ample



Built-in mirror, window seat, and dresser in bathroom

fireplace and wide-stretched mantle, the serviceable book-cases, desk and roomy buffet that are fronted with diamond-motif glass in keeping with the exterior classiness of the house, the comfortable bed-davenport that has window seats with hinged tops on either side of it, the individual gas heaters resembling wee steam radiators in appearance, the harmonious dresden pattern wall-paper, all satisfy one with a home-like restful feeling.

The tiled bathroom is tiny, but well arranged for light, heating and comfort. The built-in mirror, dresser cabinets, window seat with hinged top, in addition to its perfect sanitary equipment and its location convenient to living rooms and bed rooms make it ideal.

The kitchen is perfect in the estimation of its discriminating owner. There are easily reached and operated windows over the tiled sink and good pot and kettle drawer-and-cupboard arrangements underneath, on either side. The draft cooler cupboard is built upright on the wall just beyond and to the right of the sink, and there is a cozy breakfast nook in the corner, with moveable table and substantial built-in seats with hinged tops. A roomy spice cabinet, a built-in ironing table, and ditto sleeve board, with electric connections, an automatic hot water heater of dependable make and the good-sized dust-proof cupboards, are a continual pleasure and delight to the capable lady of the house. Over the kitchen stove is a hood in the attic as originated and planned by Mr. Sweet for all his houses, this being more effective than the usual drop hood for carrying off all fumes and smoke that may rise to the ceiling. The screen porch contains laundry tub, broom cupboard, etc.

The house is built on a cement foundation. Studding is 2x4-in. Outside finish of house is button lath covered by metal wire with coat of brown cement one-half inch thick over that, with an outer finish of silica sand and Medusa cement. Interior finish is of wood lath, over which is applied a hard-wall plaster troweled smooth for wall-paper. The house has hardwood floors throughout. Seven-eighths inch sub-floor, over which is laid $\frac{3}{8}$x$1\frac{1}{2}$-in. clear oak, with tar building paper between. House complete with window shades, electric fixtures, etc. Single garage, good cement driveway, fresh-seeded lawn well graded, outdoor water taps conveniently placed for hose connection, all arranged as efficiently as possible for the comfort of the purchasers and the good name and mention of the builders.

Concealed Garbage Receptacle

The disposal of garbage is a problem that usually accompanies the absence of an alley in the rear of a house. The difficulty is magnified in the case of a long row of houses that extend entirely across the lots and thereby prevent direct access from the street to the rear yard.

In a recent development of row houses without an alley at the rear, the difficulty was met by using garbage receptacles of the type shown in the accompanying photograph. The receptacle is entirely below the ground and contains a garbage pail that may be removed when the contents are to be emptied. The cover is in two parts, one of which may be lifted by foot pressure, as shown in the photograph, thus avoiding

soiled hands when garbage is deposited. The other portion of the cover is similar to the ordinary ring used with manhole covers, but differs from them in that it is hinged so that when the pail is to be removed it may also be raised. The ring extends over the space between the sides of the pail and the receptacle, thus preventing garbage from falling into the space. The small slab of concrete shown in the photograph prevents the cover from swinging far enough to damage the shrubs when the entire cover is raised to remove the pail. It may be omitted if desired.

Each dwelling in the row has a garbage receptacle similar to this in the front yard.

Let a Little Sunshine In

The accompanying photograph shows a house in Lake Charles, La., in which practically all of the wall space is filled with windows.

The ventilation thus made possible is no doubt appreciated in hot weather, but oh, man, imagine washing 'em!

Announcements and Publications

Shop Sketching, by Ralph F. Windoes, contains a carefully arranged and thoroughly tested course of problems which aims at leaving with the student who completes it the ability to make sketches from objects, perspective sketches from working drawings, and the ability to read accurately working drawings. Theory has been eliminated as much as possible and such technicalities as were necessary have been carefully explained, with the one aim in view, the imparting to the student the knowledge and practice required to make clear and accurate free-hand shop sketches. The Bruce Publishing Company, 354-364 Milwaukee St., Milwaukee, Wisconsin, are the publishers of this book, which retails for $1.00.

Problems in Woodwork, by Edward F. Worst. This book is compiled by a supervisor of manual training and construction work, as a guide for his teachers, but any home craftsman interested in good design and unusual treatment in a wide variety of useful and attractive articles of household use will find the work stimulating, suggestive and thoroughly worth while. The problems are practical, the designs excellent, the working drawings beautifully executed, and the text brief and concise. The diversity of materials suggested is unusually interesting. Woodwork, as the title suggests, is the foundation of all construction, but directly related to it one finds parchment lampshade making, metal work on a small scale (key plates, hinge tails, drawer pulls, etc.), splint work, caning (just the finishing touch to make the new breakfast alcove a thing of art, or the sun-room furniture, or to lighten those odd and comfortable leg-rests and foot-stools for the living room), rush wrapping, hickory splint weaving, and even some simple upholstery. A bill of material accompanies each working drawing, and the appendix contains tables for computing the cost. There is a complete index. Published by the Bruce Publishing Company at 354-364 Milwaukee St., Milwaukee, Wisconsin; $2.50.

Charles E. Marks, general contractor, formerly of Madison, Wisconsin, announces his removal from that city to Los Angeles, California, where he is located temporarily at 346 South Broadway.

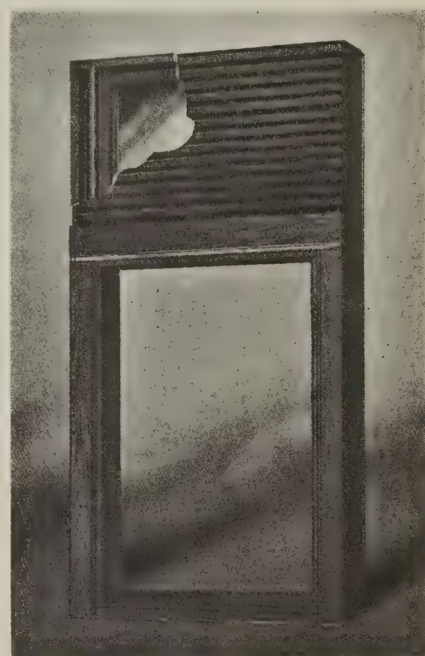
The Modern Motor Truck, by Victor W. Page, is a new book being offered by the Norman W. Henley Publishing Company, 2 West 45th St., New York City. It is a specialized reference work devoted exclusively to commercial vehicles, and is eminently practical. The design features and construction of all types of gasoline and electric trucks are given, and in addition explicit instructions for the repair and upkeep of various parts. Numerous sections, disassembled and phantom views show all features of truck construction so simplified and explained that anyone can understand. Of particular interest to our contractor readers will be the chapters on labor- and time-saving methods of leading trucks, the use of tractors and trailers, and on figuring truck costs. There are 1,000 pages, 6x9, with 750 illustrations and many designs. The book retails for $5.00.

Tiles is the title of Publication No. K-200 prepared by the Associated Tile Manufacturers at Beaver Falls, Pennsylvania. It contains basic information concerning the ingredients and processes of manufacture, gradings, sizes, shapes, colors, and finish of the various kinds of tile, and is intended to promote a more thorough understanding of this product and its uses. There are some interesting drawings illustrating the development of the different tile shapes, and other plates of drawings showing graphically and to scale the shapes and relative proportions of tiles, classified according to kind. The booklet sells for 25c.

Leslie H. Allen, recently with Fred T. Ley and Co., contractors of Springfield, Mass., first as an industrial housing engineer and then as sales manager for New England territory, has joined the staff of the Portland Cement Association, 111 West Washington Street, Chicago, as assistant manager of the Cement Products Bureau. Prior to joining the Ley organization Mr. Allen was for 12 years with the Aberthaw Construction Co. of Boston.

Handbook of Standard Details, by Charles H. Hughes, is a compilation of the standard type, dimensions, weights, etc., of the materials and manufactured parts used in the construction of machinery and engineering structures. The data has been obtained from various sources; some of the standards have been set by organizations of engineers and manufacturers, while others have been more or less arbitrarily set by leading manufacturers. The standards cover fastenings, power transmissions, pipe, tubings and fittings, rope and chain fittings, structural details, and a large number of miscellaneous parts. Material on standard engineering drawings, with a number of useful tables, and a complete index, add value. While meant primarily for the convenience of engineers, draftsmen, students and purchasing agents, this book will be of value to anyone interested in mechanical engineering. 312 pp. 4¾x7 inches. Semi-flexible leather. Published by D. Appleton & Company. New York City.

Lunken Unit-Windows—A portfolio of the standard filing type issued by the Lunken Window Company, inscribed "for your convenience in filing the enclosed and subsequent data of value to you in specifying Lunken unit-windows," contains exceedingly well devised informative booklets

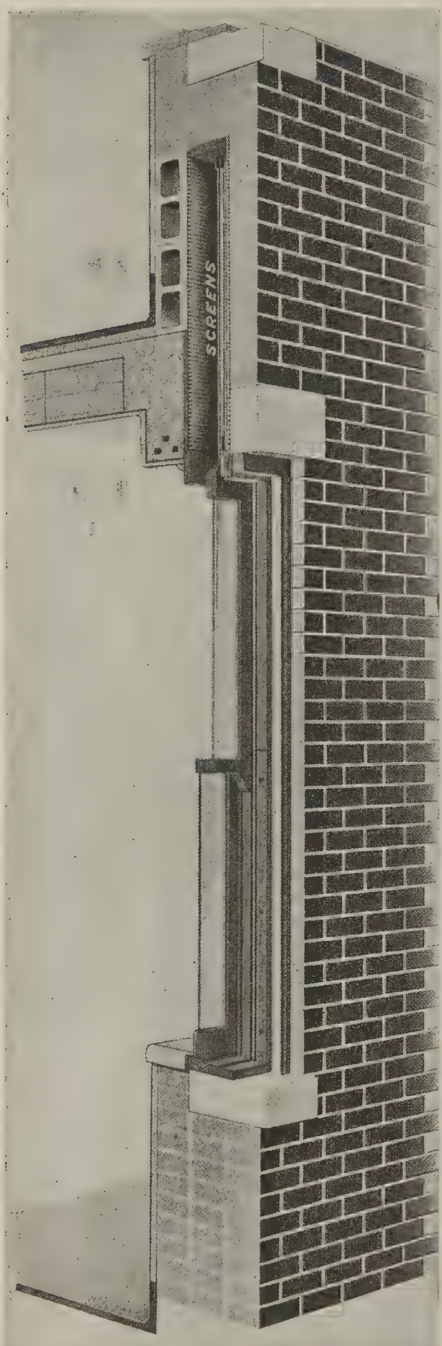


The window comes as a completed working unit with priming coat applied

including "The Lunken Window Book of Details—Light Construction," 8½x11 inches, with reproductions from sixteen plates of details having to do with the installation of the unit window in connection with frame, brick, brick veneer, hollow tile, stone, etc., construction. Its companion book, "The Lunken Window Book of Details—Heavy Construction," of similar dimensions and content, deals with the unit window and heavy construction, steel and concrete. Both of these books have their duplicates in tiny volumes, 2¾x5¼, the "Baby Book of Details" for light and for heavy construction. A circular, "Air Leakage and Dollar Leakage," itemizes in dollars and cents the approximate savings in fuel, heating facilities, maid service, screen damages, screen depreciation, and labor on screens, which the installation of Lunken unit windows is said to effect. A bulletin of February first of this year gives the sizes and dimensions of the windows available, with directions for ordering; and another of the same date gives prices, shipping rates, and terms, for both light and heavy frames. Any or all of this literature is obtainable from the manufacturers upon request.

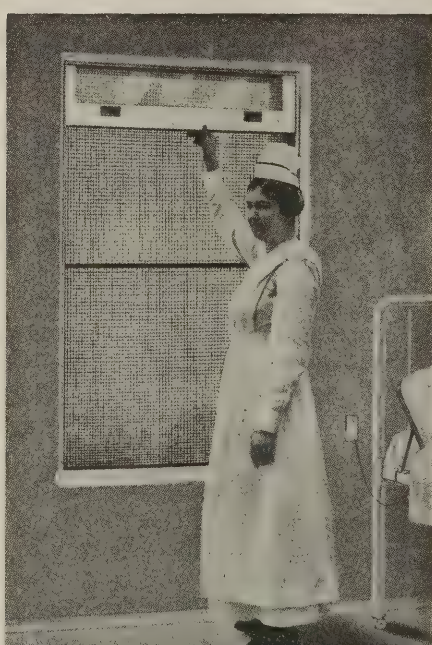
The following is taken from the booklet

on "Hospital Windows": "These windows come from the factory completely assembled: that is, with glazed sash, fitted, weighted and hung; weather-stripped, screened, with hardware attached, primed,



Showing the principle of the unit-window construction applicable to all types of buildings

and in proper working order when delivered at car. Their particular advantage, aside from the saving of time and labor on the job and their superiority of workmanship, lies in the fact that, though a double-hung type, they permit the maximum of ventilation. This is made possible by an air-tight, metal-sheathed box projecting above the head of the window and into which both sashes may be thrust when it is desirable to have the whole window space available for ventilation. Since there may be openings at the bottom of the window, at the top, or in the center, as circumstance requires, the ventilation is under almost complete control and the avoidance of drafts is facilitated. The unique yet simple method of screening used with this unit window is another big point in its favor for hospital use. As noted before, the unit window comes from the factory already screened. The screens are made of 16-mesh copper, soldered flush on solid machine steel frames. The unusual thing about them is that, instead of swinging outward or upward, as most screens do, they operate up and down like a window blind, guided in rigid copper grooves, and sliding up out of sight in the boxhead when the window opening is desired free from screening. This does away with the labor and inconvenience of dismantling and storing for winter, for when the season for screens is over they are simply pushed up into the air-tight, metal-sheathed box-head and there they stay, out of sight, protected from the weather, away from possible damage from outside agents, yet ready at the first hint of fly-time to slip down again and into place for instant service. Easy of operation, they glide smoothly and almost noiselessly, important factors in the requirements for hospital equipment. The cost of these windows is little if any greater than that of the usual type of window installation of the better grade; yet because of the standardized construction there is a minimum of air leakage about the window frames and a corresponding and appreciable diminishing in heat and fuel waste." Under date of May 25 the company announced that increased production and decreased costs permit a reduction from the February 1st lists of discounts of



The sash may be opened from the fraction of an inch to the full area of the window frame

Disappearing flat screens protecting the entire window are raised from sight and not removed for winter storage

20 per cent on light and 10 per cent on heavy frame Lunken unit windows.

The Lakewood Engineering Co., Cleveland, Ohio, announces the appointment of Robert C. Weller as general sales manager at Cleveland, and Carlton R. Dodge as western sales manager with headquarters at 1215 Lumber Exchange Building, Chicago. Mr. Weller is in full charge of all sales work.

The "Wonder" Line of Concrete Mixers, Hoists, Pumps, Backfillers, etc., manufactured by the Construction Machinery Co., of Waterloo, Iowa, is now represented in the Pittsburgh territory by the John H. Carlin Machine Co., of Pittsburgh, Pa.

All-Metal Sanitary and Fireproof Equipment, for factories, foundries, gymnasiums, public buildings, department stores, offices, hospitals—including sanitary drinking fountains, stock and storage racks, metal lockers, metal shelving, all-steel stools and chairs, also with wood seats, metal vault fixtures, improved soda kettles, 40 and 60; water heaters and instantaneous mixers, work benches and bench legs, drawing stands, etc., and a full line of plumbing fixtures—all these and many others are included in a series of illustrated and descriptive catalogues issued, with a price list, by the Manufacturing Equipment and Engineering Co., Framingham, Mass.

"The Roof That's Always New," an Introduction to the Illinois Zinc Shingles.—This monograph, issued by the Illinois Zinc Co., 280 Broadway, New York City, N. Y., illustrates and describes the latest development in zinc for roofing, in which by pre-oxidizing the zinc shingles they are given a shade as harmonious as weathered wooden shingles or slate, and the exposed surface of the shingle is not stamped or corrugated

It's wonderful how easily and quietly the garage doors fold and glide out of the way when equipped with National Garage Hardware, and then how strong and secure they are when closed, but then this Hardware has the knack of doing things right. It must be up to snuff in every particular before it leaves the factory, and when it earns the right to wear the National brand, it never sags, sticks or scrapes. It works just right.

If you are interested in this product send for our catalog, illustrating our complete line.

National Mfg. Company
Sterling, Ill.

in any way, but appears as a simple square with a rich feeling of texture. The edges of the shingles are turned down, giving a butt at the lower end equal to that of a wooden shingle. As a paintable or unpainted roofing material the all zinc shingle as a weather-resisting, non-corroding, interlocking covering presents most interesting features as described in this monograph.

Announcement is made that the competition for a three teacher rural school, conducted by the White Pine Series of Architectural Monographs, the sixth annual architectural competition, was judged at Yama Farms, Napanoch, N. Y., on May 6 and 7, 1921, by James O. Betelle, Newark; Wm. B. Ittner, St. Louis; Guy Lowell, New York and Boston; Arthur I. Meigs, Philadelphia; Irving K. Pond, Chicago. The first prize was awarded to Antonio DiNardo and Frank Hitchens, Pittsburgh, Pa. The second prize was awarded to William D. Foster, New York, N. Y. The third prize was awarded to Chauncey F. Hudson, Buffalo, N. Y. The fourth prize was awarded to Robbins L. Conn, New York, N. Y. Alfred Cookman Cass, New York, N. Y., received first mention; David W. Carlson and Emil A. Lehti, New York, N. Y., second mention; Charles H. Dornbusch, New York, N. Y.; Paul Hyde Harbach, Buffalo, N. Y.; Leon H. Hoag, Bloomfield, N. J.; William J. Mooney and Harold A. Rich, Boston, Mass. The detailed report of the jury will be published in the August number of the White Pine Series, together with the prize and mention designs.

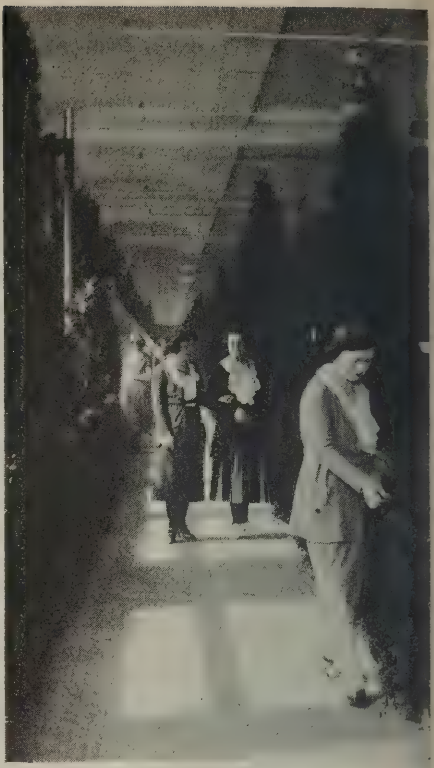
Production and Costs being now of acute interest, the stop watch and time study watch is likely to come into increasing use as a means of anticipating loss in production. A new instrument of precision has recently come to light combining all the advantages of the stop watch and the time study watch, and has in addition a split second feature. It will be known as the "split second time study watch." The split second time study watch has a double hand, and in addition to other features permits the taking of two totally different operations at the same time, or the taking of observations on two closely related operations, each different from the other. The watch has, in addition, the production dial feature used on the time study watch, which saves the mental or pencil computation, after the observation has been taken, and gives a mechanical testimony that cannot be questioned, showing the amount of production per hour after one operation has been performed.

A New Simplified Magnesite Stucco—Making a staple out of an intricate specialty has been accomplished by the manufacturers of a magnesite stucco. It has been brought about by the discovery of a method of making a dry mixture of the magnesite cement and the chloride of magnesia, a combination which all familiar with the use of magnesite know is necessary in order to make magnesite suitable for floors or stucco. The reason heretofore for not having these materials mixed together and shipped dry is that it has been considered a chemical impossibility on account of the inclination of chloride, even though dried to the fullest extent to start with, to gradually take the moisture from the air and liquefy, resulting in turning the mixture into stone. By continued experiments and perseverance the desired result has been brought about and the concern manufacturing this new material is now fully equipped and is shipping the product dry with nothing to be added at the building but water. Among the many advantages of magnesite cement shipped in this manner are the great saving in freight, the simplifying of storage and application, and the avoidance of errors in the mixing and application of the material.

"Use the Ferro-Tite Method," is the title of a folder illustrating and describing the system of waterproofing "tried and proven" on many types of buildings and under extreme hydrostatic pressure, by the Contract Waterproofing Company, 2042 Railway Exchange Building, St. Louis, Mo. Reproductions of letters from customers testifying to the merit of the method accompany the folder.

The Home Building Exposition has acquired the building materials exhibit carried on for many years in the Insurance Exchange Building, Chicago, and is now fitting up the entire sixth floor of the Leiter Building, Chicago. The enterprise contemplates selling the finished home down to the least detail to the public just as a buyer would purchase any article of merchandise, at a fixed, definite price for a "known-shown" piece of manufacture. The illustrations herewith indicate the extent and effectiveness of this extensive plan of selling homes. The general management is in charge of Henry A. Guthrie, formerly assistant manager of the Own Your Home Exposition.

Ernst G. Froderstrom, landscape architect, in action



The exhibits are separated by greenery to give individual effect

A vista of one of the side aisles

Residence A. B. Headley, Esq., 1450 East Ave., Rochester, N. Y.
Architects, Foote, Headley & Carpenter, 401-403 Carter Building, Rochester, N. Y.
Bishopric Stucco Base used on all exteriors

Residence 1839 Farrington Rd., E. Cleveland, O.
Owners, Architects and Builders—
The Joseph Larong Co.
Bishopric Stucco Base used on all interiors and Exteriors

Bishopric

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With a shortage of four million homes in this country, wise builders, having in mind the Economy, by reasons of the big saving in material and labor in its application, the Durability and Efficiency of Bishopric, can see in the growing demand for Stucco homes an opportunity for conservative and profitable investment. Seldom, if ever in fact, have the builders of the country faced such a splendid opportunity for attractive and permanent returns for their outlay.

The BISHOPRIC BASE STUCCO HOME is equally in keeping and in place on the humble street or magnificent boulevard. Always adds and never detracts from any surroundings.

Strictly in Good Taste, yet cost represents great economy—***Bishopric Base*** enables you to secure real permanency in Stucco Construction on account of its rigidity and the dove-tailed interlocking wood strips which lock Stucco and Plaster in an inverted wedge clasp with a grip that holds for generations.

No upkeep cost, and as paint cannot add to either the permanence or natural beauty of Stucco this expense is avoided. A non-conductor of heat, cold and dampness. A perfect sound-deadener.

It is of great importance in the construction of the house of stucco to provide for the preservation of its beauty, its resistance against fire, vermin and decay, its insulation against change of temperature and dampness. Bishopric stucco and plaster base in construction and in use, offers the possibilities of this insurance.

Let us send you ***Bishopric For All Time and Clime,*** a booklet illustrated with photographs of beautiful homes built with Bishopric stucco, plaster and sheathing units. It is yours for the asking.

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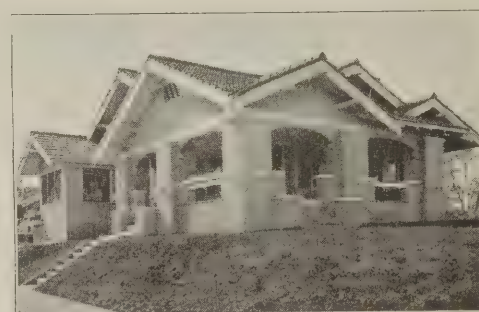
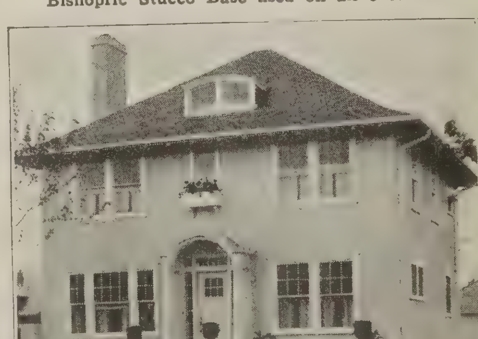


Residence C. F. Sutton
4200 Kingman St., Des Moines, Iowa
Contractor, H. J. Tillia, 215 Flynn Building
Stucco Contractor, Beard & Son
Architect, R. G. McDowell
Bishopric Stucco Base used on all exteriors

Residence Rev. E. O. Tree, Freeport, L. I., N. Y.
Bishopric Stucco Base used on all exteriors



Residence S. H. Morgan, Detroit, Mich.
Architect, Wm. C. Palmer
Contractor, R. M. Rutherford
Bishopric Stucco Base used on all exteriors

National Builder

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NATIONAL BUILDER

Volume 64 August, 1921 Number 8

The Situation

THERE seems to be a growing feeling among building contractors that $1 per hour is high enough to pay any building trades mechanic. Boston, Detroit, San Francisco, Pittsburgh and other large cities are now operating open-shop on that basis.

The wage controversy in Chicago between the building trades employers and employes had not been settled up to this writing. The men are working at their old scale of $1.25 per hour for the skilled trades and $1 for common labor, pending the decision of Judge Landis, the arbiter chosen to fix the new scale. A great flood of new work is reported to be held up until this decision is announced.

In Kansas City, Mo., where there has been a state investigation of the building industry and an arbitration of the wage dispute, the award was $1.12½ per hour. This is higher than employers expected and conditions are by no means settled.

In Cincinnati, St. Louis and many other cities employers are seriously considering open-shop if employes any longer refuse to accept wage reductions.

New wage reductions of 15 per cent have recently been made by the independent steel companies and 20 per cent by the United States Steel Corp. These reductions were announced at the same time that price reductions in steel products varying from $4 to $10 per ton were also made.

These wage reductions will affect wages paid common labor in many building-material industries such as cement, lime, sand, gravel, crushed stone and clay products. The price reductions will be reflected in a month or more in many building materials made of steel.

Railway employes will apparently accept the recent cuts in wages authorized by the Railway Labor Board without further protest, although it is understood that a vote is being taken by the unions at this time. The Pennsylvania R. R. has put its shop employes at Altoona back on a piecework system and a 48-hour week basis, which is a distinct gain toward better control of its labor. The 48-hour week consists of not more than nine hours nor less than eight hours a day with half holidays on Saturdays. Overtime is paid pro rata for the ninth and tenth hours, with time and a half after the tenth hour.

Lumber

Retail lumber dealers are said to be purchasing only for their immediate needs and are not generally stocking up. The railways are making inquiries of lumber manufacturers and railway buying is expected to pick up shortly. There are signs in the lumber trade of another car shortage as soon as grain and cotton begin to move.

The southern pine manufacturers are still doing less than a normal amount of business. Prices in some districts have weakened, but generally speaking the manufacturers have not made many cuts in the last month.

The building industries are passing through a rectifying process that predicts healthier and bigger business in the immediate future.

The total volume of buying of western pine is small. The California and Southern Oregon mills are selling mostly from stock. The better grades are said to be getting scarce and prices are reported firm.

The shingle and lath industry reports business good only in spots. There does not appear to be large stocks and prices have had a tendency to advance in districts where demand is picking up.

The best grade of 1x3 southern pine flooring is selling at southern producing points for $70 per M. The poorest grades are selling down to $14.03; 1x4 between $52.50 and $15.25. No. 1 boards S1S or S2S are selling around $25, and dimension lumber S1S1E ranges from $18 to $24. No. 1 plaster lath is selling at producing points for about $4.

Retail prices of yellow pine flooring, best grade, range around $75 to $85 in New England and Middle Atlantic States; No. 1 boards from $40 to $60, and lath $9 to $12. In the Southern and Central States B flooring is quoted at $50 to $80; No. 1 boards $40 to $90 ($90 at Miami, Fla., is high); lath at $6 to $12 ($12 at Detroit being high).

Oak flooring is quoted f. o. b. cars Cincinnati, Ohio, one of the principal distributing points, from $108.27 per M, ⅜x1½, best, to $134.67, 13/16x1½, best; to $17.43 and $30.73 for No. 1 common.

Douglas fir flooring, No. 2 clear, is quoted at producing points at from $42.75 to $51; boards from $10.50 to $12. Red cedar shingles are selling at the mills in Washington from $1.75 to $3.75 for four bundles.

Wisconsin and Michigan hardwoods, for the best grades and qualities, are selling from $90 to $150 per M at the shipping points southern quartered white oak FAS is selling for $145 to $185 per M on the Cincinnati base.

These prices are all wholesale to dealers and freight rates, jobbers' and dealers' prices must be added to arrive at the retail price. The freight tariffs may be obtained from any local freight agent, so it is possible for every builder to check his dealer's profit.

Cement, Lime and Plaster

There have been reductions in the prices of cement, lime and plaster in many localities during the last month. Producers have been making a distinct bid for business.

Prices of Portland cement range from $2.10 per bbl. net (carload lots) at Duluth, Minn., to $3.20 in Kansas City, Mo.; Atlanta, Ga., and other points. Apparently, $3 is a fair average price for carload lots, without bags. Builders buying in small lots must add a dollar or more per barrel for dealers' commissions, freight, and 40 cents per barrel for bags, which are returnable.

Finishing lime runs from $1.60 to $3.50 per 180-lb. bbl. The lowest prices are in the Southeastern States and the highest prices in New England and the Northwest. These are warehouse prices in carload lots and dealers' commissions and freight charges must be added. Common lime on the same basis runs from $1.50 to $3.

Finishing lime hydrate in paper bags, carload lots, runs from $17 at Cincinnati, in the heart of the producing districts, to $30 (in Montreal, Que.). A fair average price is $25 per ton, to which commissions and freight rates are added before it reaches the hands of many of the building contractors.

Neat gypsum plaster (hardwall plaster) is being quoted at producing points for $11 per ton and stucco calcined gypsum at $9 per ton—not including bags. Dealers are asking from $20 to $30 per ton for neat plaster in 80-lb. bags, an average price being around $25.

Brick and Tile

There is a very wide range in prices of common clay brick. The lowest known price is $12 per M at Chicago, Ill. Topeka, Kans., with a price of $35 is high. About $18 appears to be a fair average price in brick-producing localities.

Common concrete brick are quoted from $15 at St. Paul, Minn., to $32 at Omaha, Neb. An average price is around $20.

Clay face brick are quoted at from $17 to $60, a good grade of any shade being around $40. Concrete face brick are selling at from $20 to $40. Sand-lime brick sell, f. o. b. cars producing point from $8 per M at Albany, Ga., to around $20 in northern cities.

Clay hollow building tile (8x12x12) is selling all the way from $126 to $280 per M, depending on the nearness to manufacturing centers. The $126 price is at Peoria, Ill., in the heart of the producing section. For places distant from clay manufacturing centers $225 to $250 appears to be a fair average price. For the 8x5x12 size the prices are about half those quoted for the larger size.

Clay partition tile (3x12x12) are quoted all the way from $70 to $140. The highest prices are in the South. Gypsum partition tile is selling at from 17 to 20 cents per lin. ft.

Sand, Gravel and Crushed Stone

Price reductions in sand, gravel and crushed stone are noted during the last month. About $1 per ton appears to be a fair average price for washed sand in wholesale lots at the producing point. Washed gravel and crushed stone vary from $1.50 to $2.50 per ton, at the producing plant. About $1 is a fair average allowance for dealer and delivery charges. If a railway freight charge is included, the plant price of the material will be about doubled for a 20 to 50-mile haul.

Special aggregates for facing concrete blocks and for stucco surfaces are quoted f. o. b. carload lots all the way from $5 to $30 per ton, depending on the color and locality. The $5 price is for white chips. To these prices must be added freight charges, dealers' commissions, etc., when builders are purchasing in small lots.

Paint and Varnish Prices Reduced

President Joyce of the Glidden Co., Cleveland, Ohio, a prominent manufacturer of paints and varnishes, on July 16, announced radical reductions in the prices of all this company's products. These reductions are 50 cents a gallon on first-grade, prepared house paint; 40 cents on shades, and proportionate reductions in all lines.

It is stated that these reductions make a total cut in price of $1.50 per gallon on white and $1.40 on colors, and 85 cents to $1.18 on varnish since the early part of 1920. Mr. Joyce, in his announcement, says that he is convinced that the time is at hand to "reduce prices to the uttermost limit."

With Steel as Basis Other Construction Commodities Are Costly

James Inglis, president of a manufacturing company of Detroit, has sent an interesting communication to the Chamber of Commerce, which will receive the attention of the Industrial Relations Committee. Taking the price of structural steel in July, 1913, as a basis of normalcy, noting its movements upwards and downwards since that date and its current market value, Mr. Inglis has compiled a table showing what should be the corresponding prices for other commodities at the present time.

Structural steel dropped from $1.60 per 100 pounds in July, 1913, to $1.30 by July, 1914, when business was dull and the World War was brewing without people having a full comprehension of what was coming. The price mounted to $6.20 by July, 1917, and at present has receded to $2.30.

Taking the prices of other commodities of July, 1913, it is figured from the rise and fall of steel and its current price that present prices should be as follows: Brick, $9.43; lime, $1.55, and cement, $2.27. But in reality current prices are substantially as follows: Brick, $18.40 per M; lime, $3.30, and cement, $3.10.

By the same yardstick he calculates that carpenters should be paid 89 cents per hour, bricklayers $1.01, and plasterers, 98 cents, which wages compare with 62 cents, 70 and 68 in 1913. According to this reasoning both building materials and wages of the building trades have failed to respond to the decline in structural steel, causing a halt in construction.

Modern Apartment Buildings Displacing Old-Fashioned Homes

THE small cities of the United States are gradually abandoning the old-fashioned American home for the modern apartment house. This fact was revealed in a report on building operations in this country in 1920 issued July 20 by the Civic Development Department of the Chamber of Commerce of the United States, Washington, D. C. This report, which was compiled by the National Chamber in conjunction with the Federal Bureau of Labor Statistics, is one of the most complete of its kind ever prepared, and contains definite data on the amount of building construction carried on in the United States last year.

The building figures show that in 1920 70 per cent of the families provided for got one-family dwellings; 11 per cent two-family dwellings and 19 per cent apartments in a multi-family dwelling. According to the report, the figures also indicate that the proportion of multi-family dwellings that were provided last year was largest in the small cities which have not had as much experience with this type of habitation as the larger cities. At the same time the report shows that there was more house building in proportion to population in the smaller than in the larger cities. The new accommodations—house or apartment—provided in cities of 25,000 to 100,000 population was one for every 258 inhabitants, while in cities of more than a million population it was one for every 591 inhabitants, and the average for all the cities listed was one for every 350 inhabitants.

It is shown that 1920 was the record year for sale of bathroom equipment despite the small amount of new residence building. A great deal of this equipment was used in the conversion of one-family dwellings into tenement houses. The economic and social significance of these alterations, the report says, is of first importance.

A blank soliciting the required building information was sent out to the 288 cities in the country having a population of 25,000 or over. Their total population was nearly 38,000,000. Of these, 131 cities, with a population of 81.5 per cent of the total, reported.

"It is interesting to note," says the repart, "that of the estimated $1,043,000,000 spent on buildings in 1920 in the cities reporting, more than 36 per cent ($382,307,000) were devoted to dwellings. Factories and work shops came second with 16.8 per cent; stores and mercantile buildings third, with 13.3 per cent; while office buildings and garages tied for fourth place with 8.2 per cent each. Schools, hospitals and charitable buildings together called for 5.4 per cent, or $77,388,000. Amusement places cost more than churches, hospitals or public buildings, the sum being $38,637,000.

"If the rate of building in the non-reporting cities was the same as in those which reported, the total number of building in all the cities of 25,000 or more population may be estimated at 195,000 at an estimated cost of $1,280,000,000."

Why It Costs Less to Build Now

By Richard C. Ferge in the Builders' Bulletin of the Master Builders' Association of Wisconsin

WHEN the argument is made that it costs considerably less now than a year ago to erect a building, the actual proof necessary to substantiate such argument is not always immediately available. This fact has prompted me to prepare a list of the present cost of some of the principal building materials and of the present rate of wages for carpenters and masons and to contrast the same with prices and rates which prevailed a year ago, when costs were at the highest peak.

many tenants go so far as to remove such fixtures as built-in buffets and china closets and replace them with their own.

Where a house is sufficiently large to permit the use of enough suitable furniture, built-in fixtures are looked upon with disfavor by many authorities. They do not permit a satisfactory treatment of the interior and in many cases introduce a certain monotony into otherwise pleasant surroundings. Some tenants and purchasers unconsciously resent being forced to use a particular fixture, though it may be tastefully designed and in every way desirable.

WHAT $250.00 BOUGHT IN 1920
and What the Same Amount Will Buy Now

1920		1921	
1000 ft. Clear Maple Flooring	$250.00	1000 ft. Clear Maple Flooring	$100.00
		1000 ft. 2x10" Joists	39.00
		1000 ft. 2x4" Studs	39.00
		1000 ft. 1x6" D. & M.	37.00
		5000 Shingles	25.00
		6 Rolls Bldg. Paper	10.00
	$250.00		$250.00
1920		**1921**	
50 bbls. Cement	$250.00	50 bbls. Cement	$135.00
		5000 Brick	72.50
		10 yds. Sand	25.00
		10 bbls. Lime	17.50
	$250.00		$250.00
1920		**1921**	
200 hrs. Mason abor	$250.00	250 hrs. Mason Labor	$250.00
200 hrs. Mason Labor	$250.00	312½ hrs. Carpenter Labor	250.00

In some instances the cost of material for dwellings and other buildings has gone down more than 50 per cent.

Some of the prices and rates noted may vary more or less in different localities, but that fact, if so, is not very essential. The principal fact remains, and it cannot be disputed, that building costs have been greatly reduced, fully in line or more so than the reduction in the cost of foodstuffs and other commodities.

In discussing building costs and conditions with a client the contractor should drive home to him the facts shown in the foregoing table. Now is the time to build. Houses are scarce and rents bring a good return upon the investment. Some of the manufacturing lines are working with reduced forces, we all know that, but the building trade is the foundation upon which all other activities depend and if that trade is put to work as it should be it will be only a short time when all other industries will revive.

Built-in Furniture

That the use of built-in furniture does not help in the selling of residence property is the belief of Joseph A. Holpuch, building contractor, Chicago. He has found that many tenants go so far as to remove such fixtures as built-in buffets and china closets and replace them with their own.

Certain fixtures may lend themselves to but one scheme of decoration where movable furniture would be more adaptable in many ways. When it is understood that many housekeepers wish to make occasional changes in arrangement the disadvantage of any but the most carefully designed fixtures is apparent.

A notable exception to this is found in the use of built-in kitchen combinations, medicine and linen closets and other household lockers which are designed entirely for their utilitarian value and do not in any way affect the decorative treatment.

Have Sleeping Porches Come to Stay?

According to Mr. Aymer Embury II, architect, New York, the present custom of building sleeping porches on the second floor seems unsettled. Personally, he does not believe that we, as a nation, have yet determined we want to sleep. He says, "If we are to have sleeping porches for everybody, the sensible thing would be to do away with bedrooms and use dressing rooms only, for sleeping porches, especially when enclosed, become practically rooms, so that the bedrooms have little or no outside air and are dark, stuffy, and unpleasant. For myself, I prefer a well-ventilated bedroom to all the sleeping porches in the world. They are often unsightly, makeshift affairs, but if we are to have them, let us have proper ones, permanently useful, each with its dressing room."

Carpenters' Quantity Survey Bureau

That the Master Builders' Association of Wisconsin is one of the most progressive organizations of its character in the country is well recognized. The sprightly *Builders' Bulletin,* the official organ of the association, edited by Secretary Ulbricht, announces in its June issue that one of the association's activities, "The Carpenters' Quantity Survey Bureau," is growing more popular every day and now employs five persons, all of whom are kept constantly busy getting out lists of quantities from plans sent daily to the bureau by the architects, who appreciate more and more the accuracy of the survey service and the saving effected thereby to owners.

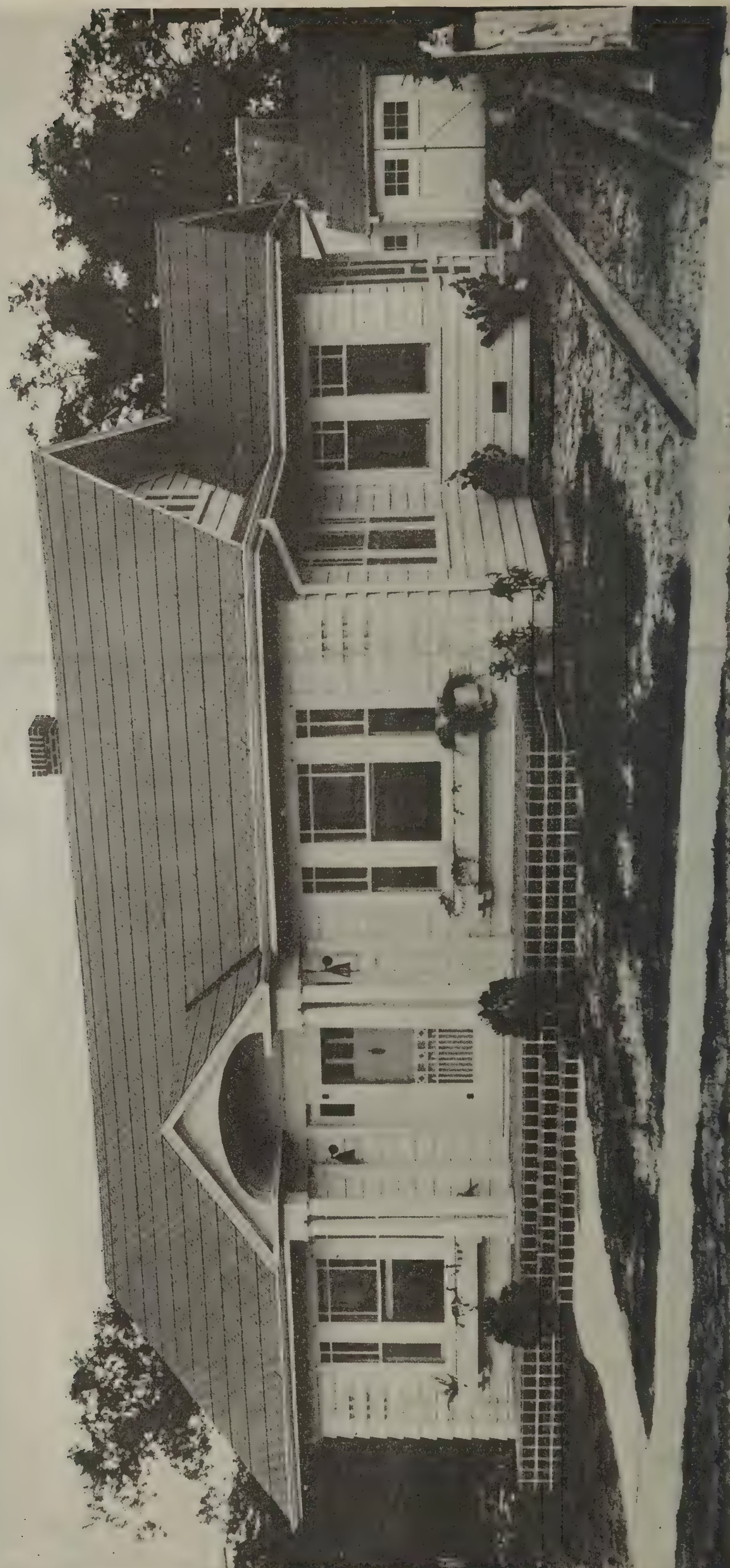
The Quantity Survey Bureau will soon rival in importance and popularity the great Builders' Insurance Company of Wisconsin, established by the association six years ago.

Architects have quickly discovered that by sending their blue prints and carpenters' specifications to the bureau about two days before they notify their prospective bidders to figure on such jobs they can more quickly secure the bids from such bidders, because the lists of quantities of the lumber and millwork will be immediately available. After the contractor has studied the plans and specifications so as to familiarize himself with the requirements he can at once begin to price the various items.

New Prices on Wire Nails

The current prices of wire nails, f.o.b. Pittsburgh, Pa., in carload lots are as follows:

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lbs.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.



An Eight-Room Bungalow. J. W. Northrop, Jr., Architect, Dallas, Texas
See Working Drawings in Detachable Blueprint Insert in this Issue

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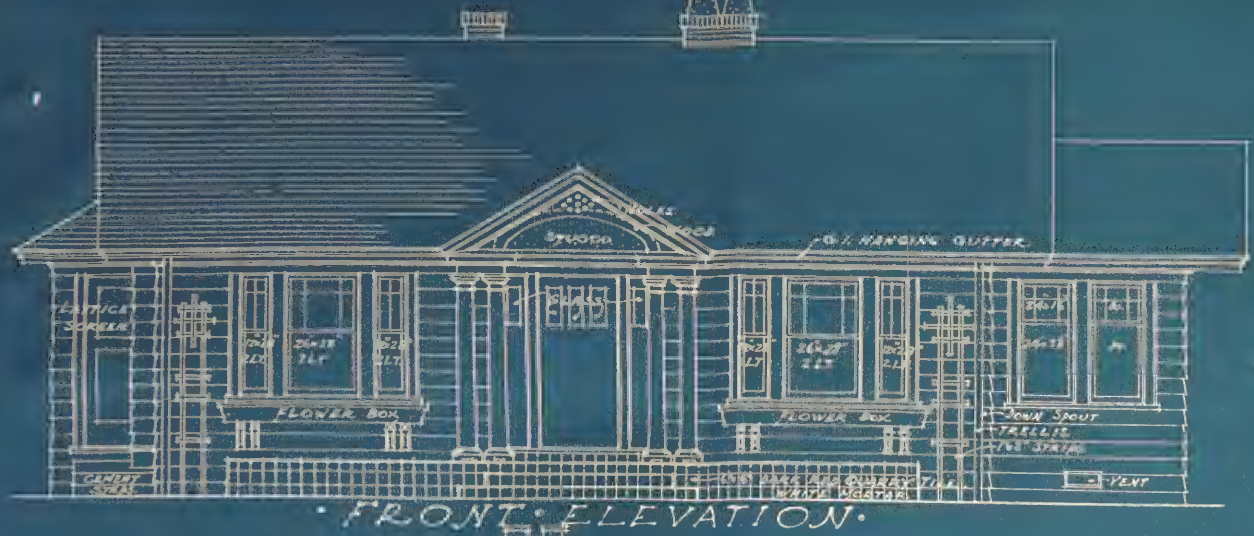
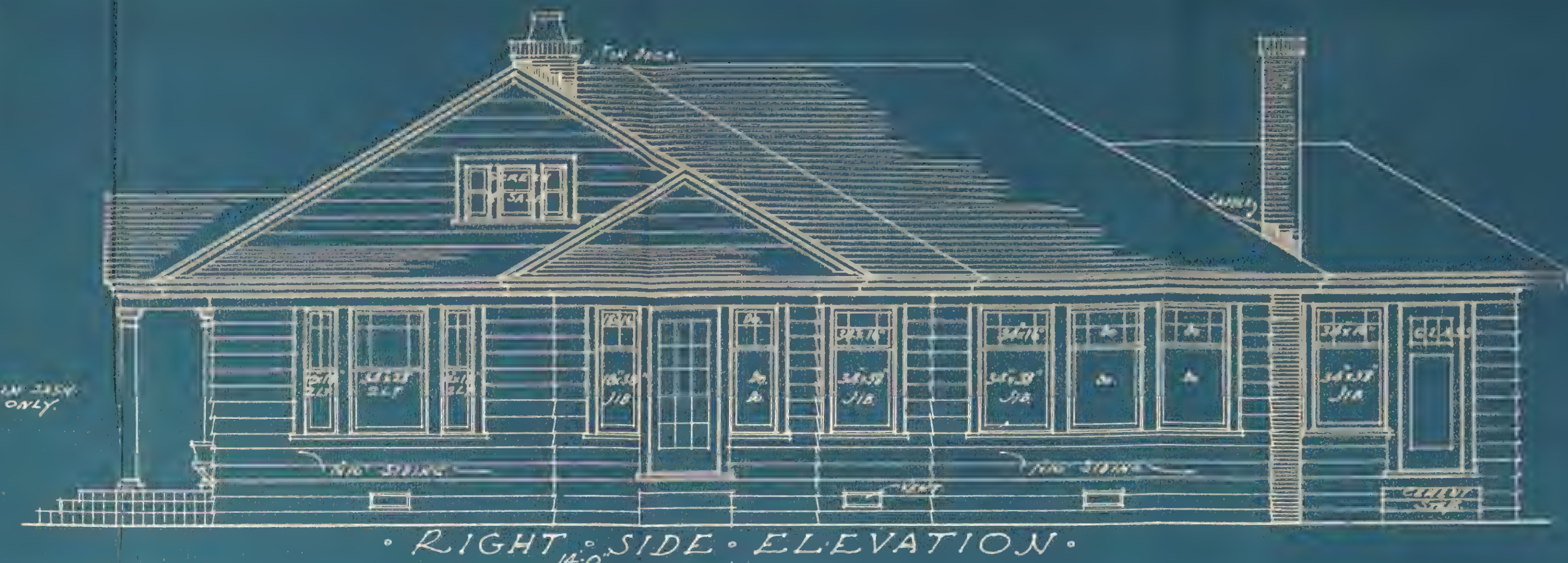
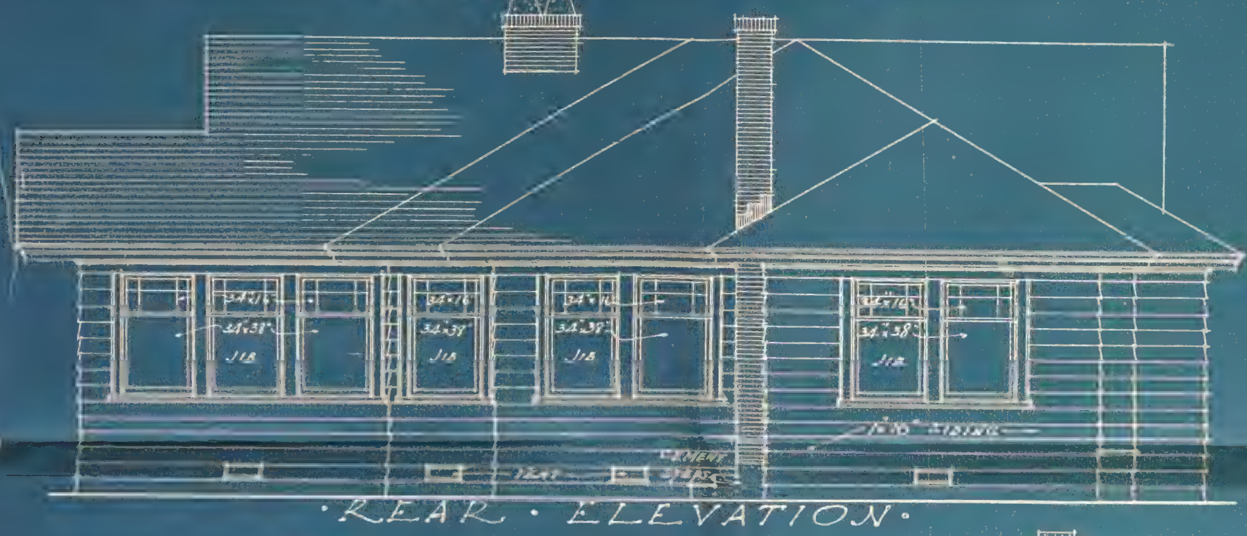
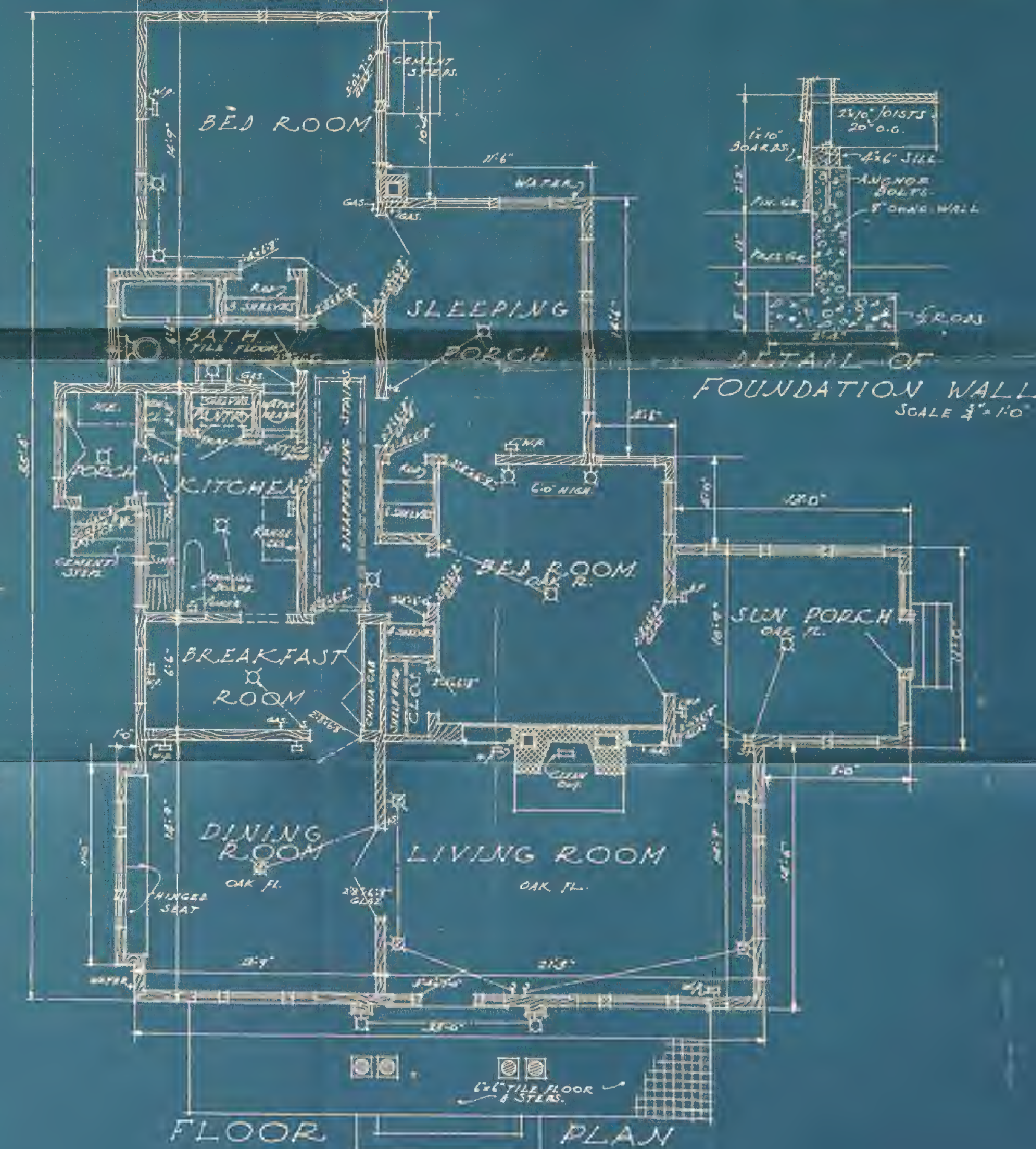








NATIONAL BUILDER

August, 1921

AN EIGHT-ROOM BUNGALOW

J. W. Northrop, Jr., Architect
Dallas, Texas

Scale: Floor plans and elevations, ¼ inch equals 1 foot

See photographs and description in reading pages

A Semi-Colonial Bungalow

Vorking Plans of this Eight-Room Bungalow are Shown in the Detachable Blueprint Insert in this Issue

BUNGALOW plans remain much the same, or perhaps it is more accurate to ıy that they are as varied as ever; each eeking to best serve the individual require-ıents of the owner. Bungalows are of such omparatively recent introduction and the

The windows are of "jib" type for increased ventilation

equirements of owners are so varied that t is quite unsafe to point to any bungalow lan and say that it is old-fashioned or ut-of-date.

On the other hand, bungalow design—imiting the term to the "looks" or appear-nce—is undergoing important changes, the ıost noticeable of which is the substitution f lighter and more carefully studied details nd accessories for the heavy "mission" or rustic" treatment of the earlier types.

The increasing popularity of the colonial tyle is no doubt largely responsible for the hanging methods of bungalow design, and, lthough there is no strict precedent for the esign of a colonial bungalow, many bunga-ows tinged with the style have lately been esigned. This gives rise to the specula-ion that perhaps the adoption of colonial etails to the bungalow type of house will ventually result in the development of a istinct manner of design that will satisfy hose who clamor for a modern American tyle.

Until lately, one of the most noticeable haracteristics of bungalow design was the pen porch extending entirely across the ront with heavy, squat columns or piers upporting a beam of tremendous span. uch porches are not only expensive, but hey are seldom pleasing in appearance. urther, they usually cut off light from im-ortant rooms and are really useful only uring pleasant weather, if at all. In the most advanced work, the porches have been much reduced in size. In many cases being contracted to a mere covering at the en-trance sometimes with a paved terrace along the front of the house.

Porches of this type are naturally adapted to a colonial treatment, which doubtless has had some influence in fixing the style. Inte-rior details also reflect the tendency to get away from the heavy treatment so long in vogue. Less lumber and more common sense and good taste is being used in interior design.

The house which is the subject of this month's supplement is a good example of recent bungalow design. It was built last spring in Houston, Tex., for L. C. Barrell. The architect was J. W. Northrop, Jr.

This bungalow can scarcely be called a true colonial design, but the general han-dling of the detailing has enough colonial feeling to justify the use of the term semi-colonial in describing it.

In this example the front porch consists of a terrace across the front of the house, only the portion adjacent to the entrance being covered. The use of red quarry tile gives an individual touch to the terrace, and the flower boxes and trellises add a home-like feeling to the whole. The coursed shingles of the roof repeat the horizontal lines of the wide siding and add interest to the otherwise monotonous or "thin" appear-ance that is produced by most composition shingles.

The construction is of frame, insulated throughout and covered with wide boards painted white. The foundation is of con-crete and the roof is covered with compo-sition, slate-surfaced shingles. There is no basement, but the house is provided with hot water heat by means of a compact heat-ing plant located on the first floor.

The sleeping porch and the sun porch are of the enclosed type, glazed on all exposed sides, and except for the fact that more wall space is given over to windows, they differ in no essential respect from the other rooms.

Fireplace of Colonial type

It will be noted that the bedrooms and the porches are grouped together at one side and end of the house. This was considered essential in order to obtain full advantage of the prevailing breeze which is from the Southeast in this locality. Practically all of the windows throughout the house are of the "jib" type, the larger lower sash sliding into a pocket at the head so that about two-thirds of the full area of the opening may be cleared for ventilation. As a matter of fact it is doubtful if this additional area of clear opening offers any actual advantage over ordinary equally divided sash in which the upper half is lowered for ventilation, as the latter method offers a better opportunity for the escape of the warmer air of the upper portion of a room. Of course the discomforts from hot weather are largely psychological or imaginary and it may be that a larger opening, although less efficient, might be more satisfactory to many minds.

The living-room has French doors leading to the dining room and the sun porch. At one side is a fireplace of colonial type flanked by bookcases. The dining-room has a built-in seat in a bay at one end and opens into the breakfast room which contains a built-in china cabinet. The breakfast room is separated from the kitchen by a cased opening and also has a door to the hall which connects the other rooms of the house.

The kitchen has a built-in ironing board and a small pantry is provided at one end. At one side of the pantry is a vegetable closet and at the other is a closet for the water heater. A small entry porch with space for an icebox opens from the kitchen. The window of this porch is not glazed, but is screened and provided with shutters that may be closed when necessary.

The hall contains an attic stair of the disappearing type that is counterbalanced so that it folds flat against the ceiling when not in use. A stair of this type is well adapted to use in houses such as this one where space for a stationary stair is not easily had and where a stair has only limited usefulness.

The bathroom has a tile floor and the three customary fixtures. Each of the bedrooms and the sleeping porch have closets, and a linen closet is provided in the hall. The hall is lighted through glazed doors opening from one of the bedrooms and from the sleeping porch. French doors lead from the sleeping porch to the rear bedroom.

The "Unit Hour" Basis Simplifies Estimating and Makes It More Uniform

A Table for Carpenters

The antiquated method of estimating the cost of a building on the basis of a certain (or uncertain) price per thousand feet of lumber, or per thousand brick, or per square or cubic foot of material, etc., is rapidly giving way to a more systematic procedure, namely that of figuring such costs upon the so-called "Unit Hour" basis, says the *Builders' Bulletin* of the Master Builders' Association of Wisconsin.

Every contractor knows (or he ought to know) how many hours of labor are required to perform one or another kind of work. He does not, however, always know how many dollars it will cost to do this same kind of work unless he also knows and takes into consideration the possible fluctuations of the wage rate affecting the particular class of work. Such rate is apt to be either higher or lower on the next jobs figured by him. Therefore, if a contractor will determine for himself the number of working hours required for performing a certain class of work (for instance, the framing of studs, joists, etc., or the laying of floors or sheathing), he can readily compute how many working hours it will take to work up all of the material required for the job. Then, by multiplying the total hours by the current rate of wages he can easily arrive at the exact cost.

The Quantity Survey Bureau of the Master Carpenters' Association, with the co-operation of several members, has compiled a schedule, or table of unit hours, for computing the cost of carpenter work, and we therefore would ask carpenter contractors to study the table and to compare the "unit hours" shown therein with their own experience and time for doing the various classes of work. If through greater efficiency on their part or on the part of their men they are able to reduce the "unit hours" given in the table they can easily compile a table of their own and figure their work accordingly.

Size	Material	Unit Hours per M ft.
2 x 4"	Studs	32 hrs.
2 x 4"	Rafters	39 "
2 x 4"	Partitions	54 "
2 x 5"	Studs	31 "
2 x 5"	Rafters	37 "
2 x 5"	Partitions	48 "
2 x 6"	Studs	30 "
2 x 6"	Rafters	36 "
2 x 6"	Partitions	46 "
2 x 6"	Joists	26 "
2 x 8"	ditto	24 "
2 x 10"	ditto	21 "
2 x 12"	ditto	19 "
2 x 14"	ditto	17 "
3 x 8"	ditto	19 "
3 x 10"	ditto	18 "
3 x 12"	ditto	17 "
3 x 14"	ditto	16 "
3 x 4"	Sleepers	40 "
Furring	On Wood	110 "
	Brick	240 "
1 x 2"	Tile	360 "
	Concrete	600 "
1 x 3"	Bridging	75 "
4x6—8x8	Timbers	24 "
8x10-12x12	do	22 "
1 x 6"	Boards	16 "
1 x 8"	do	14 "
1 x 8"	Cut betw. Joists	24 "
1 x 4"	D&M Floor	25 "
1 x 6"	Sheathing	18 "
1 x 4"	Siding	46 "
1 x 6"	do	33 "
1 x 4"	Mitered	50 "
1 x 6"	Siding	37 "
1 ¼"	D&M Floor	30 "
2 x 4"	" "	25 "
2 x 6"	" "	20 "
1 x 6"	Drop Sidg.	28 "
1 x 8"	" "	25 "
1⅛" Face	Maple	80 "
2" "	or Oak	45 "
2¼" "	Flooring	40 "
	Add for Planing or Scraping	
	Maple	50%
	Oak	80%
1¼ x 3"	Bridging	60 hrs.

The table herewith is practically self-explanatory. We wish to says only, that the "unit hours" shown in the third and last columns represent the number of working hours which in the opinion of the committee are required to frame, put in place and finish 1,000 feet of the various kinds of lumber shown in other columns. By multiplying the actual quantities required for a job by the number of "unit hours" the total number of "work hours" are obtained and the latter are then multiplied by the current wage rate. If such a table of unit hours is once established by a contractor it will not be necessary to make many changes in same. The only changes required are those caused by a possible fluctuation of the wage scale.

Spread of Building Knowledge

Indications are that building mechanics will be recruited and that the coming generations will have a broader knowledge of practical building matters than past generations, are shown by the interest taken in the public schools in building construction problems. In Portland, Ore., manual training is an important feature of the public school work and to show what the boys could do in the way of home building pupils at the Sellwood School a few weeks ago arranged an exhibit demonstrating a cottage in course of construction. The boys handled every bit of work from the foundation to the electric wiring, and their teacher, W. F. Potts, says they were intensely interested. By arousing interest in the manual training class, enthusiasm has also been aroused in other studies, so that the subject taught is serving more than one purpose.

How B. M. Neil Built a Business

By Eugene F. Tinker

SALINA, Kans., a prosperous city of 15,000 folks, had at least a score of "builders" when B. M. Neil arrived on the scene in 1917. To be sure they had enjoyed a thriving business up to that time, but it required the vision of this newcomer to prove to them that they had been only half working. The stimulus of an unprecedented demand for houses had not caused them to double their crews—they had done very little progressive advertising—why should they, when business was already good?

Well, Mr. Neil soon provided an answer, namely, to handle the business that was *waiting* for someone, instead of trying to stretch out this new era of "building prosperity" through as long a period as might be possible for them to do.

The very first thing Neil did was to buy some good signs. Something like the following was displayed on each contract residence during the construction period:

THIS HOUSE
BEING BUILT BY
B. M. Neil
Builder of Better Homes

And the citizens were not slow to begin an investigation of the so-called "better homes," with the result that they found virtue in his declaration.

They *were* "better homes" in several ways. Mr. Neil possesses a fine sense of what might be termed "building fitness." Very early in the game he learned that a house which looks commodious and well-proportioned on one lot often appears unsightly and undesirable in another setting. And in his career as a builder he has adhered very closely to this principle. General effectiveness is considered quite as carefully as are floor plans and other technical details.

When Mr. Neil "delivers" a house, it is absolutely ready for the owner to lay the rugs and begin housekeeping. No details are left uncared for. Shades are hung, woodwork carefully dusted, all scraps about the place are picked up, and in brief, the purchaser is made to feel that he has indeed a *home*. Attention to these seemingly unimportant details has won for Mr. Neil a large circle of friends. And it is through this type of service that Mr. Neil receives additional contracts from his friends' friends.

B. M. Neil, builder, "on the job"

Another point of inestimable value is that people have found Neil to be a man of his word. If flooring or finish or cement of a specified quality changes in price after the contract is signed, he doesn't try to substitute any of the "just-as-good" brands, unless with the full consent of the purchaser. He has discovered that a possible loss on an isolated contract is far better than an attempt to "under-fill" and thereby lose several other profitable contracts in the future.

And now for the most interesting part of the story. B. M. Neil usually builds a house and sells it himself, instead of working on the old contract plan. In all cases he tries to make terms to suit the purchaser. Such a business concession has brought him good returns.

"But how has it been possible for so young a man to handle a building business on such a large scale?" you ask, and the question is merited.

Mr. Neil is just 35 years old, and yet in four years' time he has built one hundred homes in a community where he started as an absolute stranger. Surprised? Then consider also that when he arrived in Salina his capital amounted to $1,800 all told. With a $400 cash payment he secured seven building sites, and three houses were well advanced before he even received a title to the lots.

"Nerve?" you say. No, not this time. *Judgment* is a more appropriate term. He didn't just *happen* to make good on the venture; everything was in his favor. The real merit lies in the fact that he has made good in a way in which 20 other contractors had failed to do when the opportunity was first theirs.

Much of the time he has been operating with two crews of 15 men each. The business has acquired such proportions that his latest investment involved a $20,000 purchase right in the heart of the fashionable residence district of the city—and this, too, represents an opportunity for an apartment section which other builders had not believed feasible.

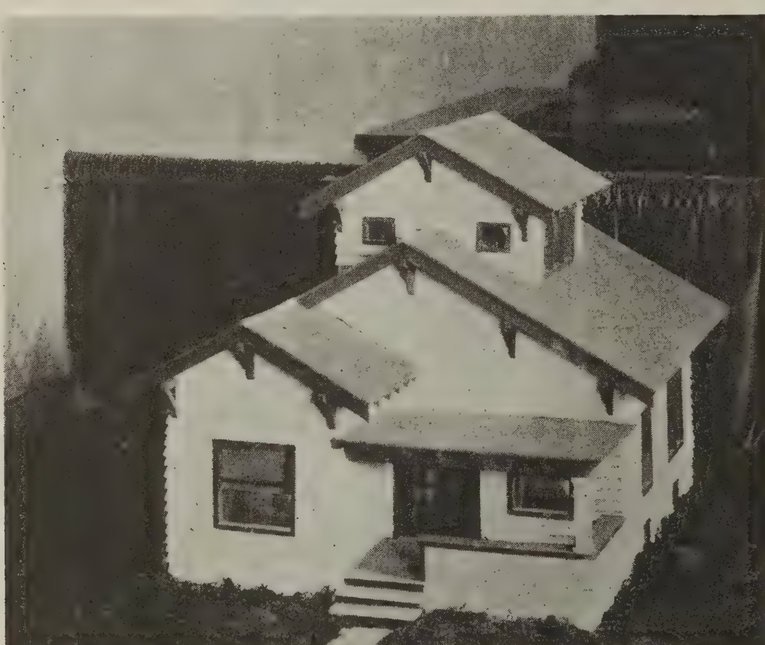
Perhaps his finest piece of work in Salina lies along the Santa Fe Wilson-Highland Avenue block. Here he planted 16 houses—yet a stranger driving down the street would never guess that the same man had designed them all, so different in type and color scheme are the exteriors.

Competitive builders complained because a few of his houses were placed on a 38-foot front. Mr. Neil quietly defeated every argument by putting up houses that are

Looking south **Some of B. M. Neil's houses** **Looking west**

really adapted to the medium space available.

Again, where most builders feel that "most any place" will do for office space, Mr. Neil secured a downstairs location in the best block available, and the office furnishings were first class, even from the beginning. A sign on the glass front was not enough. Somehow he found opportunity to have a model home constructed "to scale," painted, and electrically-lighted, which daily attracts the attention of scores of passersby. If any of them are prospective home owners, they will not easily forget the pretty little home in Neil's window—and they are bound to figure with Neil sooner or later—just because the psychology of his advertising is correct.



This model house in B. M. Neil's office window, lit up inside with electric lights, was a permanent "peppy" advertisement that demanded attention and made the name of the builder and his business stick in the mind of every passer-by

In 1920, The Bert Neil Building & Investment Co. was incorporated with a good business to begin on. Mr. Neil is likewise president of the Saline Mortgage Co. this election having taken place early in 1921.

The whole world honors a worker. Salina capital is getting back of this man who has demonstrated that he means business. As a mere incident in his building program, he spent the greater part of three months in the working out of a cost record system which is now being duplicated in the entire state. He knows that "guessing at" or "lumping off" certain items of a proposed contract is but paving the way for greater uncertainty farther on in the business. Therefore a record is made and kept of every house on which he figures, regardless of whether he gets the job or not. It is possible by such a method to know when he delivers a house, just what the deal has netted him and whether the profit came by the figures on lathing, shingling, dimension material, decoration, plumbing, or any other item or combination of items.

After all, Mr. Neil is entitled to succeed. There is no reason for calling his success "luck." Long hours overtime, careful planning, advertising, square dealing, and everlasting persistence—certainly if this is a description of "luck," then he has already earned a double portion of that state of grace.

A Builder's Publicity

W. N. Worrall, builder, of Kennett Square, Pa., announces his business to the public by the attention-arresting sign here shown. It has a real shingled roof.

A permanent and practical indicator of a builder's business

A Proved Cost Record System

This is Another Side of B. M. Neil's Methods by Which he has Won Success as a Builder

"THE average builder is still in the dark so far as his knowledge of accurate building estimates is concerned," Bert M. Neil declares. As a builder and contractor, Mr. Neil has set a standard in his home community at Salina, Kans., which entitles him to speak with authority concerning so important a subject.

He has not been content with merely floating on the wave of building which has swept the country. When other builders were able to make a liberal guess on material prices and make good on the "gamble," Mr. Neil reasoned that accuracy is quite as important in figuring an estimate as it is in making a join. Therefore he set himself to the task of working out an accurate cost record system very early in the game.

"The average contractor guesses on his building costs. They are in no sense a true estimate. If an estimate is to be made of every detail every time someone asks for figures, you can depend upon it that that builder has time to burn or that he has failed to utilize much of his previous work. Why shouldn't he *record* his estimates?" Mr. Neil brought his fist down on the desk.

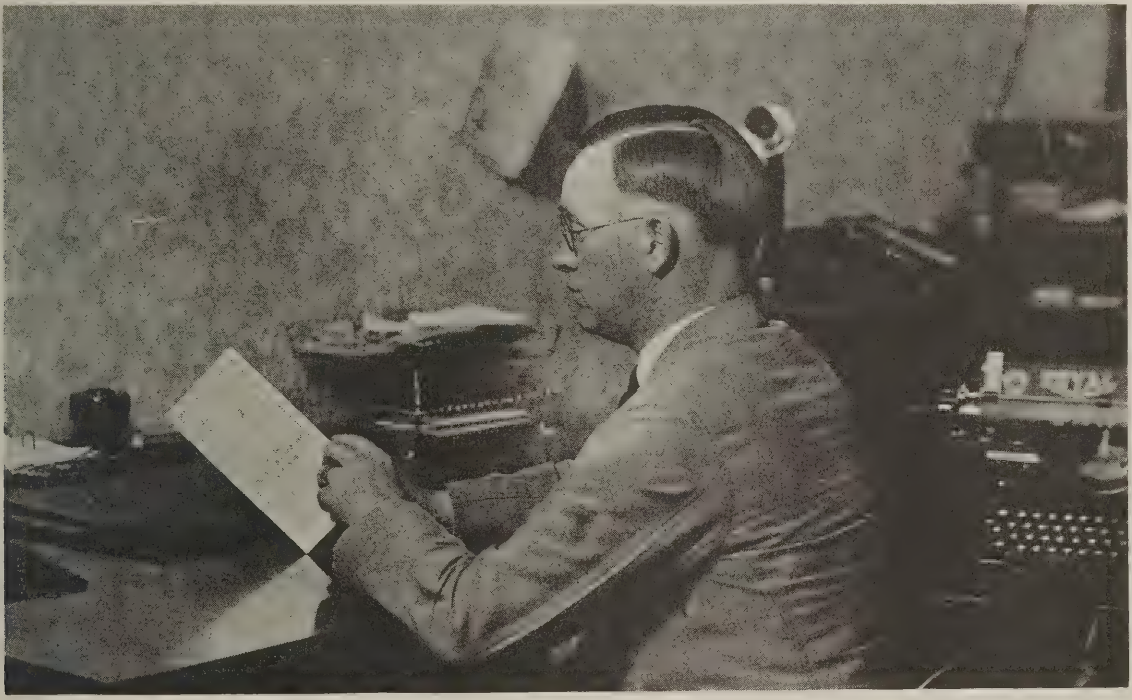
Then in that frank informal way which characterizes the man's business hours, he explained how he had been able to overcome much of the uncertainty of estimates through the use of a cost record system worked out during his "odd hour" time.

My first investigation of Mr. Neil's system convinced me that his claims were conservative. His "estimate booklet" is so arranged that all estimates are made on the basis of units so that any change of price does not affect the basis for any future estimate which might be necessary. For instance, if a certain number of shingles are used in a house estimate today, we know that the same number will have to be figured for the same size house three years from today. In fact, these days of market uncertainty makes this situation even more acute. All contractors are being asked for figures on the same job at different periods. Now, if a record has been made of the previous estimate, all that need be done in order to bring the figures "up-to-date" is to look up the market price on materials which have changed, add or subtract the amount of the change in price to or from the total estimate on the house, and presto, there you are!

First of all there is a great saving of time through such a system. Again, such a record helps a contractor to be definite enough with his figures that he will know much more about his own plans when he is through with paper and pencil. When everyone knows that lathing may be estimated in terms of yards, and that a certain "job" requires 700 yards lathing at six cents today, even an inexperienced stenographer can take Mr. Neil's unit system at some other date when lathing may have been reduced to four cents and in a few minutes discover for the inquirer that the estimate will be \$28 instead of \$42 as formerly estimated.

The rule concerning lathing or shingling estimates applies equally well to the smallest item in the house. Even mortar colors are estimated on the basis of "pound units." It must not be understood that a beginner can use this system like a veteran contractor, but the useless duplication of work in estimating numberless times on innumerable items when half the work might be spared is no doubt apparent by this time.

I took up one of Mr. Neil's Cost Records which he had just taken from his files. It was an estimate on a house which a party had first asked for two years ago, then came a delay of almost a year before the characteristic request, "What can you duplicate those plans for now, Bert?" made it necessary for him to submit a second estimate. On the flyleaf I noted a neatly sketched plan of the first and second floors, with main and special notations made on the margin concerning specifications. Through the following pages were listed items of Hardware, Lumber, Doors, Millwork, Painting, Decorating, and Miscellaneous Items. Each page when open presents seven columns—the first half for the Estimates, the last part for Verification.



B. M. Neil has a complete record of every item on every job and every job has its own book of specifications in detail

It was easily understood that under his plan an item of hardware would require additional columns of "quantity" and "per unit" and "total," but I did not understand at once why Mr. Neil had carried the idea of "Verification" across the following page in each case using the columns of "Quantity," "Cost," and "Remarks." Presently we turned to "excavation." I noted the number of yards of dirt hauled according to the Verification tallied with the estimate. One factor varied. The ground had been in unusually good condition for working just at the time, in addition to being of a slight sandy composition and the result was that problem of accuracy as well as providing a type of Cost Records which will save many hours of time when Jones or Smith comes in with, "Say, what can you build me a house like Brown's for?" He or his assistant can note the market changes which have come since Brown's house was built, and in a remarkably short time, arrive at a scientifically accurate estimate.

I turned through the pages again. On the last page I saw that a notation of the total cost together with added profit and total bid had been made. And the profit added was much less than I had supposed. After all, if a man is *accurate* he doesn't

Estimate

To be Erected

Type of House

Size of House

Garage

Bert Neil
Building & Investment Company

Salina, Kansas

112 S. Santa Fe Phone 270

MONTGOMERY BOOK & STATIONERY CO. SALINA, KANS. 1760

Item	ESTIMATE			VERIFICATION		
	Quantity	Per Unit	Total	Quantity	Cost	Remarks
MILL WORK						
Bed Mould 8016						
Bed Mould 8018						
Crown Mld 8020						
Cove Mould 8060						
¼ Round 8065						
Stool Y. P. 8267						
Stool Oak 8267						
Apron Y. P. 8641						
Apron Oak 8641						
Lattice 8280						
Lattice 8282						
Battens ⅜x3						
Drip Cap 8284						
Drip Cap 8285						
Door Stop 8541						
Win Stop 8541						
Stop Oak 8541						
Cove Y. P. 8029						
Cove Oak 8029						
Brick Mld 8046						
Screen Mld 8139						
Panel Mld 8153						
Hook Strip 8627						
Picture Mld 8264						
Pctre Mld Oak 8264						
Case Y. P. 8309						
Case Oak 8309						
Chair Rail 8640						
Oak Rail 8640						
Back Bnd Y. P. 8378						
Back Bnd Oak 8378						
Base Y. P. 6 In 8385						
Base Oak 6 In. 8305						
Base Y. P. 8 In. 8386						
Base Oak 8 In 8386						
Cap Mould Y. P. 8396						
Fillett Y. P. 8395						
Fillett Oak 8395						

Reproduction reduced one-half of a page of Mr. Neil's specification booklet and a half-size reproduction of the title page

Mr. Neil actually completed the Item for $10 less than the estimate.

Now carry this same idea through the many, many items which go into the figuring on a contract, and when the house is completed, the builder may take his pencil and know what particular items "lost" or "earned" for him. It is not enough to know that a profit of $200 came from a certain piece of work. The whole procedure may have come through a few items, while still other items were poorly reckoned with. If a contractor is to put *"business"* into his business, he should be able to know what each of the items contributed to his profit or loss when he is through.

Thus Mr. Neil has solved for himself the have to throw in a hundred or so to cover up "unthought-of" details.

The Bert Neil Building & Investment Co. of Salina has already had the satisfaction of seeing their Cost Record System not only indorsed by some of the largest building corporations of the country, but likewise adopted by them in their building operations.

"You are going to copyright the plan?" I suggested to Mr. Neil.

I shall not soon forget his significantly expressed "No!"

"If I am able to make this small contribution to the builders who are so badly in need of some system for keeping records, I shall be indeed glad to render them such a service."

This is quite like Bert Neil. His business has prospered because his methods have been efficient and his service better than that of his would-be competitors. But he has never ceased trying to lend assistance to those of his line who are willing to learn. It is more than "live and let live." He has adopted a finer and more humanitarium policy. If expressed in words it might be summarized as, "Learn to do your work better than it has ever been done, and then teach your competitors how they may go and do likewise, *if they will.*"

"Practical Business Methods for Contractors"

Supplementing the work issued under this title, the Frank R. Walker Co., designers of standardized forms for engineers, contractors and architects, Chicago, have issued "Practical Business Methods for Jobbing Contractors and Others Performing Small Work," in which the easiest and best methods of how to increase profits and stop leaks are shown. Forms for every purpose are illustrated and fully described. The subject matter is of a highly educational character and a distinct contribution to the elimination of waste time and loss in the building industry.

Selling on Rent Payment Plans

MILLS AND SONS, building contractors of Chicago, have been selling homes on easy payment plans for many years. During this time they have tried out a number of methods, but have found their present plan to be the most satisfactory.

As an example, they are now building 63 four- and five-room two-flat buildings each of which, together with the lot, is to be sold for $10,500 and as a part of the contract Mills and Sons agree to complete the street paving at no additional cost to the owner. Three hundred houses will cover the scope of this development.

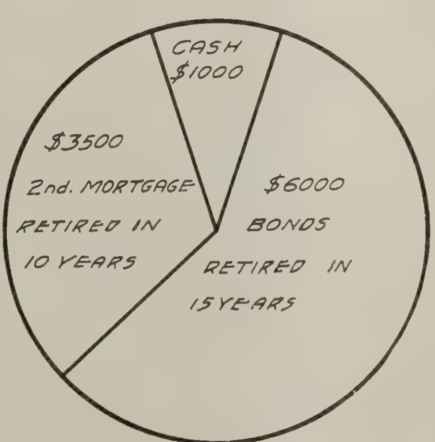
Sixty-five of these two-family buildings are being erected. Three hundred will be included in the development

The terms of sale are as follows: The purchaser is required to make a cash payment of $1,000.00, the remainder to be paid at the rate of $80.00 a month, which includes all accrued interest at 6% on the deferred payments. The balance acts to retire the indebtedness, which it will do in about 15 years.

A unique feature is noted in the method of financing the building project. In the past it has been the custom of this company to market separate first mortgages on each individual piece of property among a circle of small mortgage bankers. This circle of mortgage bankers is growing smaller from year to year as bonds have found a more ready market with the investing public.

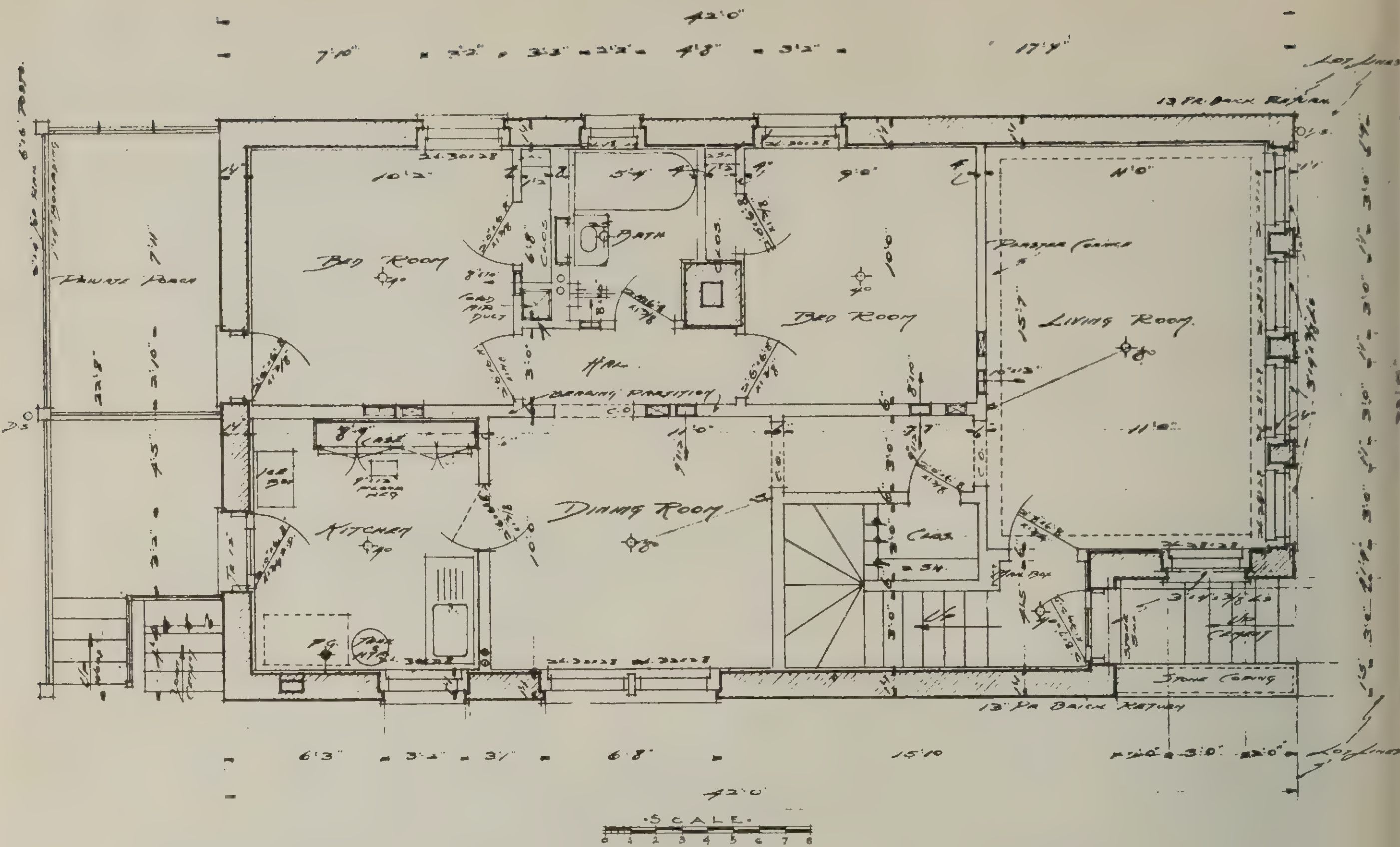
Under a plan developed by S. W. Straus and Company, the financing of the project was made possible by the issuance of first mortgage bonds secured by the entire 63 buildings. This plan is fully described by Mr. L. F. Stern, vice-president of S. W. Straus and Company, further on in this article.

The manner in which the indebtedness is reduced is shown graphically on this page. Of the amount paid on each building for the first 10 years $200 a year is used for the retiring of the bonds. If the bonds are to run until fully retired by the monthly payments they would be taken up in about fifteen years. The $3,500 second mortgage is entirely paid in about ten years, after which time all of the payments can be applied to the bonds.



Of the first monthly payment of $80, over $47 is used to pay the accrued interest. The rate at which the interest portion is reduced and the principal payment increased is shown on the next page. In this circular graph, each radial line represents a monthly payment of $80. The part of the line within the shaded area is the interest portion of the payment, the remainder being applied to reduce the principal indebtedness. In these payments, extending over a period of fifteen years, or 180 months, the interest is reduced from about $47 in the first month to about 40 cents in the last month.

Mr. Lawrence Mills, of Mills and Sons, predicts that some such a plan of financing the various housing projects will materially help in solving this problem. He further believes that the only way to insure a home building program of wide range is to make the terms of purchase approach very closely the amount of a reasonable rental. He gave an example of the success of one project, from the purchaser's standpoint, wherein bungalows, built by this company, were sold on easy terms before the marked advance in rents took place. Now, however, a nominal rental for one of the buildings in this group is about twice as much as the purchasers are required to pay to retire the mortgage and to meet all interest accrued. Hence the recourse to two apartment buildings, with the result that though none of the apartment buildings are complete, many of them have been sold. As an indication of the ease with which flats may be rented, Mr. Mills has had hundreds of requests for flats by renters who do not care to buy. It is the intention of the company to rent single flats in a number of the unsold build-



Typical floor plan. First and second floors are substantially the same plan

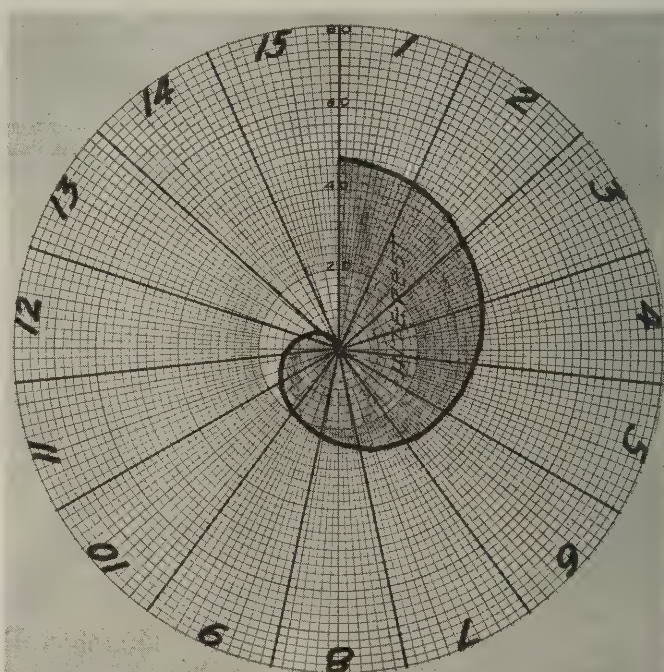
ings as soon as they are completed. In some buildings the first flat will be rented, while in others the second will be rented. In this way it will be possible to sell a building that already carries with it a fixed revenue to the purchaser, and at the same time it will be possible to suit his taste in the matter of the flat he wishes to occupy.

The financing of this project was made possible by a plan developed by the banking house of S. W. Straus & Co. It was the belief of this institution that if the larger lending institutions would interest themselves in financing the construction of housing facilities in smaller units a considerable impetus would be given to the solution of our housing problem, and they announced a reduction of their former minimum of $500,000 for construction loans to $200,000 and a number of loans have already been made as the direct result of this policy, the most interesting, in view of its unusual character, being the loan upon the Austin Manor Apartment Buildings, described above. In the case of this loan, an innovation in real estate mortgage financing was introduced in order to apply the facilities of real estate mortgage bond issues to the construction of moderate-priced homes.

Experts are in substantial agreement that the two-family house is perhaps the best solution to the problem of providing homes at moderate rentals, but the large lending institutions have heretofore largely confined their loans to the larger apartment house units.

However, this company has worked out a plan under which the large sums which can be raised through real estate mortgage bond financing may be applied to the construction of small units; while at the same time, the interests of bondholders are so thoroughly safeguarded as to make the bonds underwritten in accordance with this plan very attractive and successfully sold.

The new bond issue thus described is secured by 63 separate two-family apartment buildings, located in Chicago at North Avenue and 60th Street. Each building is designed to furnish two flats of five rooms each, fitted with electric lights, hardwood



Monthly payments of $80 over a period of 15 years, showing amount of interest included in each payment.

floors and all modern improvements. The houses are of brick and stone construction.

Under the new plan the whole property, consisting of 63 separate houses and the lots on which they stand, will be covered by a blanket mortgage; thus the bondholders will be protected by a mortgage covering all of the 63 separate properties. In addition to this the method by which the income return of the property is applied for the benefit of the bondholders constitutes an unusual feature of this financing.

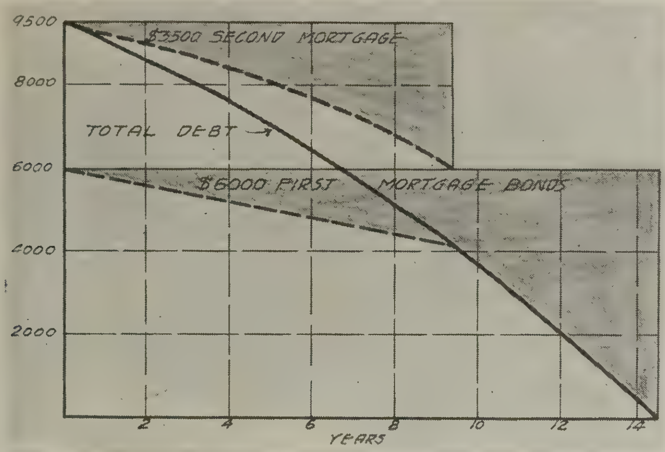
Under this method the houses with their lots will be numbered under the mortgage from 1 to 63. The individual properties will be sold by Mills and Sons under a partial payment plan as already described. This plan makes it possible for prospective owners to purchase by payments extending over a period of years. These payments will amount to a sum equivalent to a moderate rental. Under the usual provisions of the Straus plan the monthly payments coming in from the property in this way will be applied to meet the monthly payments of principal and interest coming due to the bondholders.

The yearly cash return from the whole property under this plan will aggregate more than two and one-half times the greatest annual interest charge and will be more than ample to take care of the serial payments of principal in addition to interest.

In this way the interests of bondholders will be entirely safeguarded while at the same time the houses can be offered for sale on such attractive terms as to insure the success of the enterprise.

A further provision of the trust deed in this issue provides that any individual house can be released from the blanket mortgage upon retiring $6,000 in bonds of the last maturity at a premium of 2%. This $6,000 represents the proportional part of the security represented by each separate house. These provisions will make possible the automatic release of any individual house when the owner desires to pay off the encumbrance against it; but at the same time the security remaining to cover the outstanding bonds will be proportionately as large as ever.

S. W. Straus and Co. report that the serial bonds based on this project have been very popular with their customers.



Note rapid drop in ninth year

Minneapolis Home Financing Corporation

The movement to stimulate house building in Minneapolis has culminated in the organization by the business men of a Home Financing Corporation that is likely to produce some large results in the near future, though it is only now getting to work. Its president is Samuel N. Reep, who outlined to the representative of the NATIONAL BUILDER the plan on which the corporation is operating.

This corporation differs from many others in that it does not claim to be a philanthropic association. It is entirely on business lines. About a quarter of a million dollars has been raised and placed at the disposal of the corporation.

It finances the owner of the home and not the contractor. A man that wants to build must have 20 per cent of the amount to be expended, but if he owns a lot that is counted as a part of the 20 per cent. Then the man selects a contractor and the two of them make out a full list of all the things that are going to be required in the construction. No bond is required of the contractor, but all the bills are sent in to the corporation and are paid as they become due.

It is a cash business right through, and the discount saves a considerable sum of money. The plan is a good thing for the contractor for he gets his money at once. Above all, it saves the enormous discount that a builder often has to give when he wishes to sell a second mortgage that he may be holding, which discount he adds to the cost of the house. As the corporation charges only 3½ per cent discount on a five-year loan, there is a saving at this point, for 7 and 8 per cent discounts are being generally charged for such loans, even for a first mortgage.

This corporation thus loans a home owner 80 per cent of the value of the property. It is estimated that in five years he will have paid off enough of this loan to enable him to get a first mortgage elsewhere and thus release the funds of the corporation for other home building use.

Contractors Form Association to Handle Building Work

C. A. Gaudette, manager of the Soo Lumber & Supply Company at Des Plaines, Ill., tells of a contracting association that is being formed in that town. The association includes one contractor in each of the common building trades as well as the lumber and supply company. According to Mr. Gaudette, it is prepared to furnish plans and general building advice as a part of its service.

In taking work, the separate members make individual contracts with the owner, one to complete the foundation, one to do all the brickwork, one to do the plumbing, and so on, from the excavation to the decorating and painting.

The advantages claimed for such a method of operation are many. One contention is that the price to the owner will be decreased inasmuch as the association will not take a profit on the individual contractor's work, as must be the case when work is handled by a general contracting firm. The association merely acts as an agent for the members and makes it possible for the owner to deal with them individually.

A further saving is claimed in the matter of purchasing materials, as the supply company can insure their being ready when needed and can buy in large quantities at considerable saving.

Such a plan would seem to offer certain advantages, though it might be difficult to keep the association membership available should work become slack. To insure smooth operation it would be necessary for each contractor to be available for association work to the exclusion of all outside jobs. If building should become slack in this particular territory it is to be expected that individual members would seek contracts elsewhere. This would leave a gap that might interfere with the smooth operation of the association on such work as would come to it during the local slack season.

It will be interesting to watch the operation of this association, as its success would no doubt influence other contractors to form similar associations.

Building to Suit

By Joseph A. Holpuch

President, Joseph A. Holpuch Co., Building Contractors

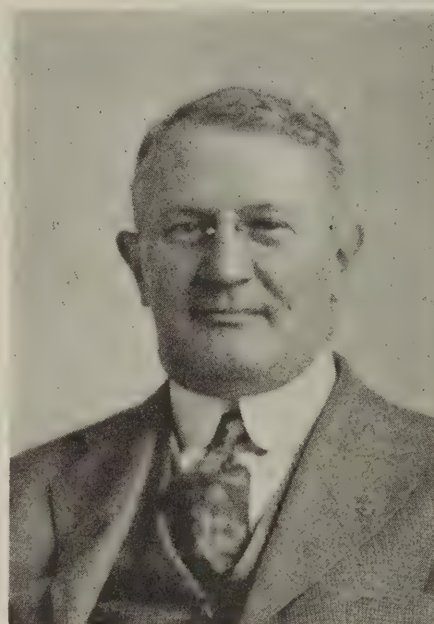
WE have built thousands of houses for sale under various easy-payment plans. While in the past we built great rows of them, with no distinguishing features other than in the color of the brick or in the development of porches and trim, our experience has shown this to be the wrong policy to follow, considered from any angle.

We now follow an entirely different plan, that of making the houses we build reflect the individuality of the owner. People don't want a house of one set style any more than they want a hat or a dress of one style. And selling houses is very much like selling hats and dresses. The prospective home owner often has a well-fixed idea in regard to the home. A hundred such prospects will doubtless have a hundred different ideas. Our present method of selling homes is to meet their individual wishes in the matter of design.

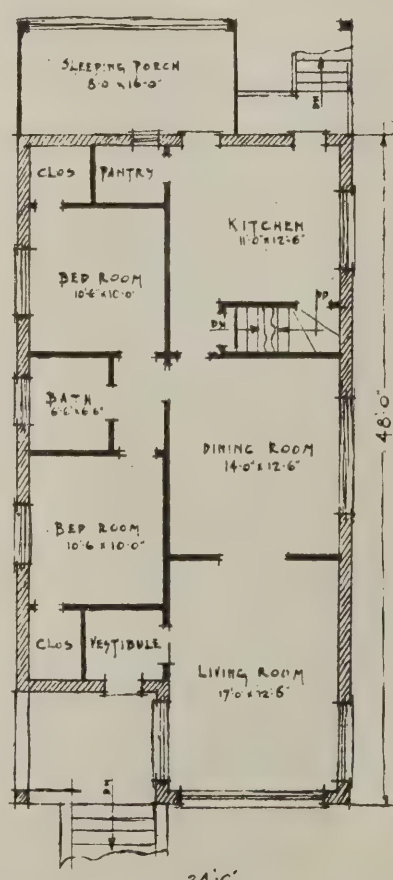
A representative home

We have found that by far the larger part of our prospective customers come to us with rough sketches of the arrangements they wish in their houses. Most of them also bring illustrations or photographs of the types of exteriors they want. With this information it is comparatively easy to interpret their wishes.

To do this we furnish an advisory service in charge of competent and experienced building men, to help our customers in their planning. Rough pencil sketches are made and changed until they suit the customer. It is often necessary to make five or six preliminary drawings before one is turned over to the draftsman who prepares the working plans. This is architectural service and we exercise every care in designing to suit the individual customer.



Joseph A. Holpuch



Typical plan

The charge for this service is merged in our general expense and may be considered as a part of our sales cost.

We have standardized nothing in the matter of design, size, or material, except that the building ordinances and local building restrictions be adhered to. We develop the prospective owner's own ideas, guard against poor or unsafe practice, and handle the construction work if he awards us the contract.

We are willing that bids be taken from outside contractors on our plans and specifications, and where it is possible for the owner to make a saving by letting the contract to one of these contractors we have always stood ready to assist in the financing of it just the same as if we did the work through our own organization.

As a result of our individual treatment of each case, we often have in one block houses ranging from five to seven rooms and of

Another of same type

one or two stories, no two of them in any way similar in appearance. The advantage of this method as compared with our earlier plan of building rows of houses of the same design, is apparent.

It is conceded that the chief advantage to be gained by building many houses of one design is in the decreased cost. To offset this argument we have found that any increase in cost for the individually designed house is very nominal and in no way proportional to the increase in desirability from the owner's standpoint. The desirability from the seller's standpoint is also increased, as is evidenced by the results we have noted.

Under the old plan of single design construction, one house was sold for about one hundred inquiries. One hundred prospective home owners were sufficiently interested to inspect the buildings and only one of them was sufficiently impressed to buy. Now, because the planning of the residence is left to the owner himself, we sell four for each five prospective purchasers who call. That fact alone should demonstrate the value of individuality in home design.

A further proof of the desirability of such a course is found in the decreasing number of foreclosures and broken contracts. This is due to basic psychological reasons. The home owners who plan their home are sold on it even before work on it is commenced. We might design them a house more convenient, more artistic, and of better material. But this house would not suit them as well as the one designed from their own ideas. Their planning makes the home a part of themselves and largely for this reason the chance of foreclosure is minimized.

There is a growing tendency on the part of home owners to get out in the open. Transportation facilities are improving from year to year, and each year sees building development extending farther and farther from the business districts. It was originally our custom to plant trees and to do all leveling and planting of shrubs and grass for lawns in the subdivisions we were developing. We now plant trees only. We find that the people want to do the rest themselves, that they desire the same individuality in their yards that they wish in their houses. They get outdoors, they meet their neighbors who are doing the same things, and they get acquainted. A spade, a hoe, and a lawn mower are shortcuts to real acquaintances and friendships and they do much toward building up the community idea.

While we have tried many different easy-payment plans we find that our present one works very satisfactorily. Our usual custom is to require a cash payment of 10 per cent of the total cost of the lot and the house. The remainder we arrange to take in payments of 1 per cent a month, and this is arranged to include the interest as it accrues.

Developing Real Estate Subdivision

By Wm. H. Britigan

THERE are scientific standards by which all subdivision properties are measured. Their value, marketability, and future development depend, to a large extent, upon these standards.

This property in a large subdivision has been set aside for the construction of bungalows. The natural features make its use in this way particularly appropriate

Ownership is the first essential consideration by home-seekers when investigating subdivision property. It is also necessary that the development company shall give the public full assurance as to the owner's responsibility and ability to deliver clear title to the property. An excellent way to accomplish this is to place the title in the hands of an established trust company as trustee and where possible give a guaranty policy as to title in amount equal to the selling price of the lot.

Next in importance is the feature of transportation. Existing surface lines, railroads, elevated railroads, as well as anticipated extensions and changes in these facilities, are valuable factors. The distance from and the facilities for reaching business and industrial centers are points of special consideration. The prospective buyer is most likely to ask for full information about the transportation before he gives the other features of the property any thought, and this factor alone very often controls his final decision to be reached after consideration.

I believe in improved subdivision property. This is property that is sold to the prospective buyer with such improvements as sewer, water, gas, and sidewalks, and in some instances paving. The sidewalks are put in first, then immediately followed by the sewers, next the water, next the gas. As far as improvements are concerned, this enables the home-seeker to build at any time.

A complete sewer system, with proper surface drainage, the water and gas mains, the service stubs for each of these inside the curbline, and street paving are necessary improvements for a home community and should be pushed forward as rapidly as possible under the existing conditions.

Every effort should be made to use the natural advantages in laying out and beautifying a subdivision. River channels offer many opportunities for establishing beautiful drives and small parks that materially increase the desirability of abutting property. Rather than merely to plat an area geometrically, it is well to consider carefully the topographic features in the preliminary planning. Natural groves of desirable trees should be preserved when it is possible.

Schools, churches, and adjoining public parks or preserves, may make residence property mort desirable. For this reason the entire district should be carefully studied before zoning the residence and business districts. The fact that adjoining property is well improved is the best prediction for the future development of the new property, and in many cases is an indication of the character of the final development.

Protection from encroachment of business upon residential streets, the stipulation of a minimum cost at which buildings may be built, the provision for a uniform brick or concrete construction, the proper set-back clauses to provide sufficient and equitable light and for preserving the neigborhood appearance are important factors to establish and maintain property values.

Ten years ago this subdivision, of which this illustration is a type, looked much like the one illustrated below. The rigid enforcement of building restrictions has helped it develop into one of the most beautiful in Chicago

The usual practice of zoning or districting residence and business property is often extended to separate residence and apartment property. Again, the natural advantages may qualify certain property for bungalow construction, or for the development of a particular type of architecture. When this is the case a corresponding restriction will make it more desirable. This procedure has been satisfactorily followed in many desirable subdivisions in the Chicago region.

The location and character of a subdivision determine, to a certain extent, the market to draw upon for both sales and re-sales. Factors for estimating the possibilities for sales and re-sales are the number of people working within a given radius, the anticipated natural expansion of the city in that direction, the development of business sections in the immediate vicinity, and the industrial expansion in surrounding areas. These factors, important as they are in the success and the value of a subdivision, offer a ready means to predict its future and to attract a particular class of prospective purchasers.

The new subdivision is outlined by sidewalks and rows of newly planted trees. Such features as the large school on adjoining property help in the selling of residence lots

The point to be stressed in subdivision work is planning. It is not enough to plan for the present alone, but, from a study of factors governing future development in the immediate territory, it is possible to plan also for the future. Naturally those areas laid out and given the advantage of the best plans will develop most and increase in value greatest over a period of several years.

Street Entrances

PILLARS and monuments marking street entrances are being used with more or less success in modern residence communities and it has become customary to mark the boundaries of subdivision properties in some such manner to indicate progress and stability.

Fig. 1—Considerable skill is required on the part of the builder to preserve the symmetry of these pillars made of carefully selected cobblestones

The cylindrical cobblestone posts illustrated on this page are built from selected stones, of nearly uniform size, set in cement. The construction of these posts requires considerable skill to obtain symmetrical proportions and it is a question of the ends justify the means.

Fig. 3—A more elaborate entrance of brown sandstone and dark tile roof

An easier piece of construction is shown in the illustration of the square pillars, also built of stones, though the stones in this instance are of irregular shape and not uniform in size. It will be noted, however, that some care has been taken in choosing the corner-stones for their special fitness. Both of these entrances are to be found in Los Angeles.

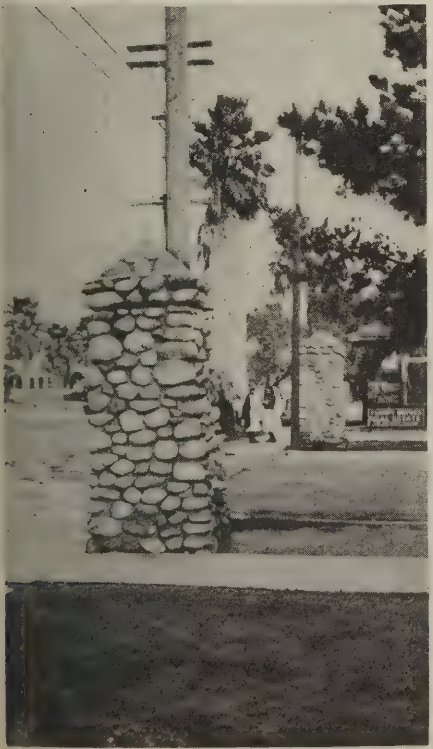


Fig. 2—This type of entrance marker is simple and inexpensive to build

A method for insuring symmetry and uniformity of design in similar cobblestone pillars was used by a contractor in Dear Lodge, Mont. He constructed a collapsible form of the shape desired, and made provision for inserting the form sections from the top as the work progressed. Care was used to select cobblestones of uniform size and shape, and the first course was begun by arranging the stones in contact with the form boards. Dry sand was then poured between the stones and the forms and packed in firmly. Cement mortar and broken or irregular stones were used to fill the central portion to the height of the first course. This method was followed throughout, form boards being added as required, until the pillar was capped. When the forms were removed and the dry sand brushed from between the stones the work was complete. No painting was necessary, and as the dry sand prevented any of the mortar from flowing out of the central part, each cobble was set out clearly and distinctly, though perfectly bedded at the inner end.

Fig. 4—A common type of entrance marker that is neat and permanent

Where several pillars of the same design are to be erected, and where uniformity is desired, this method gives very good results and in many cases will actually speed the work.

A similar method was used in building fireplaces and chimneys of cobblestones, with equally good results in obtaining the effect desired.

Whether mortar joints should or should not show in cobblestone or irregular stonework is a matter of taste. It has been pointed out by authorities that the use of stones that are too large and studied efforts to conceal mortar joints, as above described, are faults; the reasoning being that any building material should express stability. It is obvious to anyone's intelligence, for instance, that cobblestone construction is held together by mortar, and to satisfy the sense of stability the mortar joints should show. But, as stated, this is a matter of taste.

Fig. 5—A simple dark brick pillar with ornamental cap combines economy and good taste

A third Los Angeles street entrance of more pretentious design is shown with arches over the sidewalks. These are built of cut sandstone of a rich brown color with dark red tile roofs. The roof framework is of pine, stained brown. The blending of brown and dark red with the green of the vines which grow upon these arches gives a very pleasing effect.

Entrances to Colonial Gardens in Chicago are marked with dark brick pillars with ornamental caps. A decorative plate, set into the brickwork, carries the name of the subdivision and it is intended eventually to note the street names similarly.

Where the pillars at street entrances are artistic and appropriate they should be solidly and permanently constructed. Stone, concrete, iron, and brick make permanence possible. The cheaper ornamental posts, such as are often built of light timber with wood lath, are not desirable.

Tests of Building Materials

THE Bureau of Standards of the Department of Commerce in its Technical News Bulletin gives notice of important tests and investigations of interest to builders and building contractors.

Owing to the current nature of the investigations, it will sometimes be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the bureau will be pleased to furnish technical data to those engaged in the particular application of the subject in order to avoid the delay incident to publication.

Among other tests and investigations those described below are of interest to many building contractors.

During the past month work has been pushed on the preparation of a publication which will give the results of the extensive test of a reinforced concrete and clay tile floor slab which was carried out by the Bureau of Standards at Waynesburg, Ohio.

This paper, which will probably be issued as one of the technologic series, will contain information which should be of much interest and value in connection with the now-important problem of reducing the cost of building construction. It is not possible to state just when this paper will be ready for distribution, but the work of collecting the data is now practically completed.

A preliminary report is being prepared, based on results obtained in the investigation of colorless water-proofing materials for building stones, some of this work having previously been mentioned in the Bulletin of the Bureau of Standards.

This report will describe the nature of the materials, the appearance of the treated stone, the depth of penetration, and the effectiveness of various preparations in preventing water absorption during a period of six months' exposure to the weather.

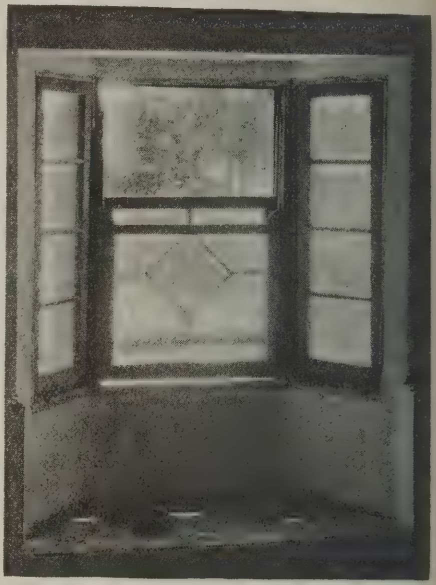
Two tests of hollow wall panels, restrained, were made during the month and two unrestrained hollow wall panels were laid up for fire tests. The heat penetration through the hollow walls was somewhat greater than through the comparable solid type and the deflections were larger during the first hour of the test period, although the final deflections were no larger than with the solid walls.

The temperatures on the unexposed side at holes and cracks were considerably higher than the general surface temperatures, this being particularly true of the crack at the top joint which communicated freely with the hollow space in the wall.

A paper on the specification for the color of gypsum plaster by Emley and Faxon was published in the Journal of Chemical and Metallurgical Engineering, June 18, 1921.

A Window Seat on a Stair Landing

An attractive window recess is shown in the illustration herewith. It is made to form a window seat on the stair landing in a brick bungalow recently built at Park Ridge, Ill., by Olson and Johnson, contractors.



A Dove Cote

A dove cote, besides serving its more utilitarian purpose as a shelter for the birds, may be used as a decorative feature in the yard. Though this one is very plain, it is spotless in its fresh paint and lends a touch of life to the back yard.

Sleeping Porches and Equipment

SPECIALLY prepared places for open-air sleeping have become conspicuously popular in the last few years. In fact, they have come to be so generally regarded with favor that the newly constructed house which does not possess one or more of them

Fig. 1—An excellent sleeping porch built over a side porte-cochere

is nearly as rare as the modern home that has no porch for outdoor lounging. While coming into this popularity, the outdoor sleeping porch has also undergone some important changes in the matter of design.

The type of outdoor sleeping quarters most generally preferred today consists of a room that is roofed and ceiled and floored in quite the ordinary way. It, however, will differ from the usual indoor bedroom in certain other respects, especially in that its outside walls will be given over to windows, or window openings, almost entirely. Of such walls there always are at least two, frequently three, and occasionally, where the room comprises a tower, all four. These openings, rarely exceeding 4 ft. in height, may be left either wholly open or they may be equipped with something in the way of windows, blinds, awning curtains or screens, to afford the desired degree of protection. Windows of a kind that can be easily thrown entirely open, such as either inward or outward swinging casements, are always especially satisfactory, for the regulation of undesirable draughts is thus made easy. The so-called car type of window, which is opened by its being dropped into a sort of pocket underneath, is likewise suitable.

A sleeping porch is perhaps more often desired as an addition to the already-constructed house than any other feature. And the desire for it very frequently involves a rather difficult problem of location. It must be convenient of access, and preferably in more or less close conjunction with the other sleeping rooms. Moreover, it should not entail too great an expense, especially in a preparatory way. Therefore, if the house has its bedrooms on an upper floor and the sleeping porch is to be in direct association with them, the matter of locating the addition often becomes doubly difficult of solution.

Illustrated in Fig. 1 is one suggested location for the feature that solved the problem particularly well, and perhaps from it others may become readily recognizable. In this case the sleeping porch has been built on the top of a side-extending *porte-cochere*. Thus, as will be seen, the sleeping porch has been placed on the second-floor level, and hence in convenient relation to the other sleeping rooms, without special preparation.

This porch is approximately 8 ft. square in interior dimensions. There are four small windows in each of its three outside walls, and these windows are of the double-hung kind, with the bottom half of all of them screened. An excellent circulation of air is thus assured, yet complete control or regulation of it is possible. There are also blinds to regulate the admission of light. The feature is directly connected with an inside

Fig. 2—The windows of this sleeping porch may be lowered into wall pockets

sleeping room, and the doorway to it was created by changing a gable window into a door. The building on of this sleeping porch was made especially easy, and entailed no very considerable cost.

Another sleeping porch (Fig. 2) is nearly 6 ft. wide by about 9 ft. long, is built over a small rear porch, and has four small windows in each of the two ends and six in the exposed side. These windows are provided with sash which can be completely removed during the summer months, by simply lowering them into individual wall pockets or slides underneath, in car-window fashion, or quickly brought into service, singly or

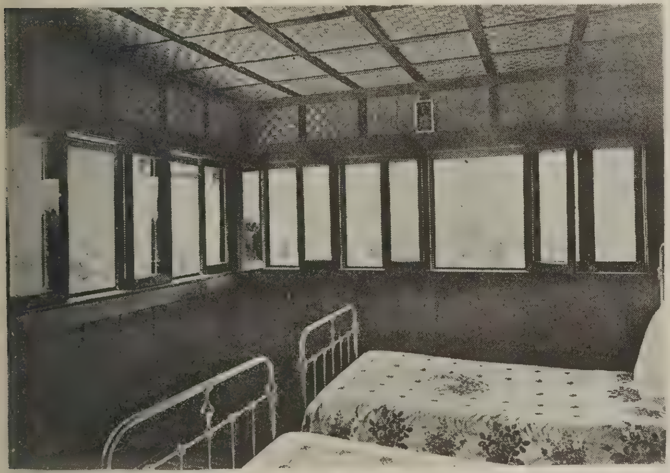


Fig. 3—The more subdued coloring of the walls and ceiling prevents this porch from becoming uncomfortably light. Wall beds would convert this porch into a useful day room

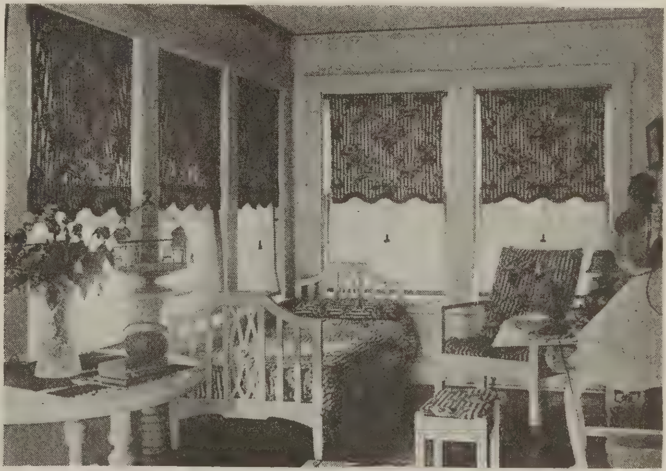


Fig. 4—There are two corner beds on this porch which is also used as a sun parlor

Fig. 5—There is no hint of a bed in the porch of this Beverley Hills house

Fig. 6—But the bed is instantly available when it is wanted

together, for regulating drafts. They are also fully screened and equipped with canvas roll-curtains. Access to the addition is direct from an inside sleeping room.

In regard to interior finish, the open-air sleeping room is very frequently given about the same careful treatment as an ordinary inside room, although this, of course, is a somewhat optional matter. Often, for instance, the lower part of the walls will be finished with a wainscoting and the upper part, as well as the ceiling, plastered and tinted. The woodwork is in many instances painted white, or even enameled. Such finish, however, while very effective, naturally is a little difficult to keep looking clean, and also has a tendency toward making the room rather uncomfortably bright. For these reasons many persons advocate the use of colors, for both woodwork and plaster tinting; and sometimes the colors thus employed are of quite pronounced shades. The happy medium is perhaps reached by using something like olive green, buff, gray or some other rather subdued tone. Fig. 3 shows a room of this kind very effectively finished with a top wall border and ceiling covering of basket work.

In Fig. 4 is shown a very delightfully and practically planned sleeping-porch interior. Being an especially roomy sleeping porch, with a length of about 17 ft., it contains a single bed in each of its two outside corners. It is both a sleeping porch and a sunroom in one and is, therefore, furnished accordingly.

In reality the most satisfactory way is to make the porch serve the twofold purpose of a sunroom by day and a bedroom at night by the use of suitable wall or door beds. The ordinary bed often lessens the attractiveness of the room and it always occupies much of the floor space.

A large sun porch was recently added to a house in Beverley Hills, Chicago, now occupied by W. R. Remmler. A wall bed was installed at the time the porch was built and the convenience of the installation is well shown in two of the illustrations. In Fig. 5 the porch is shown clear. It is roomy and comfortable and no hint is given as to its use as a bedroom. The concealment possible with any good wall or door bed is perfect.

The second illustration (Fig. 6) shows the bed lowered for use, the work of a few moments only. The door of the recess into which this bed is swung is 3x7 ft. The depth of the recess or closet is not over 2½ ft. As may be seen, this is a double bed. It is 4½ ft. wide and 6½ ft. long and takes any standard mattress and bedding.

All sun porches in the Monterey Apartments at 4300 Clarendon Avenue, Chicago, are equipped with wall beds. As in the previous example this use of wall beds for porches illustrates the many conveniences gained both in space saved and in appearance. It is possible to use this type of bed whether on the porch or in the adjoining room. It may be put entirely out of the way during the day, permitting the full use of both the porch and room for other purposes. In case of heavy rains or storms during the night, occupants can instantly turn the bed from the porch into the room.

As the porch is often one of the most popular rooms in a house it is desirable to make it as attractive as possible. When wall beds help to do this and at the same time add materially to the convenience of the occupants, their use can consistently be recommended and planned for in any event.

Fig. 7—The Monterey Apartments have an attractive sun porch during the day

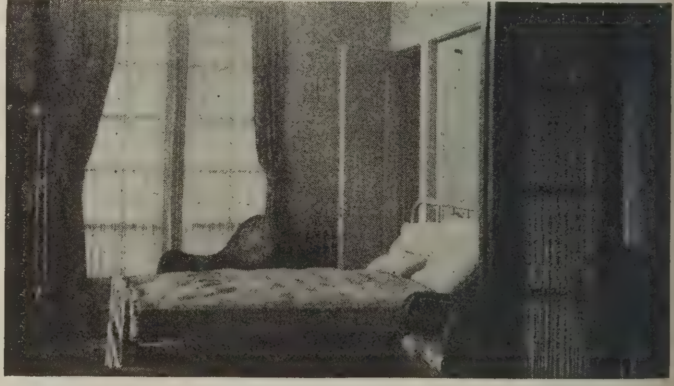


Fig. 8—At night a bed that was concealed in the wall converts the porch into a sleeping room

Mechanical Refrigeration for the Home

THE rapid improvement of small household refrigerating plants during the last few years has made them more desirable for residence use. To give entire satisfaction in domestic use they must be designed and built to require a minimum of attention, the ideal one, of course, being one that requires no attention whatever. This ideal condition, however, is impossible of attainment with anything mechanical, though it is very closely approximated in the best refrigerating plants.

In mechanical refrigeration, the cooling effect is obtained by the expansion of a compressed gas which cools the gas and draws the heat from the medium surrounding the expansion chamber. It is, in a way, analogous to the heating plant, as is explained in Figs. 1 and 2.

Fig. 1 shows the boiler for converting the water into steam (A); the steam supply line (B); the radiating surface (C); and the return line (D), in which the condensed steam is returned to the boiler. When heat is applied to the boiler it is transferred to the water and carried to the radiating surfaces by the steam, where the steam gives off its heat of vaporization and is thereby condensed. The condensed steam or water is returned to the boiler where it is again evaporated. This action is continuous.

In the simple refrigerating plant a gas is used instead of water. Among the most commonly used are ammonia, carbonic acid gas and sulphur dioxide. The action is the same, no matter what refrigcrating gas is used, but for convenience in describing the action ammonia will be taken as an example.

In Fig. 2 the refrigerating coils (A) are placed in the space or medium to be cooled; the evaporated ammonia is returned to the compressor (C), through the return pipe (B). This ammonia gas is compressed into the compression tank or receiver (D), in the presence of cooling coils in which water flows. The compressed and liquefied ammonia is then allowed to expand in the refrigerating coils, completing the cycle.

Heat is taken from the compressed gas by the water in the circulating pipe in the compression tank. This heat is dissipated as the water is allowed to flow to the sewer. Then, as the pressure is reduced in the refrigerating coils, the ammonia is cooled and draws heat from the refrigerating space or medium in which the refrigerating coils are placed. As it draws heat from the surrounding medium it evaporates and is returned to the compressor in the form of a gas under comparatively low pressure.

In explaining the analogy between this and the heating plant, assume the ammonia in the first to correspond to the water in the second. Then, in the heating plant the water draws heat from the fire and dissipates it into the air surrounding the radiating surfaces. In the refrigerating plant the ammonia draws heat from the refrigerating space or medium and dissipates it into the water coil in the compression or condensing chamber. The air in the room to be heated

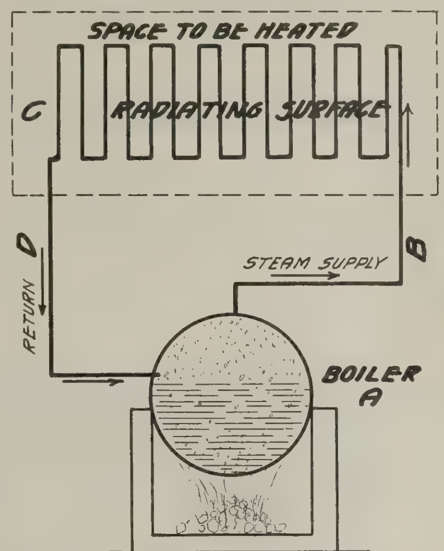


Fig. 1—In the heating plant water absorbs heat from the fire and gives it off in the room to be heated

in the one case corresponds to the water coil in the second.

As these points are analogous, so are the complete cycles in the two cases.

Practically all domestic refrigerating plants

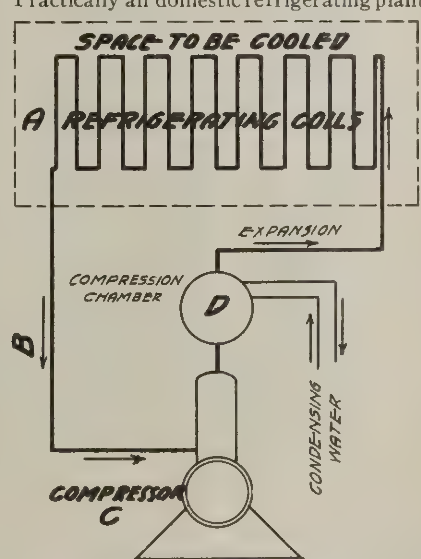


Fig. 2—The refrigerating gas absorbs heat from the space to be cooled and dissipates it in the condensing water

use electric motors for power. They range in size from ¼ horsepower up. A conservative estimate of the amount of power consumed per day is 1.5 kilowatt-hours; in many cases it is less than this. The motor is started and stopped automatically by means of a thermostatic arrangement set to maintain a constant temperature either in the refrigerating chamber or in any compartment. The motor operates about 20 to 25 per cent of the time in a room the temperature of which is 70 degrees.

It is evident that an efficient and satisfactory home refrigerating plant must be automatic in its operation. The housewife is not qualified nor does she wish to take care of a hand-operated machine. The hand-operated machine also wastes perishable food by under-refrigeration and it wastes power by over-refrigeration. With an automatically operated plant the proper temperature is maintained at all times, whether or not the home is temporarily vacated.

In many of the small refrigerating plants a brine tank contains the refrigerating coils. This tank may hold from 50 to 100 or more pounds of brine and may be maintained at a temperature but a few degrees above zero. It is, therefore, similar to a cake of ice, with a temperature far lower than that of ice. It serves to store the cold and makes constant operation of the plant unnecessary.

The successful plant includes many refinements which make its operation practically perfect. The thermostatic control, the automatic control of condensing water, and the separation of oil from the refrigerating gas become points of importance in the small outfit which make manual attention unnecessary.

Among the many advantages to be gained by the use of mechanical refrigeration are the elimination of time and bother with the ice man and the insurance against the occasional absence of ice. The refrigeration is constant and the compartment temperature may be maintained at any point. Foods may be kept in better condition which makes for economy and health insurance. Table ice and frozen deserts can be made as desired. There are no impurities such as are present when ice is used, and the constant watching of the ever-full drip-pan is eliminated.

For the home the small refrigerating plants are made in many types. The unit plant includes the cabinet and food compartments complete and should give entire satisfaction as all of this is considered in its design and manufacture. There are, however, many small plants built to equip the ordinary ice box. In these types the brine tank which contains the refrigerating coils is made to occupy the ice compartment of the old refrigerator, and the motor and compressor are often placed on top of the box. The basic principle of operation, however, is the same in each case.

In line with the subject of refrigeration is the matter of cooling air for ventilating the home. This may be accomplished in a number of ways, most common of which is the method in which the air is cooled in a central ventilating plant and forced through the house in much the same manner that warm air is circulated in the hot-air heating plant.

Modern Furnace Heating

By George H. Hess

FOR the heating of such buildings as dwellings, churches, stores and schools there is much to commend the use of good hot-air furnaces. The distribution of heat by means of the circulation of warmed air is exceptionally effective.

Particular advantages of the hot-air furnace are that it diffuses heat immediately upon lighting the fire and it provides ventilation as well as a thorough circulation of heat. Heated air, being less dense than cool air, is lighter and will rise. It is upon this principle that the hot-air furnace operates. Air admitted to the bottom of a furnace is heated and is caused to rise to the conducting pipes at the top of the heat chamber. From here it flows through the conducting pipes to the rooms which are to be warmed. The action in the rooms is similar, in that the warm air rises to the ceilings where it spreads out and replaces the cool air.

In order to be able to conduct warm air into a room there must be some provision for letting out an equal amount of air from it. This calls for an exhaust from the heated space for the purpose of carrying off the cool air. Return air openings for this purpose are generally located in or near the floor, as it is at this point that the heavier air is collected.

In the return-air or gravity system, the cool air from the rooms is returned to the bottom of the furnace heating chamber, where it is again heated and rises to the conducting pipes. The plant is thus converted into a complete circulating system by which cool air at the floor is drawn off, heated and returned to the rooms. The process is continuous, automatic and entirely successful.

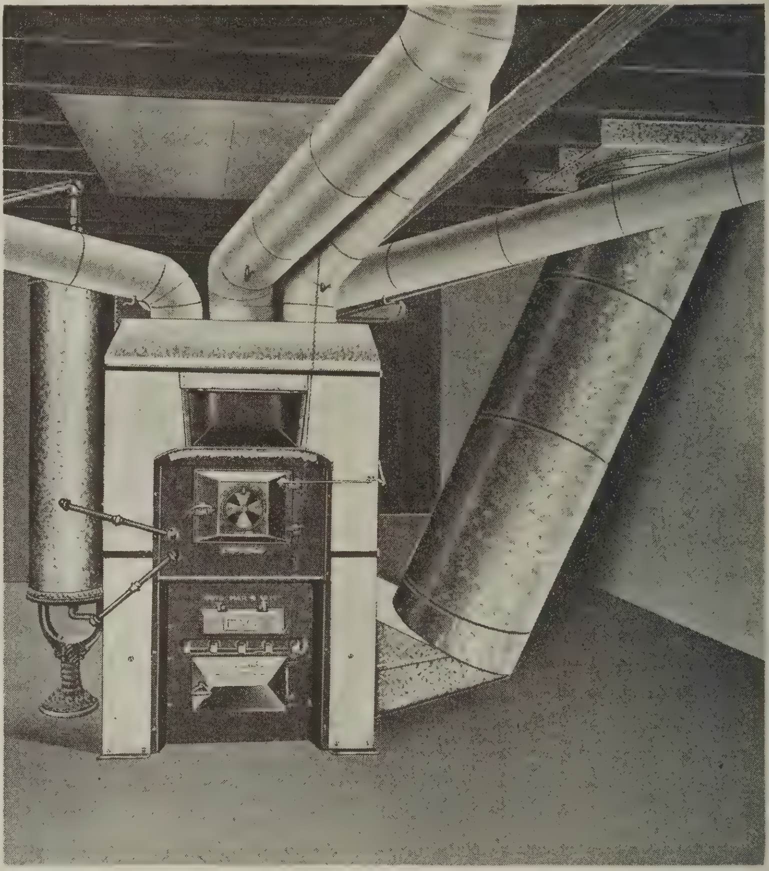
The gravity system is applied by two different methods, though the principle upon which they operate is the same. They are the pipe furnace method with a separate pipe and register for each room, and the pipeless method which uses one large register for both hot and cold air, and eliminates all horizontal pipes and ducts. This latter method could more properly be called the one-pipe method, as all of the heated air for the building is conducted to the first floor by means of a large vertical stack.

The pipe furnace is the better known and is available for all closses of houses. It fits more thoroughly the return-air or gravity system of heating by circulation.

Modern practice admits the fact that return air registers in each room are not necessary. One or two in the lower halls or living room in an ordinary dwelling are sufficient. One large air duct is preferable to several smaller ones of the same aggregate area, as the effect of friction is much reduced and larger volumes of air are delivered.

It is sometimes desired that fresh air from out of doors be used. In this case the air is drawn through an air duct opening to the outer air, and outlets for the waste air from the rooms are supplied by means of fireplaces or other ventilating flues. The fresh air supply, to give best results, must open on the side toward the prevailing winds. While the use of sufficient fresh air is always desirable, this method of obtaining it is quite unreliable on account of the shifting winds. It is therefore advisable to install the return-air system in addition and to provide for shutting it off when outside air is being used. Both will not operate successfully at the same time. In connection with this it should be remembered that ventilation is actually a dilution of the stale or used air with a quantity of fresh air. In buildings used for residence purposes, where doors and windows are opened and closed, and with the air continually circulated by the heating system, this dilution or diffusion is usually sufficient without providing for the admission of outside air through the heating plant.

Crooks and turns in air lines retard the free flow of air. A short pipe is more efficient than a long one, hence it is a mistake to carry a hot air pipe across a room in order that the register may be under a window, if it is possible to reach any other part of the room by a shorter one. The height of the basement where the furnace is to stand has much to do with its successful operation. A high basement causes a better delivery of heat.



Modern warm-air furnace

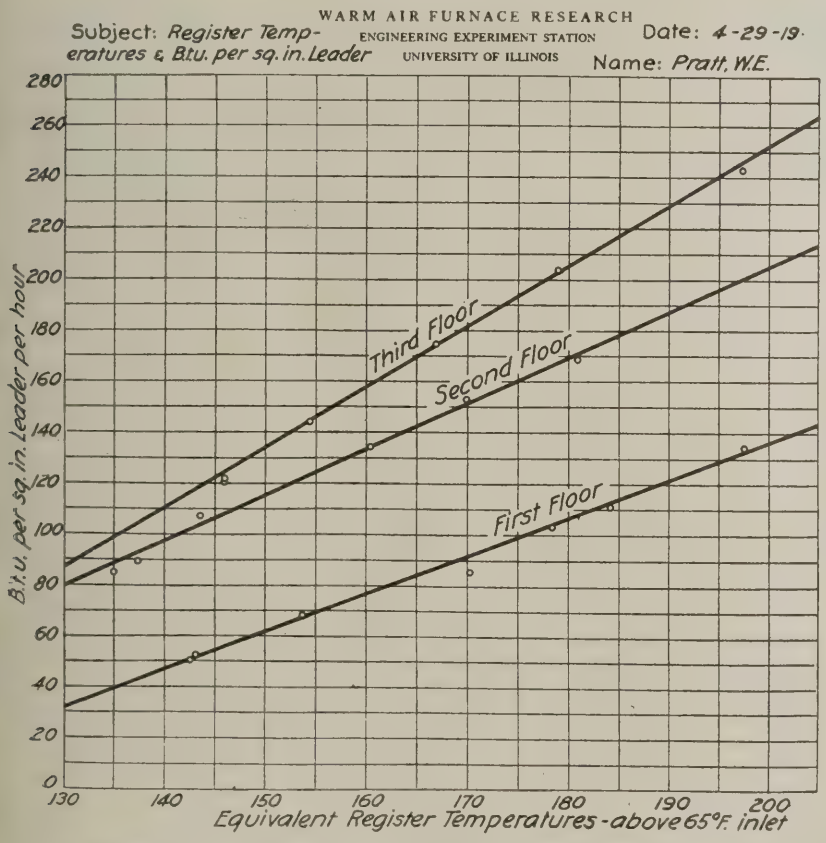
The pipeless furnace method of heating provides one large register only, and one-half of it, usually the central portion, is used as a heat outlet. The other half serves as a cold air return or supply for the furnace. It is essential that rooms to be heated by this method shall open into the main room and this is an indication of the limitations in its application.

With any method of heating it is important that the proper humidity be maintained in the rooms. With a furnace this moisture is supplied from an open water pan placed within the air chamber, the evaporating moisture mingling with the warm air as it passes to the rooms. Dr. W. A. Evans, formerly Chief of the Board of Health of the City of Chicago, has stated, "Whenever you add heat to air you must add water to it in proper proportion. Hot, dry air will take water wherever it finds it—it will take it out of wood and the furniture will fall to pieces. It will take water out of the nose, throat and bronchial tubes and infection will result." Modern practice in furnace construction and installation provides the proper amount of water in the heated air.

Many types of furnaces are on sale. All are good. The preference in selecting should be given to those which do not depend on putty or cement for the integrity of the joints, and which, by warping and expansion of parts, will not develop leaks and diffuse gas and dust through the rooms.

Curves Help to Calculate Size of Hot Air Leaders

ONE of the most important results of the work done on the piped furnace plant in an investigation of warm air furnaces and heating systems by the Engineering Experiment Station of the University of Illinois, was the determination of the heat carrying capacity of first, second and third floor leaders and stacks. These results are given in the University Bulletins Nos. 112 and 120.



Effect of air temperature at register on leader capacity

The curves show the effect of air temperature at the register on the leader capacities and have been plotted from data obtained in seven tests.

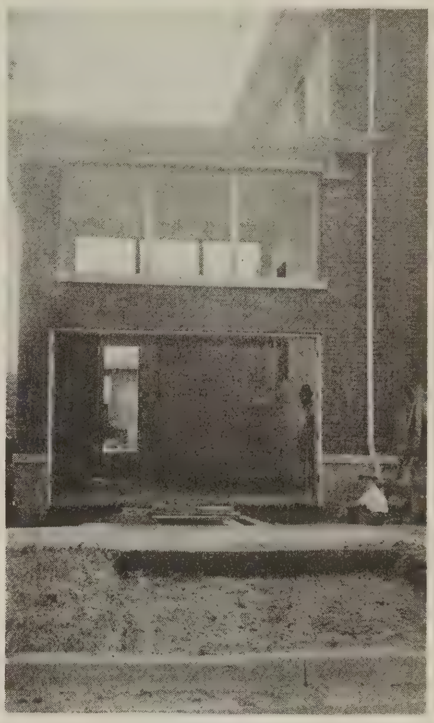
When the B.t.u. loss per hour from any room on any floor (first, second or third) is known it is possible to determine the square inches of leader pipe necessary to heat the room to 70 degrees Fahrenheit on a zero day.

If, for example, it is found that the living room on the first floor of a house has a heat loss of 16,600 B.t.u. per hour, and a register temperature of 185 degrees Fahrenheit is to be used, each square inch of leader supplies 115 B.t.u., and the calculated area becomes $16{,}600 \div 115 = 144$ square inches which requires either one 9-inch and one 10-inch leader or a special 13½-inch leader. From the data obtained in the seven tests it was apparent that the temperature at the registers on the second floor was approximately 10 degrees lower than on the first floor.

It is quite evident that the design of a furnace heating system must be based on the B.t.u. loss per hour from each room. This method of computation is quite familiar to the engineer and can be used by any well qualified furnace man, as fairly simple formulas can be made to cover most types of installation.

A Sun Porch Over the Garage

An interesting feature of a new brick residence in Oak Park, Ill., is the construction of a garage and sun porch as an integral part of the house. The photograph was taken before the job was complete and shows the garage floor partly tamped. The garage floor is naturally at a lower level than the first floor in the residence, and the sun porch is at an elevation between the first and second floors. Entrance to this porch is by means of a stairway from the rear of the main floor of the house. No light is shut off from the second-story rooms by the porch, as there is sufficient space for windows above the porch roof. There is no opening from the garage directly into the house. This offers but little disadvantage, which is more than offset by minimizing the effects of noise and gases from the garage.



Garage and sun porch

Words of Cheer

We have a higher sense of service, a wider-spread willingness to give aid to the injured in business. Thousands of firms whose cases seemed hopeless months ago are on the road to safety.—*Herbert Hoover to the National Association of Real Estate Boards.*

Radiator Heating

By H. N. Dix

RADIATOR heating in its many forms has many advantages—it is the most cleanly, neither producing nor distributing dust or soot; it is the most economical on coal, far better in this respect than any other form producing an equal volume of warmth; it distributes its warmth to all nooks and corners of a home irrespective of wind or weather, unmindful of closed doors. Successful radiator heating does not depend upon transoms, grills or return ducts; it lasts as long as the home—the boiler and radiators being of cast iron there are no rusted out parts periodically to replace or repair; and most important from the builder's standpoint a house so heated is easier to sell to the average person, resulting in the more rapid turning over of funds.

Many Forms Available

There are two general classes of radiator heating, steam and hot water. Steam is usually considered to include the familiar one-pipe type, two-pipe steam, vapor, vapor-vacuum, vacuum and kindred patented systems. Hot-water includes the ever-popular up-feed gravity system, the closed tank or pressure system, the forced circulation type now being advocated by several prominent engineers and the down-feed system where the boiler is on the same level as some or all of the radiators.

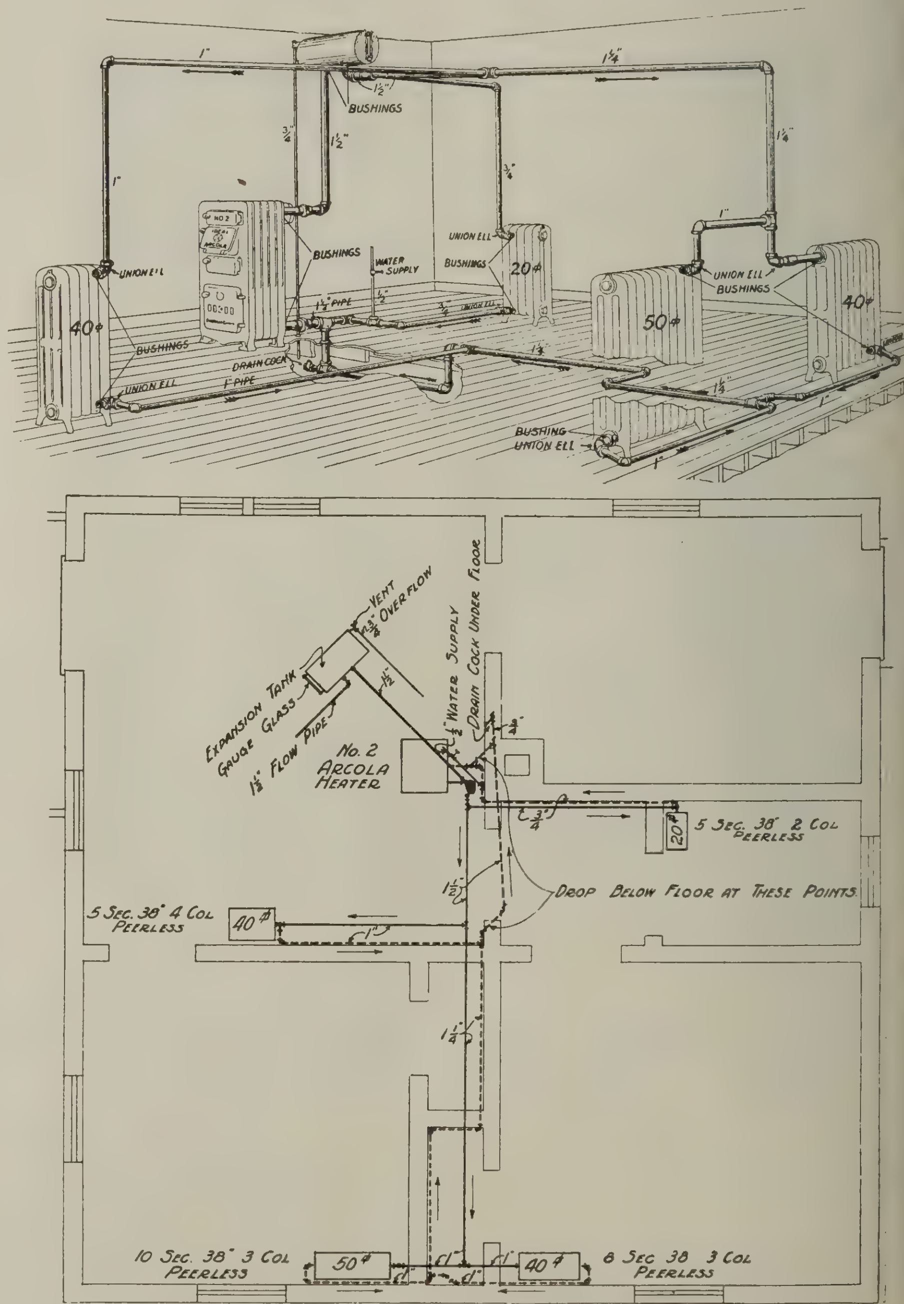
Each of these types has its advantages. One-pipe steam is extensively used because it is simple and comparatively cheap to install. Vapor, vapor-vacuum and such systems include more refinements and necessarily cost more—usually about 35 to 40 per cent more than steam. They are perhaps more economical on coal than the one-pipe steam system as most always installed. However, the latter system if properly designed, as later described, can be made just as economical and satisfactory.

Among the hot-water systems the usual up-feed gravity system is perhaps the easiest to install properly. It costs about a third more than one-pipe steam but since its heat is more uniform and more easily controlled and since it averages a saving of from 10 to 20 per cent in coal over one-pipe steam it appeals to most lovers of home heating comfort.

The closed tank pressure system, with its expansion tank in either the attic or basement is often used because under certain conditions it can be installed for less money than the gravity type. It has the further advantage of using smaller pipes and so affording a better appearance.

The forced circulation type—up to now used almost exclusively for large commercial installations and central heating—is being pushed by some because very small pipes are used and because the radiators need be no larger than those used on a steam plant. However, it has the one drawback of having a motor and circulating pump to get out of order. It is claimed though that it is extremely economical on coal.

The other type of hot-water system, that in which the radiators and boiler are all on the same level is mostly confined to the small home of seven or eight rooms or less. Such a system is cheaper to install than the usual up-feed system and because a cellar is not needed to house a heating plant a further saving in building cost is secured. As for economy it is probably the most saving on coal since no heat is wasted in a cellar or other place where heat is not needed. Another decided advantage is the feasibility of giving modern radiator heat to a home built on swampy ground or on bedrock, where the digging of a cellar is out of the question.



In the down-feed hot-water system the boiler and radiators may be on the same level

Necessities of a Heating System

By far the most important essential of any heating plant, hot air or radiator heat, is the chimney. Any boiler or furnace manufacturer will testify that poor draft causes more complaints than all other troubles. A poor draft is always followed by wasted coal, slow heating, inability to produce steam or heat in desired quantities, soot deposits in the boiler or furnace flues and general dissatisfaction.

And what constitutes a good chimney? In the first place it must be of proper cross-section area, and it must be sufficiently high to create enough draft tension to pull the air through the firebed in the heater. Further it should be round or as nearly square as possible. It is best that it be straight and raised at least three feet above the highest point of the roof. A chimney flue for a boiler should be an independent one for that purpose—it must have no other openings into it from fireplaces, stoves or instantaneous hot-water heaters. Similarly it must be airtight without loose set walls of tile or brick. A smooth tile flue is best in which the tile is properly set in mortar with the space between the lining and the brick well filled with cement. All joints should be smoothed off on the inside so that no projecting mortar introduces resistance to the flue gases or serves as a shelf upon which soot can collect. A good flue will do a lot towards making an otherwise mediocre heating plant a success.

Any radiator heating system of necessity requires a boiler to extract the heat from the coal, a system of piping to convey the heat to the radiators, valves to relieve the system of air and so permit the heat to circulate, and radiators to give off the heat to the room. These are the bare necessities; other more or less essential parts are pipe and boiler insulation, valves on the radiator to control the heat, decoration on the radiators to make them pleasing to the eye, thermostats to control the fire and so the home temperature, humidifiers, radiator covers and boxes, etc.

Do Not Skimp on the Boiler

Being the heart of the system the selection of the boiler is the most important. Unfortunately because of a desire to cut price, this all important object is often selected upon a price basis and not upon its ability to do the work demanded of it. What success would the Packard or Pierce-Arrow car make with all its wonderful appearance, etc., if the makers had put a single-cylinder motorcycle engine under the hood because that was the cheapest power plant obtainable? On the contrary the engine is considered the most important part of the car, its power advertised, and countless dollars spent upon its development. Just as the engine sends the auto over the road, so the boiler sends its heat throughout the home. Do not choose a motorcycle boiler to heat a 10-room house.

A boiler should be amply large, a big firepot holding a goodly supply of coal is a necessity. Do not be fooled by the published ratings of many boilers—they may mean several things. As every builder knows he can purchase boilers of equal listed rating at widely varying figures. The main reason for this is that, although rated the same, they are not the same size by any means. As in all things you only get what you pay for. If boilers were all rated on the same basis—the best for the home being of such size as to develop catalog rating for eight hours on one charge of coal and with enough (not less than 20 per cent) left at the end of that time to ignite the next charge—they would all be of near the same price; with allowance of course for nature of trim, heating surface and efficiency.

As a concrete example of this, the A-6-19-S steam boiler is rated at 400 sq. ft. on the eight-hour basis. If the A-4-19-S (normally rated at 300) were rated on a six-hour basis it would have the same rating, 400 sq. ft. In other words the two boilers, the 4-19-S, actually much smaller in size and capacity, listed at $149.50, and the 6-19-S listed at $193, could be sold in competition with each other and of course the six-hour boiler would be the one purchased if price alone were taken into consideration. Watch the rating method when specifying or buying boilers. The shorter the firing period the smaller the boiler and the less it should cost.

The Radiators

There is little to be said in regard to the radiators, they are all quite similar in appearance and, if of one of the standard makes, are up to their rated surface. Structurally they are much alike except that one of the largest manufacturers some years ago abandoned the old-style slip nipple construction and now screws the sections together with internal right and left-threaded nipples. He claims that such a construction is much less likely to leak and that the radiator will stand more abuse in shipping and erecting. Other makes still continue the lighter weight push-nipple.

Undoubtedly all readers of this article are aware that the 38-inch, 3-column radiator is the cheapest size made and that if made lower in height or of one or two columns the cost is materially increased. Window radiators are also more expensive and if covered with a seat or other enclosure they must be increased in size from 25 to 35 per cent which further increases the cost.

Valves

There is hardly any one part of a steam plant of greater importance than the too-often-neglected air valve. By all means do not try to use cheap air valves. You will not notice the difference of a dollar a valve in a small home and the difference in satisfaction is most surprising. With good radiator air valves and with *large quick venting valves on the mains* an otherwise ordinary steam plant can be made to function as satisfactorily and as economically as any patented vapor system.

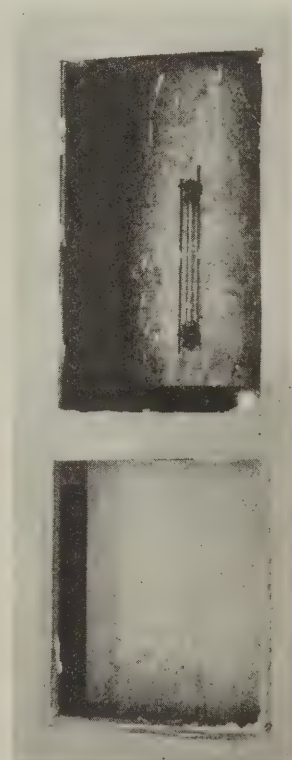
Radiator valves may be either the usually packed variety or they may be packless and leakless. Of course the latter type costs more—perhaps one or two dollars per valve —but this is very cheap insurance against ruined walls, floors and ceilings from leaking valves.

Thermostats

Any heating system—radiator or hot-air —is better off if it is equipped with an automatic thermostat. Such a device maintains an even home temperature by controlling the drafts of the heater. A very good equipment will cost approximately $75 all installed. Such thermostats come in various models—without clock, one-day clock and eight-day clock; with spring, gravity, or electric motor. Although not a necessity for the average family a thermostat saves coal and increases general heating satisfaction.

Using Waste Space for Expansion Tank

The waste space above the metal clothes chute in the residence of Dr. McKenzie, just completed by Olson & Johnson at Park Ridge, Ill., has been used to good advantage for the installation of the hot water expansion tank, as is shown in the illustration herewith.



The photograph, taken before the building was completed, shows the provisions made for gaining access to the tank for inspection. It is out of the way and at the same time it is conveniently located.

Plumbing in the Modern Home

By J. A. Farley
Manager Plumbing Department, Crane Company

THE plumbing installation in the modest home differs in many respects from that in the more pretentious residence. However, there are certain fundamental considerations common to all installations.

The requisites of plumbing a house may be enumerated under four general heads.

All supply pipes must be deep enough to prevent freezing

The supply end considers the collecting, storing and conveying of water to the various fixtures. It may also include the possible purification, aeration, filtration of the water or some combination of these processes.

At the points of usage, various types of fixtures are used for sanitary convenience. Suitable fixtures, their fittings and proper installation become the second feature in correct plumbing.

It is evident that some means of waste disposal must be supplied. Included under this head are the waste from lavatories and sinks, soil and vent pipes, traps, and so on, to protect the health of the occupants of the building. The water is here used for flushing purposes and as a carrier of offal.

The fourth essential feature is the outside sewer work, designed to serve the purpose for the individual job and to accomplish it without danger to the health of the community. Means of waste or sewage disposal are numerous. They include, among others, the public sewer, septic tanks, filtration beds, etc.

Under the first general heading or supply end is included all of the necessary piping to carry the water from the point of supply to the various points of usage. There are a number of supply systems, the most common of which is the supply from city or corporation mains. Where the supply is to be taken from such a main the city or corporation makes the necessary connection at this point. A corporation cock is installed, usually near the curb, and provision for shutting it off at the surface is made by means of a curb box with loose key. In general this part of the installation is owned by the corporation.

From this point the actual supply plumbing begins for the house owner and it includes all of the work necessary to lay the water supply pipe to the house and to distribute it to the points desired. It is necessary that all trenches for supply lines be deep enough to prevent freezing in winter. This depth, which should be uniform, is determined by the climatic conditions, though

Rolling in a lead supply pipe

in many localities a minimum depth of cover is provided by ordinance.

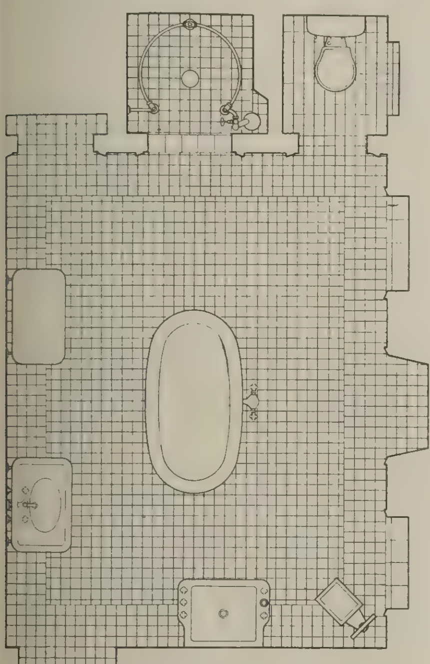
All supply and waste pipes should be in partition walls and in no case should uncovered supply pipes be located in exposed walls where there is any danger of their freezing. Suitable pipe coverings may make such a location safe when it is necessary to install it in this manner.

In water closets, lavatories, baths, sinks and at other points of usage the water is

All supply and waste pipes should be in partition walls

Elaborate equipment of large bathroom

Tiled mirrored walls and tiled floor



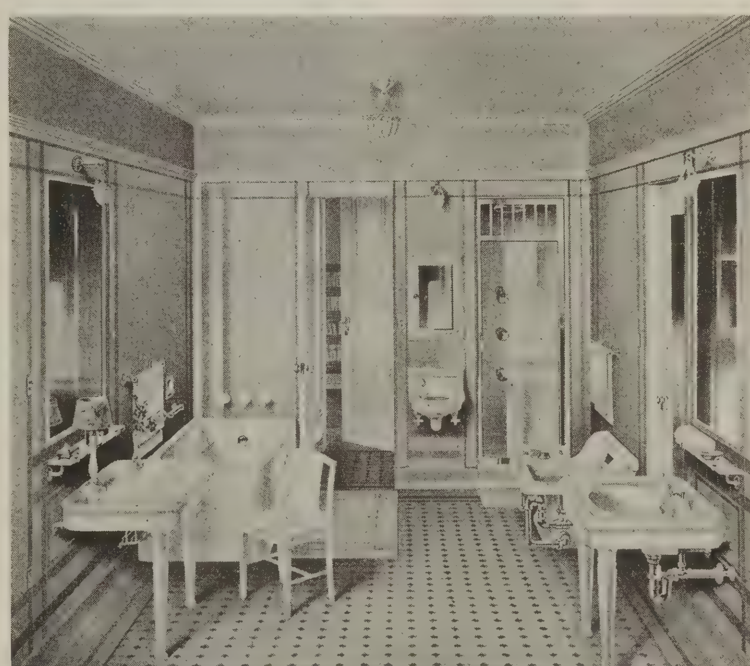
used to carry off the waste, to flush and clean the fixtures, and to form seals in traps which prevent the admission of disagreeable and dangerous gases rising from sewers. In this respect the sanitary features of modern plumbing and modern fixture design are most important.

The water seal is accomplished in all fixtures by means of traps of various kinds and designs, though the principle involved is the same in each case. When any fixture is flushed with clean water from the supply the pollution or offal is carried off through the waste pipe to the sewer. The last of the flushing water, which is clean, is retained in a trap, sealing the opening into the waste pipe.

In the earlier plumbing practice traps were aften omitted or improperly designed and installed. This is a point that should always be investigated carefully when changing or remodeling a plumbing layout or when new fixtures are to be installed. Leaky traps are a menace to health as well as a source of disagreeable odors.

Soil, waste and vent pipes are usually of cast or wrought pipe with screwed or calked joints. The sizes required in different installations are provided in most plumbing ordinances and should be amply large.

Every fixture should be separately trapped by a water-sealing trap placed as close to the fixture as possible. The discharge from any one fixture should not pass through more than one trap before reaching the house drain.



A complete equipment

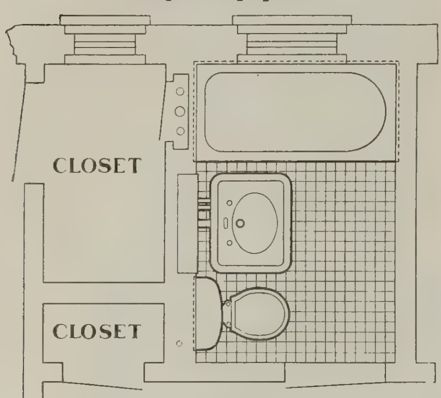
When a considerable body of water rushes down through a pipe it forms a suction, and if the pipe is made air-tight, this suction is often enough to break the water seals in traps; hence it is important that plumbing systems be properly vented.

The outside sewer pipe work is also a part of the plumbing job and is taken care of in a number of ways. Most common as well as most satisfactory is the direct connection with the city sewer. Where this is possible no other methods shall be considered.

During the last 20 years many changes have taken place in plumbing practice. In the not too distant past it was customary to install "S" traps of lead with lead waste pipes. As plumbing ordinances were adopted in the various cities this practice was discontinued. The installation of light soil pipe with joints poured but not calked was also prohibited. The modest home today is equipped with plumbing that would have been envied by the millionaire 30 years ago. Plumbing features that were luxuries then are necessities now.

Factors governing the selection of plumbing fixtures are many and there are unlimited combinations that may be used with

Compact equipment



good taste in most cases. In the small home where both price and available room for the installation are to be considered, the latitude in selecting is naturally less. In the modest home the necessary fixtures are the kitchen sink, the bath, lavatory and closet, with the necessary provision for heating water. As the home becomes more pretentious the number of bathrooms may be increased and the diversity of fixtures in each becomes greater.

While a modern bathroom of the smaller size, suitable for the small home or apartment building, would contain a bath, lavatory and water closet, and would occupy a space as small as 5 x 7½ feet, it would be complete and in entire good taste. In such a room it would be poor taste to use the more elaborate and massive fixtures that are to be found in the larger bathrooms.

As an example of the other extreme, a model bathroom is 12½ x 20½ feet and contains a large lavatory set on crystal glass legs with white metal mountings, a dressing table of similar design, a six-foot porcelain bath set in the middle of the room, a solid porcelain seat bath, a combination needle and shower bath with a glass door, a water closet combination, and a scale. The shower bath and water closet are in separate recesses opening into the main bathroom.

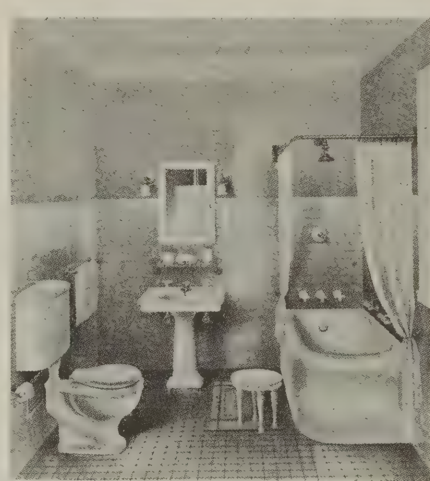
The decorative treatment of this room is in keeping with that of the adjoining rooms. The floors and walls are dull finish, in low tones of grays and blues against which the fixtures show in sparkling whiteness. One side of the room has a fireplace which is flanked on each side by leaded windows of milky glass. On the opposite side of the room two large mirrors are tiled in as a part of the decorative scheme. The ceiling is decorated in low tones of buff, blue and rose with frescoes of a Florentine character.

This room is so large that it is in no way crowded with the fixtures it contains. In the proper surroundings it is in excellent taste. It has been made to conform to the design of the adjoining rooms in every way.

Any modern bathroom may be made a harmonious part of the rooms it adjoins by the use of tiling that is now procurable in many tints and colors.

Almost any desired tone or texture may be procured in this tiling, and original designs are much used to suit individual tastes or to match the furnishings or decorative treatment of the house as a whole.

The pure white of the porcelain or vitri-



Neatness rather than elaboration marks the small bathroom

fied china fixtures is only enhanced by the use of these tinted tiles, while the trimmings and metal work can be individually treated to make a harmonious combination. The artistic possibilities of decorative treatment for the bathroom are now being given the attention they deserve.

It is true that the term plumbing calls to mind the bathroom, to the partial exclusion of all other parts of the building. In a way this is a wrong impression, as other important features are lavatories in sleeping and dressing-rooms, drinking fountains, kitchen sinks, slop sinks, and laundry trays, as well as many other useful combinations.

The plumbing features in a modern model kitchen are the kitchen sink, usually with integral drainboard, and the vegetable and pantry sink. The many designs available make any arrangement possible.

On account of their great convenience laundry trays, water supply for lawn and garden sprinkling and for the garage or barn are further plumbing necessities.

A Service to Producers and Users of Wood Waste

The Wood Waste Exchange of the U. S. Forest Service has been transferred from Washington to the Forest Products Laboratory, Madison, Wis., where its future activities will be centered. The Exchange has in the past contributed much towards more complete utilization of wood, by supplying a medium through which the mills and wood-using factories could locate markets for their side lumber and short lengths, and wood-consuming factories sources of material of this character which would meet their requirements.

Centering the activities of the Exchange at the Forest Products Laboratory will permit an expansion of this service, in that it will be possible to include suggestions as to markets and new uses for by-products and low grade material, based on the latest results of technical research carried on by the laboratory. As both the Forest Products Laboratory and the Association of Wood Using Industries have pointed out, there is a large wastage of wood annually because of ignorance on the part of manufacturers of one another's wood requirements.

Quarterly reports on "Opportunities to Sell Waste," similar to those issued in the past, will be sent to all concerns who wish to be listed as having wood by-products and waste in any form for sale. These reports will contain the names and addresses of manufacturers of various wooden products who could under suitable conditions use raw material from these sources, together with information as to kinds, sizes, form and condition of the stock desired. Suggestions as to the proper methods of caring for the material until it is ready for market will also be included.

A similar report on "Opportunities to Buy Wood Waste" will be sent to wood-using factories and other consumers who ask to be listed for this service. This report will contain information relating to manufacturers who have such material and its character, quality and amount available.

None other than actual producers or consumers of wood stock of this character can become patrons of this Exchange. All communications should be addressed to the Director, Forest Products Laboratory, Madison, Wis.

Bracing Up

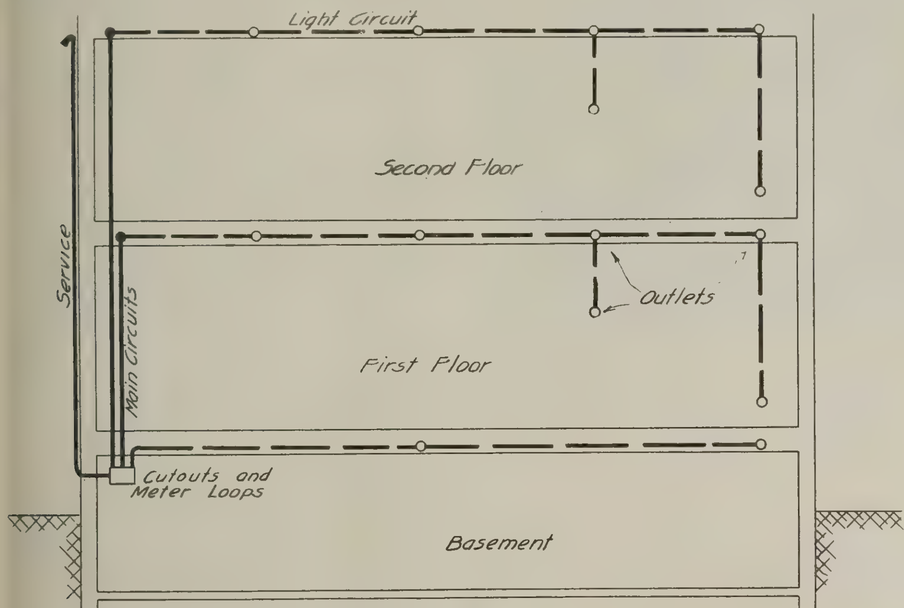
I have records showing that in most manufacturing industries efficiency has increased from 20 to 30 per cent during the past 12 months. Our farmers are making extraordinary efforts. They will bring in this year's crop at a much less cost than for many years past.—*Herbert Hoover to the National Association of Real Estate Boards.*

Planning the Electrical Work

There are four necessary parts of any house wiring installation. They are service, meter, circuits, and outlets.

The service includes the bringing in of wires from the point at which the central station company will make its connection, and the installation of cutouts and meter loops. Strict rules regulate the manner in which this work must be done as well as the material that shall be used.

The meter is generally owned and installed by the central station company.



However, it is necessary that the proper circuits be run for it when the wiring is done.

From the cutout box the main circuits are run for the different floors. All of this work must be done before one light can be supplied with power. As an example, the essential parts of every wiring job are shown in the diagram of a two-flat building on this page. In this case the service connection at the outside is made at the elevation of the second floor ceiling joists. The location of the cutout is also governed by wiring regulations and is shown in the basement. The meter loops for the two main circuits and the two main circuits are also shown, all of these parts being indicated by heavy solid lines.

The owner must pay for all of this though he may not specify its capacity below a certain point. The ultimate capacity, the size of the various wires, the manner in which it is installed, and the material itself are fixed and set down in specific rules that must in every case be adhered to by the wiring contractor.

The capacity of each installation is great enough to supply ample illumination for the building. The maximum lead on any individual circuit is fixed.

It is apparent that the cost of this necessary service and circuit wiring makes up a very appreciable part of the total cost of the complete installation. If the owner is to have twelve outlets in the building, each of the twelve must bear its proportional part of this service cost.

If we assume that the service work or overhead complete costs $72.00, then $6.00 must be spread upon each outlet. The actual cost of wiring the outlet may be $2.50 in addition, making the total cost for each outlet $8.50. The interesting point to note is that each additional outlet, up to the ultimate circuit capacity, reduces the unit cost.

Wall, base and switch outlets

To illustrate, it is possible to take a very common case. The owner finds that he would like to have some more lights in each apartment, say, two more in the ceiling and three wall brackets. He also wants a wall receptacle in the kitchen and two base receptacles for ornamental lamps, the vacuum cleaner, and such equipment. This will bring the total number of outlets to twenty-eight instead of twelve. As many of these are wall and base outlets, it will bring the average individual cost slightly above our assumed $2.50, say, $2.75. Having made these changes, then, the total cost of the job will be the original $72.00 plus the cost of 28 outlets at $2.75, or $149.00. This is at the rate of $5.32 an outlet.

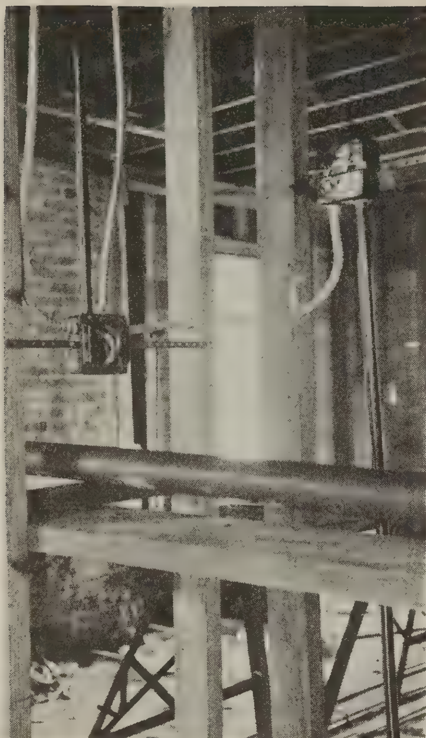
Though these figures are merely assumed to illustrate the case, they tend to show the economy in an installation that is designed to load each circuit. The owner must pay for a certain capacity whether or not he uses it.

Many contractors estimate wiring jobs on the basis of a fixed price for each outlet. Additional outlets in this case would very likely be charged for at the same rate, when, as a matter of fact, the additional outlet might give him a profit at less than half of this amount.

There are two things the contractor may do with a wiring job. He may buy it—which is actually what he does when he places the successful bid—or he may sell it. The electrical contractor is in an ideal position to advise the architect, the building contractor and the owner, in the matter of the electrical features of a building. He may call their attention to various improvements and additions, and by doing so he may assist in securing for the owner a more satisfactory job and for himself an increased contract.

It is an unfortunate fact that the electrical installation is often slighted in the planning. When this is the case and when it is apparent to the electrical contractor that certain changes or additions will better please the owner he should not hesitate to advise him.

The successful architect and the successful building contractor are often generalists. Their field is broad and it requires this characteristic. The electrical contractor is essentially a specialist. Realizing this fact, many architects depend upon such specialized knowledge in designing the electrical installation. How such a plan works to the advantage of the owner is shown in the following example:



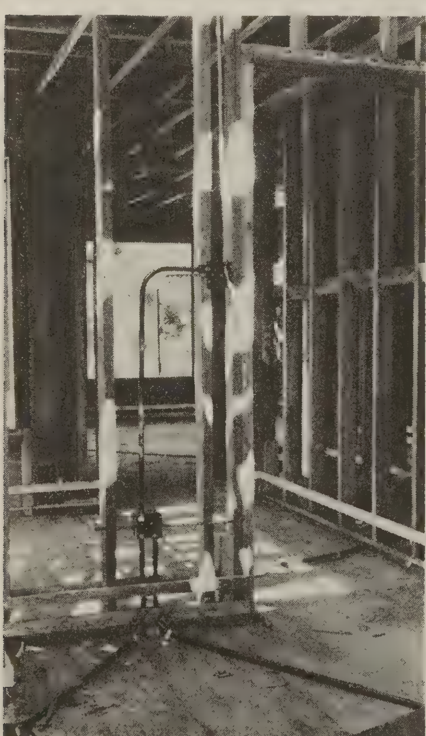
Use of metal instead of wooden headers in installation of wiring devices for both rigid and flexible conduit

One architect submits plans to an electrical contractor. He gives the contractor full information regarding the various rooms. With this information to guide him the contractor studies the job, makes notes of suggested changes and improvements, and consults the architect and owner in regard to them. Such changes are usually made. The contractor next lays out his circuits, and here he shows his real worth. He takes extreme care to load each circuit to capacity, starting at the top and working down. As a result there is no wasted copper in the entire building.

In most cases this contractor is awarded the job—often at a price estimated as actual cost by his competitors. He considers the fact that there is no waste in the job—a condition not often encountered and therefore not considered by the other bidders. The result of this practice is that the owner gets a better job cheaper, the architect has a satisfied client, and the contractor makes a profit.

One feature alone, out of many that have to be considered, makes saving possible on many jobs. A base outlet for floor lamps, vacuum cleaners, and so on, may be as convenient if located near a wall switch as if it were placed on the opposite wall. When this is the case the saving is apparent. Instead of a long line of conduit, a few feet is all that is required. The amount of wire required may be reduced as much as 50%.

For just such reasons as those given above it is a good policy to get the wiring contractor's advice on any installation before adopting it.



Economical arrangement of base and switch outlets. Two base outlets back to back serving two rooms. Eighty-six outlets in this house—fully twenty more than the average

Care and Use of the Hygrometer in Kiln Drying

The correct use of the hygrometer is of vital importance in the interpretation and consequent regulation of kiln conditions. Drying conditions altered because of a false conception of the conditions present often result in honeycomb and other highly detrimental degrade. Several basic practices are suggested by the Forest Products Laboratory for the proper handling of hygrometers

Calibration

Hygrometers should never be assumed as registering the correct reading until their accuracy has been established. It is not at all unusual for a thermometer to register a few degrees higher or lower than the true temperature. Each thermometer of a hygrometer should be checked against a standard thermometer of known accuracy over the range of temperatures anticipated in its use. Corrections for the several temperatures may thus be determined if inaccuracy exists. Checking should be done with the bulbs of the standard and the tested thermometers close together and in the same medium and temperature of medium. The correction factor for a thermometer at a certain reading being known, it is simple enough to determine the true temperature.

Filling and Care

Hygrometer reservoirs should be filled with pure water only. The open-top type of reservoir is easily filled, but the inverted-tube type often presents difficulties. The latter type may be filled if submerged horizontally in a pail of water with the water level slightly above the well opening. Other methods of filling such a tube are by means of a wash bottle or small bent-stem funnel. In any case the body should be dropped below the mouth level.

It is important that the silk or muslin covering of the wet bulb be kept in good condition at all times. At least a small amount of solid material is always left in the meshes after evaporation, and sooner or later such a deposit impedes the transfusion of moisture. It is because of this that pure or distilled water should always be used in the reservoir and that the wick should frequently be changed.

Placing the Hygrometer

The hygrometer should be placed at the exact points where information as to conditions is desired. Do not place it near a door or a wall, or where it will be subjected to direct radiation from the heating coils, as conditions at these points are probably not representative. To obtain representative conditions take an average of several readings in different parts of the kiln.

Taking the Readings

In reading the wet-bulb thermometer care should be taken that there is sufficient air circulation to give the maximum evaporation rate from the bulb covering. At low temperatures, i.e., up to 120 degrees F, there should be an air velocity of at least 15 feet per second. At the higher temperatures this rate is not quite so essential A thorough fanning of the air about the wet bulb is usually required. The lowest wet-bulb reading for any air condition is the one desired.

What's the Matter?

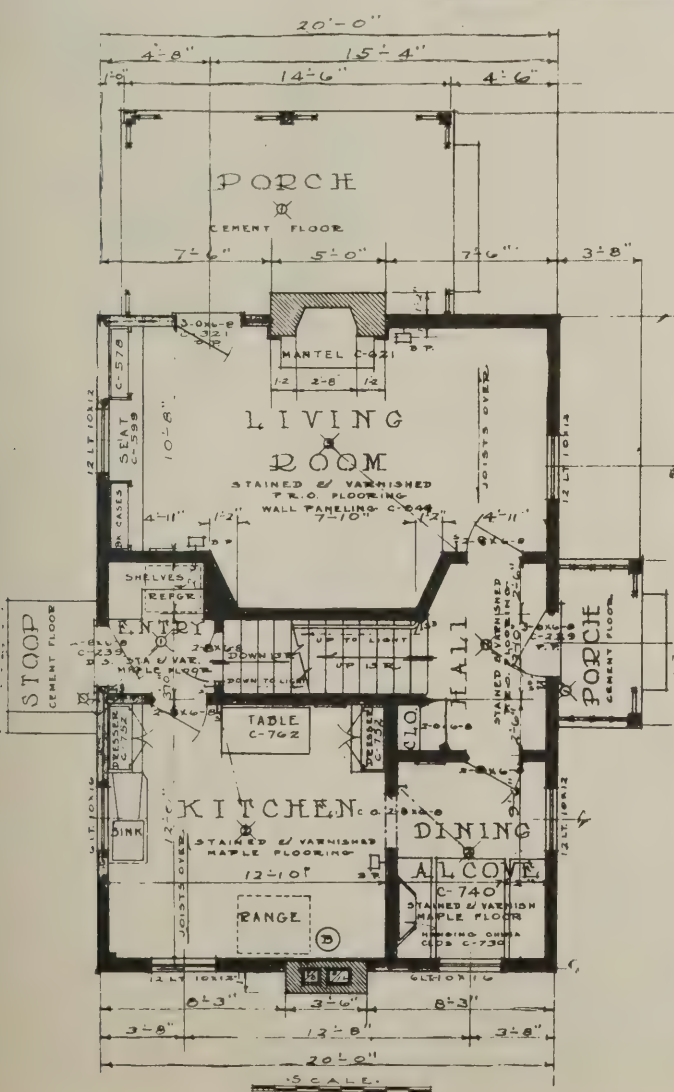
The resistance of a few groups of manufacturers or dealers to lowering prices to the general level; the resistance of a few groups of workers to accommodate their wage to the decreasing cost of living, and the necessity of a better day's work; the refusal of some people to curtail their extravagance—all such contribute to our undoing.—*Herbert Hoover to the National Association of Real Estate Boards.*

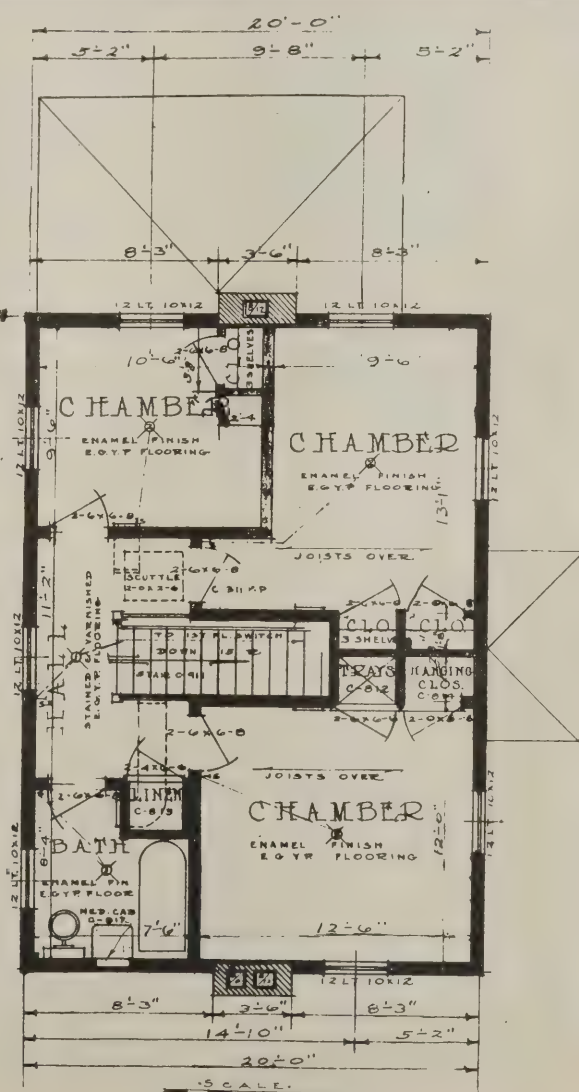
A Six-Room House

THIS six-room house was designed for the Curtis Companies by Trowbridge & Ackerman, Architects, New York City. The first and second floor plans are reproduced in part from the original drawings. The basement plan is not shown, but contains provision for a laundry, fuel room, furnace room and storage.

This is one of the houses that have been developed in four architectural expressions by the Curtis Companies through a system of standardization in charge of Messrs. Trowbridge & Ackerman, in connection with designs of a complete line of woodwork suited to each architectural style.

The simplicity and dignity of this little house express the Colonial type, the characteristics of which, in the language of Mr. Ackerman, are, above all, symmetry and quiet dignity. The plan is regular and in the form of a rectangle; consequently it is an economical house to build. Among the principal features of the Colonial house is the simple roof, with its relatively narrow





cornice made up of well-formed mouldings. There is a certain primness about the Colonial house which results from its nicely spaced windows, its well studied details, and the ever-important consideration that it never strives for effect. It is a straight-forward solution of an architectural problem.

The bill of material for this house is subjoined.

Bill of Material for Six-Room House, Norwich C-531

MASONRY

Quantity	Description
178 cu. yds.	Excavating for basement
6 cu. yds.	Excavating for main wall, post and chimney footings
11 cu. yds.	Excavating for porch walls and footings
5 cu. yds.	Fill under porch
151 cu. ft.	Concrete—main wall, post and chimney footings
633 cu. ft.	Concrete—main wall, 10 inches
183 cu. ft.	Concrete—front porch, wall and footings
	967 cu. ft. concrete 1:3:5 requires:
	165 sacks cement
	19½ cu. yds. sand
	32 cu. yds. stone or screened gravel
112 sq. ft.	Cement finish for foundation ½". 1:2 requires:
	3 sacks cement
	½ cu. yd. sand
2 M	Common brick for chimney
3 M	Common brick for fireplace
	Requires:
	7 bbls. lime
	3½ cu. yds. sand
509 sq. ft.	Cement floor for basement 3" thick
	Base 1:2½:5. Top ½". 1:2 requires:
	36 sacks cement
	2½ cu. yds. sand
	4 cu. yds. stone or screened gravel
196 sq. ft.	Cement floor for porch 4" thick
	Base 1:2½:5. Top ½". 1:2 requires:
	20 sacks cement
	2 cu. yds. sand
	3 cu. yds. stone or screened gravel
2	Chimney caps
40 lin. ft.	8x8 Tile flue lining
66 lin. ft.	8x12 Tile flue lining
205 sq. yds.	Stucco. Requires:
	53 sacks cement
	4½ cu. yds. sand
9 sq. yds.	Metal lath for corners, etc.
544 sq. yds.	Inside plastering
	Requires 87 sacks, 100 lbs. each, wood fibre plaster
2	8x10 C. I. clean-out doors and frame
1	10x12 C. I. clean-out doors and frame
1	8" thimbles
2	6" thimbles
1	7x9 ash dump
1	32-inch fireplace throat and damper
1	3x3x¼ angle for fireplace 3' 4" long

LUMBER

Pcs.	Size	L'gth.	Ft.	Description
4	6x6	7	84	Basement posts
1	6x8	12	48	Basement girder
1	6x8	14	56	Basement Girder
20	2x4	8	107	Basement partition studs
7	2x4	7	33	Basement partition studs under girder
	1x6		400	Basement partition lining D. & M.
	2x4		76	114 Lin. ft. basement partition plates
	2x6		100	100 Lin. ft. wall plates
	2x8		80	60 Lin. ft. box sill
2	2x8	12	32	Basement window headers
3	2x10	14	70	Basement stair carriage
3	2x10	12	60	Basement stair treads
1	2x8	12	16	First floor stair header
55	2x8	10	734	First floor joists
3	2x10	16	80	Main stair carriage
4	2x8	9	48	Second floor stair header
7	2x8	9	84	Second floor joist
26	2x8	12	416	Second floor joist
12	2x8	14	224	Second floor joist
27	2x6	18	486	Second floor ceiling joist
46	2x6	18	828	Main rafters
4	2x4	12	32	Dormer rafters
2	2x6	16	32	Dormer beam
3	2x4	16	32	Cornice blocking
88	2x4	16	939	Outside studding
12	2x4	18	144	Outside studding
20	2x4	12	160	Gable studding
68	2x4	9	408	Inside studding first floor
92	2x4	8	491	Inside studding second floor
	2x4		200	300 Lin. ft. outside plates
	2x4		320	480 Lin. ft. inside plates
	1x2		84	500 Lin. ft. plaster grounds
	1x2		342	2050 Lin. ft. furring strips for stucco
	1x3		75	300 Lin. ft. bridging
	1x6		20	40 Lin. ft. ribbon
	1x6		26	52 Lin. ft. cornice plancier
	1x12	6	6	Shoe rack
	1x10		24	28 Lin. ft. closet shelving
	1x2		3	18 Lin. ft. closet shelving cleats
	1x8		680	Sub-floor first floor (shiplap)
	1x8		620	Sub-floor second floor (shiplap)
	¾x2¼		350	Finish floor, living room
	¾x2¼		304	Finish floor, kitchen and dining alcove
	¾x2¼		690	Finish floor, second floor
	1x8		2050	Box sheathing
	1x4		1020	Roof sheathing (spaced 2")
	1x6		272	Roof sheathing D. & M.
			10¼	M shingles (4½" to weather)
			3	Squares composition roofing
			8¼	M 4-ft. lath for plaster
			3	M 4-ft. lath for stucco
			7	Rolls building paper (500-ft. rolls)
2	2x4	16	22	Front porch ceiling joist
2	2x8	16	43	Front porch ceiling girders or truss
3	2x4	10	20	Front porch rafters
1	2x4	14	10	Front porch hip rafters
2	1x8	16	22	Front porch beam casing
1	1x4	16	6	Front porch beam soffit
1	1x6	16	8	Front porch cornice plancier
	⅝x4		35	Front porch ceiling M. & B.
12	2x4	9	72	Rear porch ceiling joist
2	2x8	16	45	Rear porch girders or truss
4	2x8	9	48	Rear porch girders or truss
9	2x4	10	60	Rear porch rafters
2	2x4	12	16	Rear porch hip rafters
2	1x8	16	22	Rear porch beam casing
4	1x8	9	24	Rear porch beam casing
1	1x4	16	6	Rear porch beam soffit
2	1x4	9	6	Rear porch beam soffit
	⅝x4		158	Rear porch ceiling M. & B.
1	1x6	16	8	Rear porch cornice plancier
2	1x6	10	10	Rear porch cornice plancier
				Alternate
	1x6		1122	Roof sheathing, if laid solid

NOTE—No material included for scaffolding.

FINISH HARDWARE

Quantity		Description
20	Pr.	3½x3½ Door butts
2	Pr.	3½x3½ Cellar door butts
2		Front door cylinder lock sets
1		Rear door lock set
8		Inside door lock sets
7		Closet door lock sets
2		Cellar door lock sets
6		Cellar window sets
14		Window locks
14		Window lifts
1½	Pr.	2½x1¾ door butts, seat
4	Pr.	2½x1¾ door butts, bookcase
2		Door fasteners, bookcase
2		Elbow catches, bookcase
4		Drawer pulls, bookcase
1	Pr.	2½x1¾ door butts, china case
1		Door fastener, china case
6		Drawer pulls, tray case
9		Drawer pulls, linen case
10		2½x1¾ door butts, kitchen dresser
6		Door fasteners, kitchen dresser
4		Elbow catches, kitchen dresser
4		Drawer pulls, kitchen dresser
2		Flour bin pulls, kitchen dresser
1	Pr.	2½x1¾ door butts, kitchen table
1		Door fastener, kitchen table
2		Drawer pulls, kitchen table
1		Flour bin pull, kitchen table
1	Pr.	2½x1¾ door butts, medicine cabinet
1		Door fastener, medicine cabinet
3	Doz.	Coat hooks for closets
3	Hanks	Sash cord
48		6-lb. Sash weights 288 lbs.
8		4-lb. Sash weights 32 lbs.
		Total Sash weights 320 lbs.

ROUGH HARDWARE

Quantity		Description
80	lbs.	3d nails (fine)
41	lbs.	3d nails (common)
6	lbs.	6d nails
175	lbs.	8d nails.
50	lbs.	10d nails
15	lbs.	16d nails
10	lbs.	6d finish nails
20	lbs.	8d finish nails
4	lbs.	6d casing nails
55	lbs.	8d casing nails
1	lb.	1½" brads
¼	lb.	¾" brads
28	lin. ft.	Galv. iron ridge roll
42	lin. ft.	Galv. iron hip roll
100	lin. ft.	Galv. iron gutter, complete with hangers
84	lin. ft.	Galv. iron conductor pipe with hooks, elbows and strainer
70	lin. ft.	Tin flashing 20" wide
120	lin. ft.	Metal corner beads, inside corners
90		Tin shingles 5x7

PAINT

Quantity		Description
5	gals.	Paint, exterior, 3 coats
1	gal.	Boiled linseed oil for primer coat
31	gals.	Stain for dippings shingles
9	gals.	White paint for interior, 3 coats
7½	gals.	Enamel for interior, 2 coats
7½	gals.	Filler stain for interior
3	gals.	Shellac for interior
13½	gals.	Varnish for interior, 3 coats
1½	gals.	Shellac for floors
7	gals.	Varnish for varnish floors, 3 coats
1½	gals.	Oil for kitchen floors

Questions, Answers, Kinks and Discussions--V. L. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

Accurate Grinding

The device shown in Fig. 1 was made by Mr. George Alexander Ross, of Oak Park, Ill., who is at the head of the pattern shop and foundries of a large technical school.

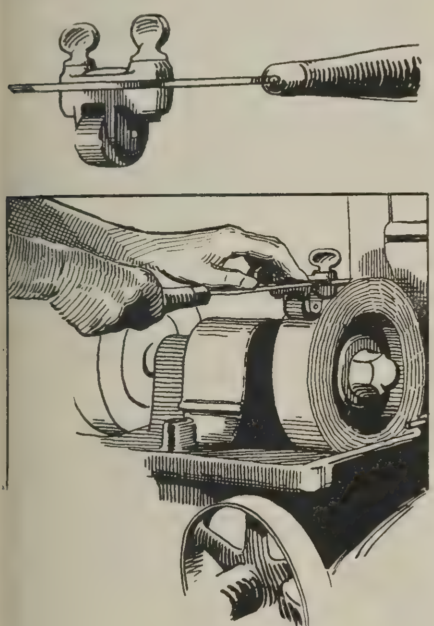


Fig. 1

Mr. Ross says that while it proves to students that a properly sharpened tool is by all means the only tool, it is also a great time saver when it comes to putting edges on a number at a time.

The device is simply a broad rest mounted on a roller with an upper trap carrying two thumbscrews which clamp the tool in the position desired.

Estimating, Shingling and Framing

R. D., New York, asks: (1) What is the best way to estimate number of shingles in a ½-pitch roof; also for hip and valley roof? (2) Are there any books of estimating cost of frame house construction? Answer: (1) Walker's *Building Estimators' Reference Book,* page 1281, says: "Ordinary wood shingles are furnished in random widths, but 1,000 shingles are equivalent to 1,000 shingles 4 in. wide.

"Dimension shingles are sawed to a uniform width, being either 4, 5, or 6 in. wide.

"When estimating the quantities of wood shingles required to cover any roof area, bear in mind that the distance the shingles are laid to the weather will have to be taken into consideration, as it will not take as many shingles when laid 5 in. to the weather as when they are laid 4 in. to the weather

"There are 144 sq. in. in 1 sq. ft., and the ordinary shingle is 4 in. wide. Providing they are laid with 4 in. exposed to the weather, each shingle will cover 16 sq. in. of roof or wall surface; or it will require 9 shingles for each sq. ft. of surface to be covered. As there are 100 sq. ft. in 1 square, it will require 100 times 9 shingles, or a total of 900 wood shingles to cover 100 sq. ft. of either roof or wall surface, and with an allowance of 10 per cent to cover the double row of shingles at the eaves, waste in cutting, narrow shingles, etc., it will require 990 shingles to cover 100 sq. ft. of surface. (2) A list of books on estimating, taken from our book file, has been mailed to the inquirer. We shall be glad, however, to have additional suggestions from our readers.

Scrapers

A simple type of scraper is shown in Fig. 2, which is another suggestion by Mr. Ross. The body is slotted deep enough to fix an old blade or strap which has been re-ground. The handle is a piec of dowel.

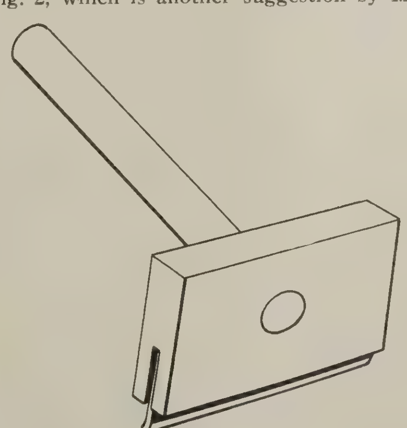


Fig. 2

Dale R. Van Horn, Lincoln, Neb., contributes a photograph here reproduced of a scraper made from the bit of an old plane fastened to a hardwood handle fashioned to fit the hand. The edge was ground off and a new one, almost at right angles, was put on again. It has been in use for several years and is one of the handiest tools about the shop.

Scraper made from an old plane bit

Floor for a Dairy Barn

E. L. L., Rhode Island, writes: "I am building a cow barn and we are at a loss what to use for flooring. The owner wants a concrete floor, but we are in doubt if it is healthy for cows to stand and lie so long on a cold floor, for we have to keep cows inside a great deal in winter time. So please advise me what I should use." Answer: Above all things, the dairy barn floor should be sanitary, which means that it must be impervious and easy to clean. Concrete has these characteristics and for that reason is specified by health departments. Of course, it is the usual custom to use considerable straw or some other bedding material in connection with a concrete floor. This bedding acts as an insulating medium between the floor and the animal. Sometimes cork-brick or creosoted wood block is used on the stall platform as these materials are poor conductors of heat and cold, and are consequently more comfortable to the animal. They, of course, require the use of bedding like the concrete floor. It is very seldom that a plank floor is used in a dairy barn nowadays on account of its short life. If the planks are laid directly on the ground they are wet and slippery, and if built above the ground are cold and drafty.

Under separate cover we are sending you by courtesy of the Farm and Cement Products Bureau of the Portland Cement Association a copy of their "Manure Pit" circular which gives some instructions for building a dairy barn floor of concrete.

A Saw Kink

Albert Reedman, Amsterdam, New York, writes: "I am sending you a sketch of a saw that I filed to saw nails with. I used this to saw the nails off in replacing broken slate (see Fig. 3). It works so much better

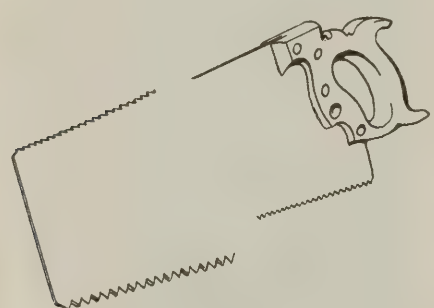


Fig. 3

than a slater's ripper—no danger of breaking slate. It is also a fine thing to use when you come to a nail in a board; just turn the saw over and saw the nail off. I do not know as there is anything like this patented; I never saw one before."

Device for Raising Posts

"The following device is one which may prove useful to some of your readers," writes B. R. Maxwell, Charleston, Ill., "especially to those in the rural districts where the proper equipment is not always at hand to handle the work; at least, I found it very much so one time when I was called upon to frame a barn for a farmer whose barn burned about the first of December and it was a hurry-up job to provide shelter for the stock and feed. (See Fig. 4.)

"The posts were 8x8x18 ft. long, and I had but four men. We got the framing done at noon. One of the men said, 'Boss, have you got a wince block and ropes to raise the posts?' I said, 'Yes, about 20 miles away, but the roads are so a team cannot make it there and back in a day and we cannot wait.' But I told him not to worry and that by five o'clock we would have them all in place, 16 posts, 8x8x18 ft. long. 'We'll sure have a hard job of it,' they said.

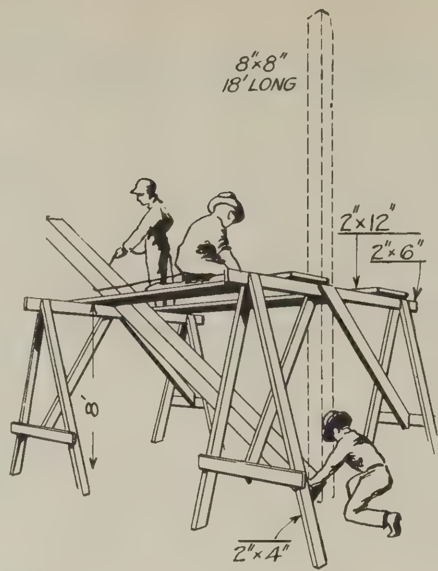


Fig. 4

"It took them one-half hour to make two trestles and get ready to raise the first post. We put it up and moved the outfit on to the next post and so on around, and before five o'clock the posts were all in place.

"The one trestle must be braced so the weight of the post bearing against it cannot push it over, and the 2x12 planks strong enough for the two men to walk on. Then with a ¾-in. rope on one end of the post and two men upon the plank and two on the ground, they can very easily put one end up on the trestle and two men can then set it on end. Then when it is plumbed and braced the job is done. Of course this will work any place for any kind of a post, and not much loss in the trestles because they can be pulled to pieces and there is always a place for short pieces on the job."

Another Square Kink

Many of us prefer a special try-square that is not already notched for use in scribing, so I take a sharp pointed instrument

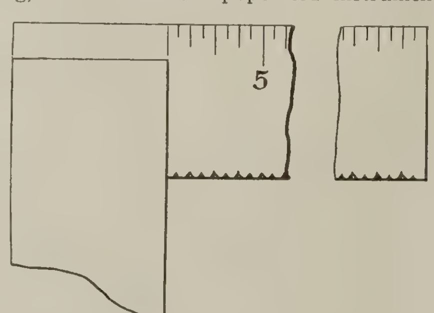


Fig. 5

and another square and mark my square as at *a* in the drawing (Fig. 5). Then I use a three-cornered file and file notches as at *b* and *c*, using very small notches for the ⅛-in. ones. This kind of a square is sure handy, and you would not do without it after once using it.—*Earle R. Spahr, Xenia, Ohio.*

Another Scaffold Bracket

Benjamin W. Coates of Moncton, N. B., writes: "Referring to the sketch for a scaffold bracket by F. G. Rockwood of Waukesha, Wis., I use a scaffold bracket that is similar to his, only, I think, a little better.

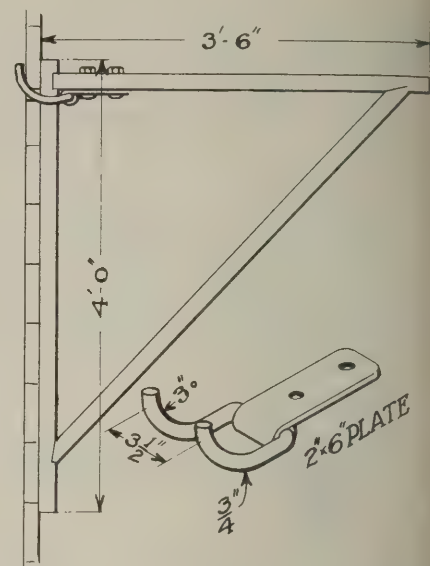


Fig. 6

See Fig. 6. It does away with the tipping of the bracket so as to get it through the boards, which, I think, would be a little awkward when one is standing on a ladder. The sketch explains itself."

Problems of an Ogee Arch

In reply to your "Problem of an Ogee Arch" appearing in the June number of 1921, the accompanying drawing is sub-

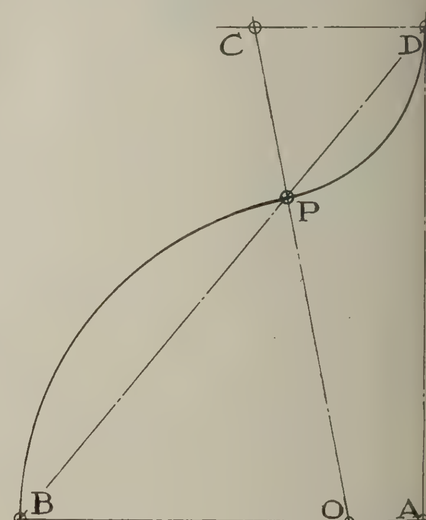


Fig. 7

mitted (Fig. 7). First, draw a line from *B* to *D*, then strike the lower radius from *B* to *P*. Strike a line from *O* to *C*, passing through intersection at *P*. *O* is the required center.—*Louis Vanderpol, San Diego, Calif.*

To Cut Off a Tapered Porch-Post

In repairing round porch-posts it is often necessary to cut off the bottom of the post and replace it with a turned piece. When the bottom of the post is in fair condition it is an easy matter to lay off a certain amount from the bottom end of post and saw.

I have had occasion to cut off some so badly rotted that measuring from the base was impracticable. I hit on the following method:

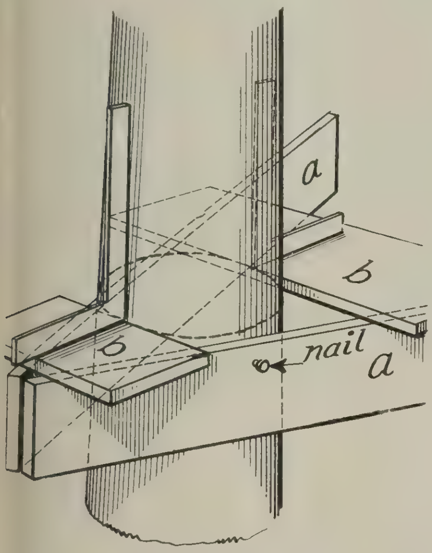


Fig. 8

Two strips (*a, a,* Fig. 8) were nailed to the post, with the upper edge of strips at the place it was desired to cut. One nail was driven in each piece and into the post, and the strips so joined as to form a V with the post in the opening of the V. It is now an easy matter to place a board *b* in position across the strips *a, a,* and by use of the square to test whether or not the strips are lined up properly. A second nail is then driven into each strip and the strips can be used as a guide for sawing. If it is found that the post is about plumb, as they often are, a level can be placed on *a* and *a* to locate them.

The above method takes less time to do than to tell about it and has proven very satisfactory.—*Franklin Beener, Bridgeport, Pa.*

Books on Drafting Room Practice

L. E. Lucas, an architect of Petersburg, Va., says in his inquiry for books on drafting room practice: "It occurred to me that some of the old heads had perhaps jotted down some of the little kinks and short cuts that they had discovered in their practice and gotten them into book form."

There are hosts of books on architectural and mechanical drafting, some worthy and some not. The Industrial Press of 49 Lafayette Street, New York, publish a pamphlet called "Drafting Room Practice, Working Drawings and Drafting Room Kinks" which, while largely mechanical, is very good. French, of Ohio State University, has written numerous good books along architectural and mechanical lines in drafting. A good deal can be gotten from the texts of the International Correspondence School, and the handiest book to be found in perspective is by Frank E. Mathewson and published by the Taylor-Holden Company, of Springfield, Mass.

Making a Basement Water-Tight

W. B. M., South Dakota, writes: "I have a concrete mixer and do all my own concrete work. I should be pleased to receive any information relative to water-proofing concrete. Water is about 4 ft. from the surface here; hard to get a dry basement." (Also *Myron Law, Hamar, N. D.*—same query.) Answer by Portland Cement Association: Concrete made from properly selected aggregates, combined with portland cement in suitable proportions, when thoroughly mixed to the right consistency, carefully placed, and adequately protected during early hardening, will be water-tight under all ordinary conditions. In the case of basement construction, if the level of ground water is apt to rise above the level of the basement floor it will exert an upward pressure which will tend to lift and crack the floor unless the weight of the floor is sufficient to counter-balance that pressure. For instance, if the ground water rises 1 ft. above the level of the floor it will exert an upward pressure of about 62½ pounds per square foot. If the concrete floor is 4 in. thick its weight will be about 50 pounds per square foot. Thus the water pressure would be greater than the weight of the floor and might lift and crack the floor in which case water would penetrate through the cracks. In such cases it is necessary to make the floor thick enough so that its weight will be sufficient to resist that upward water pressure. In case the upward water pressure amounts to several hundred pounds per square foot the cost of a concrete floor thick enough to resist it by weight alone would be excessive, and it is then desirable to put in a reinforced concrete floor which is properly anchored to the building walls and columns. This construction is similar to that of a water tank, the difference being that the water pressure is external instead of internal. Where water is about four feet from the surface it would seem to be quite simple to get a water-tight basement providing the level of the basement floor is not placed lower than 4 ft. from the ground surface.

New Idea in Concrete Construction

P. O. H., New Jersey, writes: "In the very near future I intend to build a number of concrete houses. One of the ideas which I wanted to work out was to make the wall forms in such a way that they would form the interior decorations of the rooms. This would eliminate plastering. If I carried out the above scheme there would not be any air space in the walls to keep out dampness and to keep the walls from sweating. Will you advise me how to overcome the above problem? What kind of water-proofing could I use to best advantage?"

Answer by Portland Cement Association: Your proposition to construct concrete walls so as to eliminate plastering can be worked out satisfactorily provided some means of insulation is included in the outer wall construction. The most economical, of course, is a hollow wall, or one containing an air space; or, if desired, this air space can be filled with granulated cork or other insulating material. Unless some such means of insulation is adopted, damp walls are certain to result and it would be next to impossible to maintain satisfactory temperature within the building. Concrete in itself is of low conductivity; however, if the moist air in the room comes in contact with the colder surface of the outer wall, condensation will form and dampness result. This condition would not be relieved by the use of water-proofing since water-proofing will not serve as insulation. Moreover, a coat of Portland cement stucco when properly applied will make walls impervious to water and will prevent them from becoming wet and communicating the same to the interior wall. The proper method for applying stucco is described in the bulletin of the Portland Cement Association, "Recommended Practice for Portland Cement Stucco."

Data sheets are issued by the Portland Cement Association describing the Van Guilder System. By this method the air space within the outer wall is obtained by means of a core which is part of the forms for casting the outer walls. The inner surface of these walls can be made smooth by means of sandblast or rubbing with carborundum blocks to remove form marks, and a paint can then be applied directly to the concrete. This will give you the finish you have under consideration.

A Built-in Phonograph

A unique variation of the built-in features usually found in the colonnade separating the dining and living rooms is suggested by John D. Budde, contractor, Tilden, Neb. On the dining-room side he builds two china cabinets. On one side of the entrance in the living-room he builds in a writing desk, with a bookcase below; and on the other side of the entrance he places a built-in phonograph with a case below for records.

To Prepare an Uneven Floor for Linoleum

C. A. C., Holliston, Mass., asks for the following information from his fellow subscribers: "I have a kitchen floor to cover with linoleum, and it is uneven in some places by reason of wear. I should like to know if there is any preparation which I can flow on or trowel on like cement to fill up the uneven places."

Estimating Ornamental Plastering

E. R. U., Wisconsin, asks for information on methods of estimating ornamental plastering, such as running cornices, modeling of ornaments, casting ornaments and putting them in place. Mr. Virgil G. Marani, chief engineer, Gypsum Industries Association, answers in effect as follows:

At the present time, in the order of their importance, the chief factors entering into the cost of any plastering operation are: The cost of labor, freight, cost of hauling to the job and erection to place of application, and cost of material. Items entering into an estimate on plaster work are: The kind of lath, base or background, upon which the plaster is to be applied. The size and nature of the ornamental work, whether it is of a size and form permitting it to be run in place, or requiring that it be first cast and then secured in place, in which latter case the method of securing also involves the cost.

In all cornice or molding work of plaster, the number of corners and miters add to the cost as well as the number and kind of returns in the design. Straight cornices or molds can be run or set in place for less cost than those that are circular, elliptical, or a combination of such curved dimensions and plane surfaces.

In all surface plastering, interior and exterior angles add to the cost as also does the area of ceiling surfaces, the height of the walls and ceilings, and the height of the building.

Two or three-coat work becomes an important cost item, not only because of the extra material required, but also on account of the labor involved for the moving of scaffolds, etc.

Generally speaking, when in possession of labor and material costs, the estimating of plastering work involves the following:

1. Teaming materials to the job. 2. Hoisting materials on the job. 3. Storing materials on the job. 4. Weather and drying conditions. 5. Water supply and kind of water. 6. Sand supply and nature of sand. 7. Kind of lath, base or background to be plastered. 8. Kind of plaster and proportions specified. 9. Square yards of surface to be plastered. 10. Number of coats specified and how applied. 11. Height of walls and area of ceilings to be plastered. 12. Number and nature of openings in surfaces to be plastered. 13. Number of interior and exterior angles on surfaces to be plastered. 14. Lineal feet of cornices or moldings. 15. Number of interior and exterior angles, miters on cornices or moldings. 16. The grit of the cornices and moldings. 17. The kind of cornices and moldings—whether they are composed of plane surfaces, or are circular, elliptical, or a combination of such. 18. The kind and size of ornamental plaster work and whether the design will permit of running in place or pre-casting and securing in place. 19. The method specified for securing all ornamental plaster work which must be pre-cast. 20. The height of the building.

In estimating plaster work, the usual custom is to estimate as follows:

1. All surfaces by the square yard. Some estimators deduct openings of 1 sq. yd. or more. 2. Run cornices and moldings by the lineal foot. Interior and exterior angles (miters), so much each. 3. Cast cornices, moldings and ornamental work, so much for the girt, so much for the material contained, and so much for the labor involved.

The art of plastering and the correct estimation of costs can only be acquired by actual practical experience, and speed of operation is recognized as an economic essential.

Operating Power Saw Rigs

Some Pointers That Will Aid Builders on the Job

THE builder employing a portable saw rig or woodworker on the job should know the proper care and operation of equipment of this machine, so as to get the best results from it with the least repairs and expense.

First of all, such machinery needs care. Many builders are inclined to leave their machines exposed to rain and snow for a week or more without protection. How they expect to get full efficiency out of a machine treated in this manner is hard to understand.

The operation of a saw with power, gasoline or electric, is no more dangerous than the use of an ordinary hand saw—that is, provided the proper precautions consistent with the operation of power-driven machinery are taken into consideration. Manufacturers of these machines provide all practical safety devices essential in their operation.

One of the most dangerous things that the saw operator can do when ripping lumber is to attempt to remove edgings or slivers which may have become lodged in the saw groove or throat of the saw-table while the saw is in operation. Flying knots or chips from the saw should be guarded against. No saw should be operated unless properly equipped with proper guards. The saw-guard should always be set low enough to let only the stock pass easily under it and far enough forward so that the operator cannot see more than about 2 inches of the revolving saw.

Another danger to guard against in the operation of the saw is the so-called "kick-back." To avoid this a spreader is usually placed directly back of the saw. However, much cross-cutting and ripping is being done alternately on the saw during a day's run. Moreover, the spreader back of the saw does not always work to the best advantage when doing cross-cutting or mitre-cutting, and some machines are not equipped with this safety device. Therefore, the operator must be on his guard constantly.

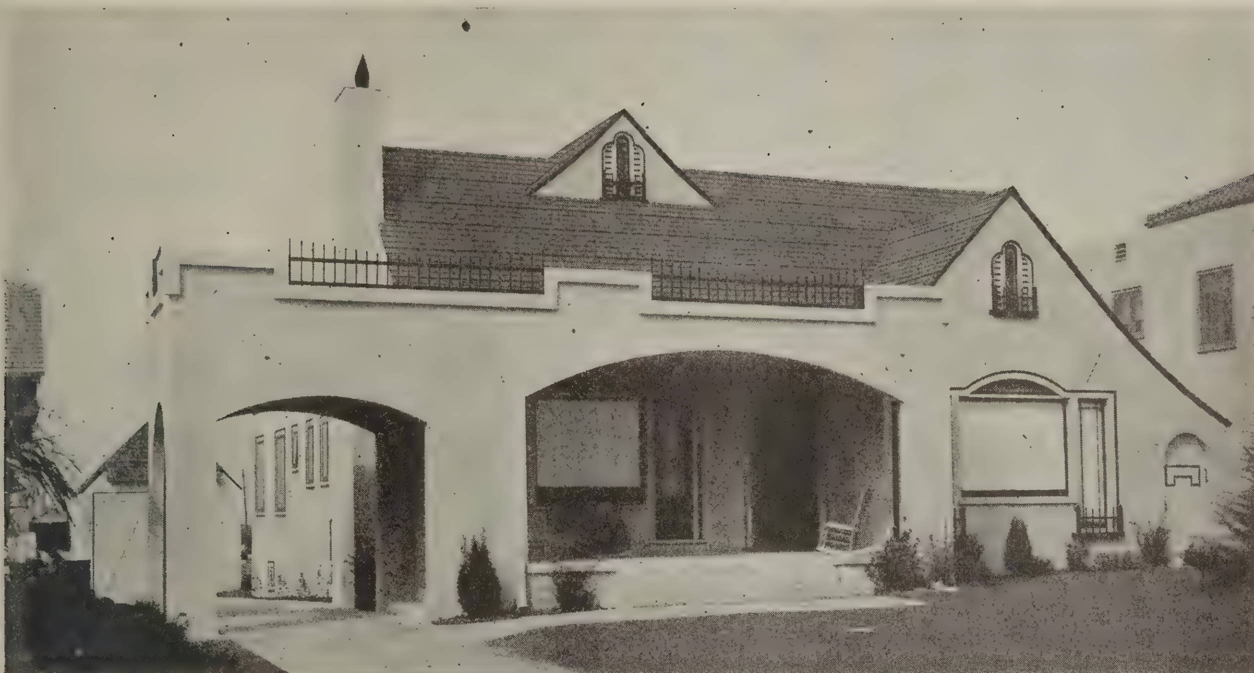
Kick-backs while ripping generally occur when no spreader is used back of the saw, and warped stock is forcibly thrown back by the centrifugal force of the saw, generally striking the operator in the abdomen and often causing serious injuries. Running warped stock, however, is not the only cause of accidents of this nature. Some of them are: Using spreader that is thinner than the saw; attempting to operate the saw with insufficient set, causing the stock to bind and kick back; using too small a saw; operating with the saw-table set too high; leaving too small a portion of the saw exposed.

Another bad practice which one often sees among men operating power saws on building jobs is that of setting the saw so that it just cuts through the stock. A saw ripping 1-inch-thick stock, when set in this manner, has a tendency to drive the stock back at the operator. This is the case especially if it has teeth of 1-inch pitch. These teeth strike at such an angle that three of them are engaged at one time, making the stock extremely likely to kick back. A saw set at the proper height for ripping only engages one or rarely two teeth in the lumber at a time, thus the cut is made with less power, and the tendency to draw the stock through, rather than drive it back at the operator, is helped along. The setting and filing of the saw also are important.—*Successful Methods.*

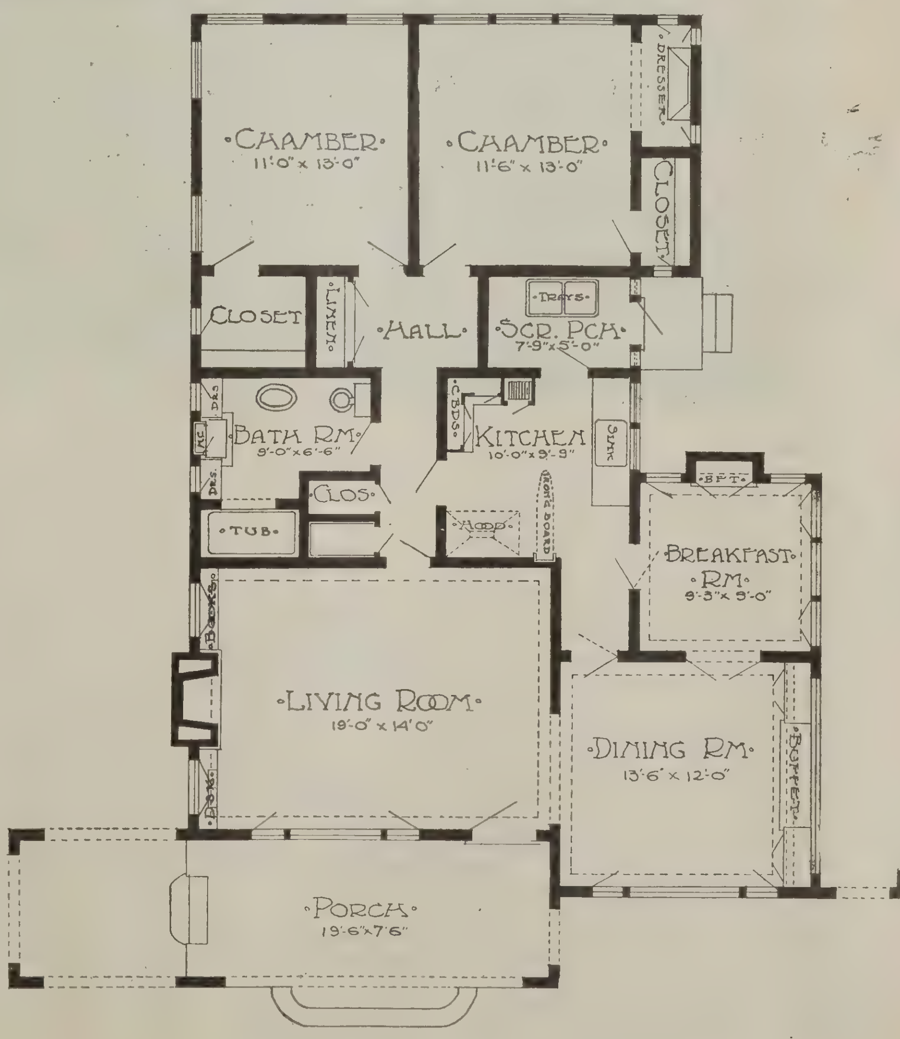
Plenty of Business

Members of the real estate board of Dallas, Texas, at a meeting on July 1 declared the efficiency of labor offset the high price of labor, that there was plenty of business, and the only need is determination to go out and get it.

A New-Style California House



Showing a variety of influences effectively used



VARIOUS indeed are the styles of the new homes that are being built in California since the war. Young architects, or young men possessed of an architectural leaning that has since been developed, who were in service abroad, are doubtless responsible for much of this variety of types and interpretations. At least it is very easy to discern in many of these new homes influences, variously expressed and variously combined, that unmistakably have come from the several lands these young men collectively visited—England, France, Belgium, Italy, and other countries.

Illustrated herewith is one of these post-war products. And while it represents a combining of a number of different influences, the little house constitutes, due to good craftsmanship, an especially well-balanced creation and a decidedly attractive and practical small home. It, in fact, presents, as the illustration makes evident, an exterior appearance that not only is unusually pleasing but causes the house to seem quite materially larger than it really is; and, as will be observed from the accompanying floor plan, its interior is not only a model of convenience but one of economy in arrangement also.

The outside walls are of cement-stucco over frame construction and a deep cream in shade; and the shingled roof and all trimming, including the grill-like ornamentations beneath some of the front windows and atop the porch and porte-cochere walls, are black. It should be further noted that the roof is characterized by a doubling of every fifth course of shingles. The porch on the front, which is extended at one end into protecting porte-cochere, is roomy and constitutes an excellent outdoor retreat. It, incidentally, is floored with cement, and both it and the driveway extension have a flat composition roof. From the other front corner of the house there is an extension of the wall to form an attractive gateway.

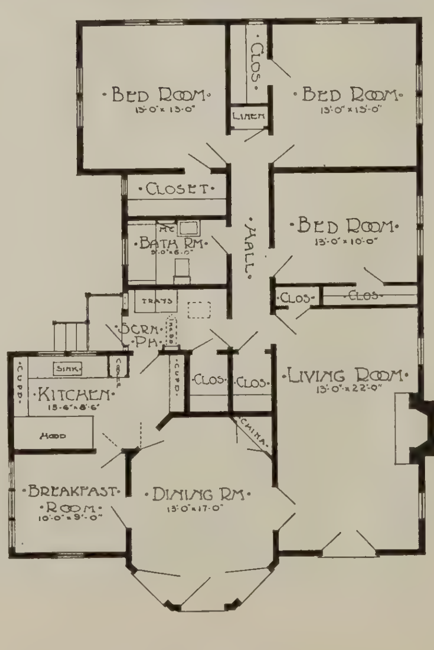
In studying the floor plan, especial notice should be taken of the convenience of the connections and of the numerous closets and built-in features. In the latter respect, it will be observed that the living room contains bookcases at one side of the fireplace and a desk at the other; the dining room is equipped with a combination of buffet and china cupboards; the little breakfast room also has a built-in buffet; the kitchen contains a disappearing ironing board, a draught cooler closet and the other customary conveniences; the hall includes a linen cabinet, a closet and the water heater; the bath room possesses two drawer and shelf cabinets, a box seat and a medicine case, and one of the bed rooms, in addition to the regular clothes closet, has a small dressing alcove with a built-in dresser, while the other bed room has an unusually roomy closet.

The interior finish consists of old ivory with mahogany trim in the living room and dining room; old ivory alone in the breakfast room and two bed rooms, and white enamel in the hall, bath room and kitchen. Hardwood floors prevail throughout, except in the bath room and kitchen, the former of which has tile flooring. The walls of the living room, dining room, breakfast room, two bed rooms and hall are papered, and in the bath room and kitchen they are finished, to a height of about five feet, with a smooth, hard plaster coat which is enameled like the woodwork. The mantel of the fireplace is of dull-toned tile and wood.

The house has neither basement nor cellar, but it is equipped with built-in gas radiators for heating and all other modern conveniences. It is located in Los Angeles, California, and was designed by Edward E. Sweet, of that city.

A Neat Appearing Bungalow

Cement stucco over frame



IN both structural lines and color scheme, the little bungalow illustrated herewith presents a particularly neat, dignified and pleasing appearance. It also has an attractive and practically planned interior, possessed of numerous roomy closets and many excellent built-in conveniences.

The outside walls are of cement-stucco over frame construction and are finished in a light sky-blue tint; the roof is of wood shingles painted light gray, and the wood trimming is in white. Red brick, however, is also introduced in the trimming scheme, being used both as a coping for the top of the walls of the bay-like extension on the front and for finishing the top of the gable walls. On a front corner is an open cement paved terrace, from the middle of which a pair of glass doors, comprising the main front entrance, opens into one end of the long living room. The bay-like extension, set in the middle of the front wall, also has a single glass door, designed with an arched top, in each of its three angles, by which direct access is provided to the dining room. This dining room, it incidentally will be observed, is planned in the form of an oblong octagon.

Further study of the interior discloses a pair of doors, which are of glass, intervening between the dining room and living room, while leading off of one corner of the latter is a central hall that directly communicates with the kitchen entry porch, the bath room and each of the three bed rooms. Besides the closet possessed by each bed room, it should be noticed that the living room contains a small one for wraps, the connecting hall has both a linen cabinet and an extra wardrobe closet, and off the kitchen porch is a large storage closet. The built-in features include a corner china cupboard in the dining room, a medicine case in the bath room, a disappearing ironing board ı the kitchen porch, and a draught cooler oset, cupboards and so forth in the kitchen. On a front corner, incidentally, will be bserved a small breakfast room, which ffers possibilities for den, sewing room r children's play room, should any of these ɛ preferred.

The interior finish, for which pine is sed throughout, consists of light French ray in the living room, dining room and reakfast room; of old ivory in the hall ıd bed rooms, and white enamel in the bath room and kitchen. The walls of the bath room and kitchen are finished, in high wainscot effect, with a smooth, hard plaster coat which is enameled like the woodwork, the wall space above being tinted, and the walls in the remaining rooms are papered. Hardwood floors prevail throughout, except in the bath room, kitchen and kitchen entry porch, tile being used in the bath room. The bath tub is tiled in, and tile sink drainboards are found in the kitchen. The mantel of the living room fireplace is of brick and wood in a Colonial design.

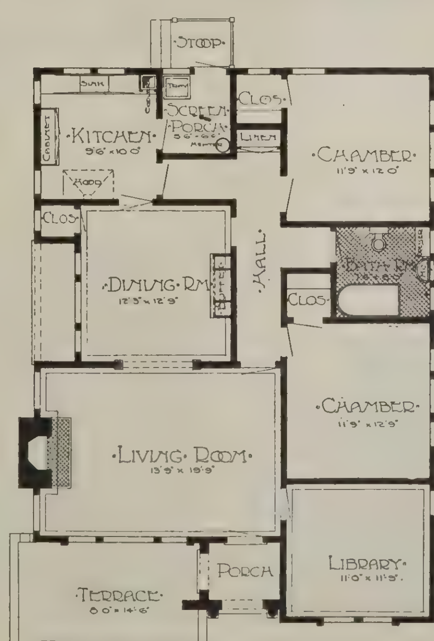
The house possesses neither basement nor cellar, but the one or the other might have been provided, with an inside stairway to it taking the place of the storage closet on the kitchen entry porch. There are built-in gas radiators to supply heat, and the equipment includes all other modern conveniences. The house is located in Los Angeles, California, and was designed by Walter S. Davis, of that city.

A Composite Style

Designed by the DeLuxe Building Co.

ALIFORNIA architects seem to be ever striving toward the creation of the different," and generally they succeed with ery admirable and commendable results. Ierewith is illustrated a small one-story ouse that is an exceptionally charming and ttractive interpretation of the mission tyle--which means, incidentally, that the :udent of architecture will find it possessed f certain points that are Spanish and others ıat are Moorish, plus still others that can nly be ascribed to the individualistic temerament of the interpreter. The Moorish ıfluence is especially noticeable, for in:ance, in the arches of the entrance. Hower, it is perhaps best merely to say the ouse is a new California product, and one ıat, found variously modified by the different designers, has come to be, in the ıst two years, quite popular in the southern art of the Golden State.

The house, even aside from its particuırly interesting entrance, possesses many



features and details that combine to give its exterior exceptional attractiveness. Of these, note especially the walled-in terrace on the front, the small porch on one side accessible from the dining room through French doors, the effective grouping and detail treatment of the front windows, the panel-like gable vents, and the various other character lending touches to be observed from the photograph. And the color scheme adds still further charm to the outside appearance. The walls, which are of cement-stucco over frame construction, are finished in strikingly rough style and are of light brick-red color; the roof, somewhat mildly pitched, is of tile, which is reddish-brown in color, and all wood trimming outside is done in a weathered shade of brown, while the iron grills beneath the front pair of windows and the gable vent over the entrance are black. The little entrance porch, the terrace and the small porch on the side are all floored with red cement.

In interior arrangement and general treatment the house is somewhat similar to the California bungalow. The rooms are provided with convenient connections, and there are roomy closets for the bed rooms and several excellent built-in features. The latter include a buffet in the dining room, a dresser cabinet and a medicine case in the bath room, a linen cabinet in the hall, and a draught cooler closet, cupboards and so forth in the kitchen. Incidentally, in studying the accompanying floor plan, it should be realized that the room here designated as a library may be utilized, instead, as either an extra bed room, a den, or otherwise.

The woodwork finish in the living room and dining room consists of California redwood; in the library, two bed rooms and hall it is in old ivory, and elsewhere it is in white enamel. The walls of the kitchen and bath room are finished to a height of about five feet with a smooth, hard plaster coat which is enameled like the woodwork, and the walls of all other rooms are papered Hardwood floors are found throughout, except in the bath room and kitchen, th former of which is tiled.

The house has no basement or cellar, al though the one or the other might easily have been provided. The heating plant consists of built-in gas radiators. The plans are by the De Luxe Building Company, o Los Angeles, California, and the house i located in that city.

Changing a House Into a Home

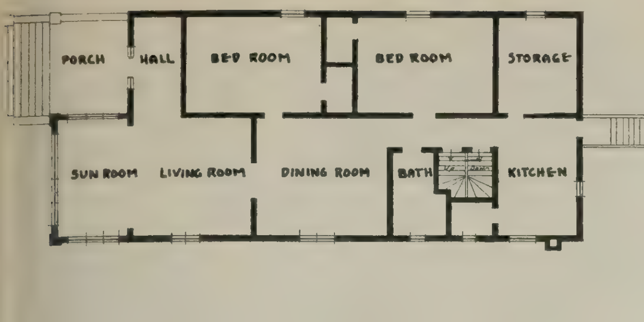
THE purchased house very often does not fully meet the requirements or wishes of the new owner. Carefully planned remodeling can do much to correct this, and the results obtained in many cases are pleasantly surprising.

A good example of what may be done is shown in the illustrations on this page. When this house at 3823 Addison street, Chicago, was purchased by Dr. C. S. Krysinski, the rooms were small, poorly arranged, and poorly lighted. The front door gave access to a small vestibule which itself opened into the living room. Back of the vestibule, along the east side of th house, were two small bedrooms, while bac of the living room was a small dinin room. A small bathroom and a narro stairway to the second floor opened fr a hall that extended from the dining roo to the kitchen. The bathroom was ma

Both inside and outside, neatness is the keynote

The old dining room was enlarged by the addition of a sun porch

This rear sun porch is the real heart of the home



Before

After

particularly crowded by the space required for this stairway.

Though there was a large space available on the second floor, only one small room had been finished.

Dr. Krysinski began his remodeling by tearing out the front vestibule partition and by building an attractive open stairway in this space. The partition separating the two bedrooms was also removed, making one large, comfortable room. The living room, with the sun porch in front, was the only part of the interior that was left as it originally was.

The old narrow stairway was torn out and the space thus obtained was added to the bathroom.

An attractive flower bed forms the center of this automobile drive

Two large sun porches were built on, one opening from the dining room and one to the rear of the kitchen. A comfortably large breakfast room was also added in the rear.

Many changes were made in the interior finish. The rear hall, kitchen and bathroom were tile floored and were wainscotted with white tile. Keene's cement plaster, white enameled, gave these rooms an especially clean, attractive appearance.

The second floor, when completed, comprised two bedrooms, a bath, and a large card and billiard room.

As is indicated in the illustration, the yard has been especially well taken care of, practically all of this outside work having been done during this year.

But the point that impresses the visitor is the excellent arrangement and the appropriate decorative treatment of the interior, and the taste that has been used in furnishing it. It is difficult to imagine these results having been obtained with the old, barn-like, and poorly arranged house to work from. It is an excellent example of converting a house into a home, and is a prediction of what may be expected when careful thought is given to the remodeling job.

The Chimney Flue

A. M. Daniels, assistant mechanical engineer of the division of agricultural engineering, Bureau of Public Roads, in his monograph on "Operating a Home Heating Plant," issued as Farm Bulletin 1194 by the United States Department of Agriculture, has this to say about chimney flues:

Chimneys defective in construction or badly located cause many failures of heating systems. Air passes up the chimney flue with a spiral movement; therefore a round, smooth flue is preferable because it offers less resistance to the upward passage of the gases. For structural reasons and because of the increased cost it is not nearly so common as the square or rectangular flue. The square is preferable to the rectangular. Many chimney flues are not lined. That is a mistake. The first cost of a lined flue is greater, but the benefit is not only better furnace operation but continued fuel saving; moreover, the danger of fire is lessened.

The most efficient chimney, as far as draft is concerned, is one built perfectly straight from the bottom up with a round or nearly round flue, lined with tile or having the interior surface made smooth by other means There is no advantage in tapering the inside toward the top. The cross section and height are determining factors of efficient service. The transverse area must be sufficient to pass the volume of air required to burn the fuel properly, and the height must be great enough to produce sufficient draft and insure against interference by adjoining buildings or projections of the same building.

In a square or rectangular chimney the corners are dead. The effective area in square flues is 85 to 90 per cent, and in the rectangular flues about 75 per cent.

Ordinary residence chimneys vary in height from 25 to 60 feet, their area being proportional to the size of the house. A chimney large enough for the draft may yet be too small, for no flue should be less than 8 inches in diameter or 8 inches square. Satisfactory results can be expected under ordinary conditions with warm air, hot water, or steam plants if the sizes given in the following table are followed. The sizes given are the commercial designations, the actual sizes of the flues being a little less.

Type of standard flue lining

Flue Sizes for Residences

Volume of Building *Cubic Feet*	Size of Flues: Round *Inches*	Square *Inches*	Rectangular *Inches*
20,000	8	8 by 8	6 by 10
40,000	9	9 by 9	8 by 12
60,000	10	10 by 10	8 by 14
110,000	12	12 by 12	10 by 18

Hollow Brick Walls for Government Houses in England

By John Y. Dunlop

ONE of the most successful results of housing construction through the agency of the English governmental organization since the finish of the war has been to explode the old theory that groups or rows of houses if built of the same material must necessarily be monotonous.

Because of the extreme necessity of exercising all possible economy in the construction and in the transporting of material houses in any area are now being practically built of the same material.

Of course, when we look back and survey the type of buildings which were erected all over England previous to the war we find nothing but a class of work which was built to stand for ages.

I quite well remember when the most of building by-laws demanded that for a bungalow house built with stone the wall must be two feet thick and if built with brick they had to have a 14-inch wall. Since then we have had a rude awakening and now we are content to build a two-story

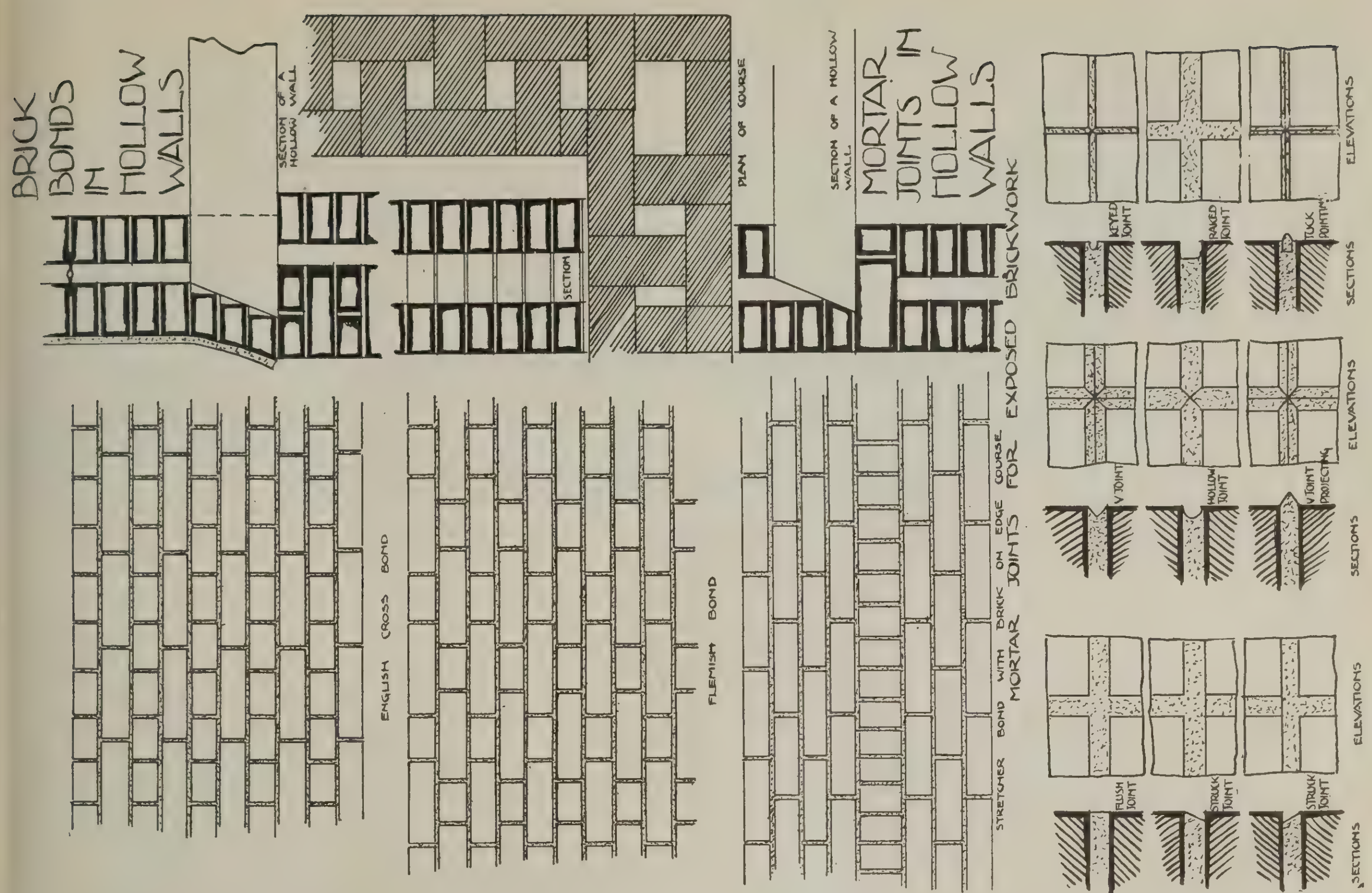
Street of gable houses. Stucco and hollow brick walls

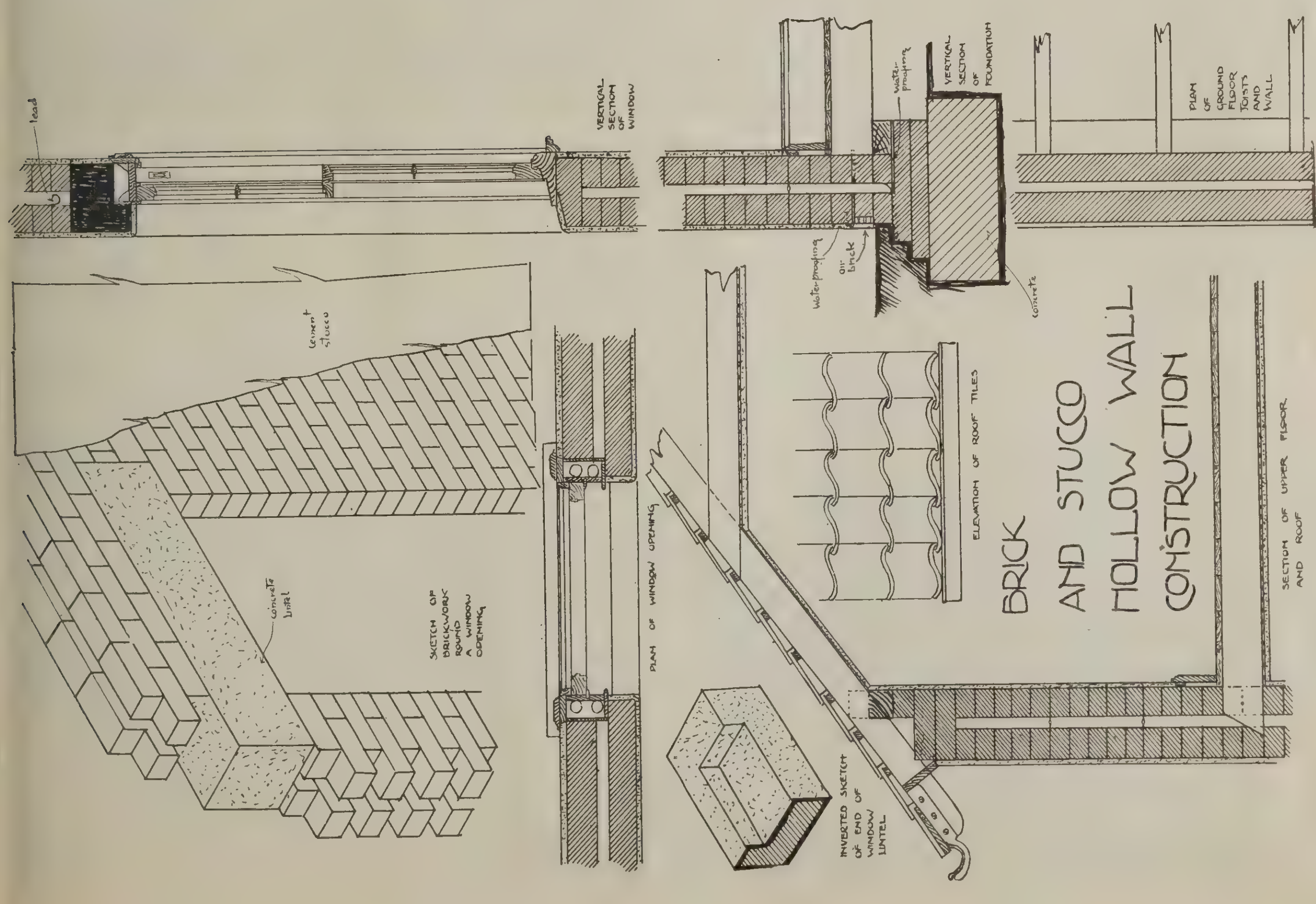
house with 9-inch walls. The economy of such construction is quite evident when it is considered that in this way anything from 30 to 40 per cent of material alone is being saved in outside walls. The width of the foundations are also somewhat decreased and although it is still considered good practice to build the foundations beneath the surface of the ground, still there is not the same tendency to go so deep down, which means that the English architect is aiming at effecting a saving in the foundation as well as the fabric of the house.

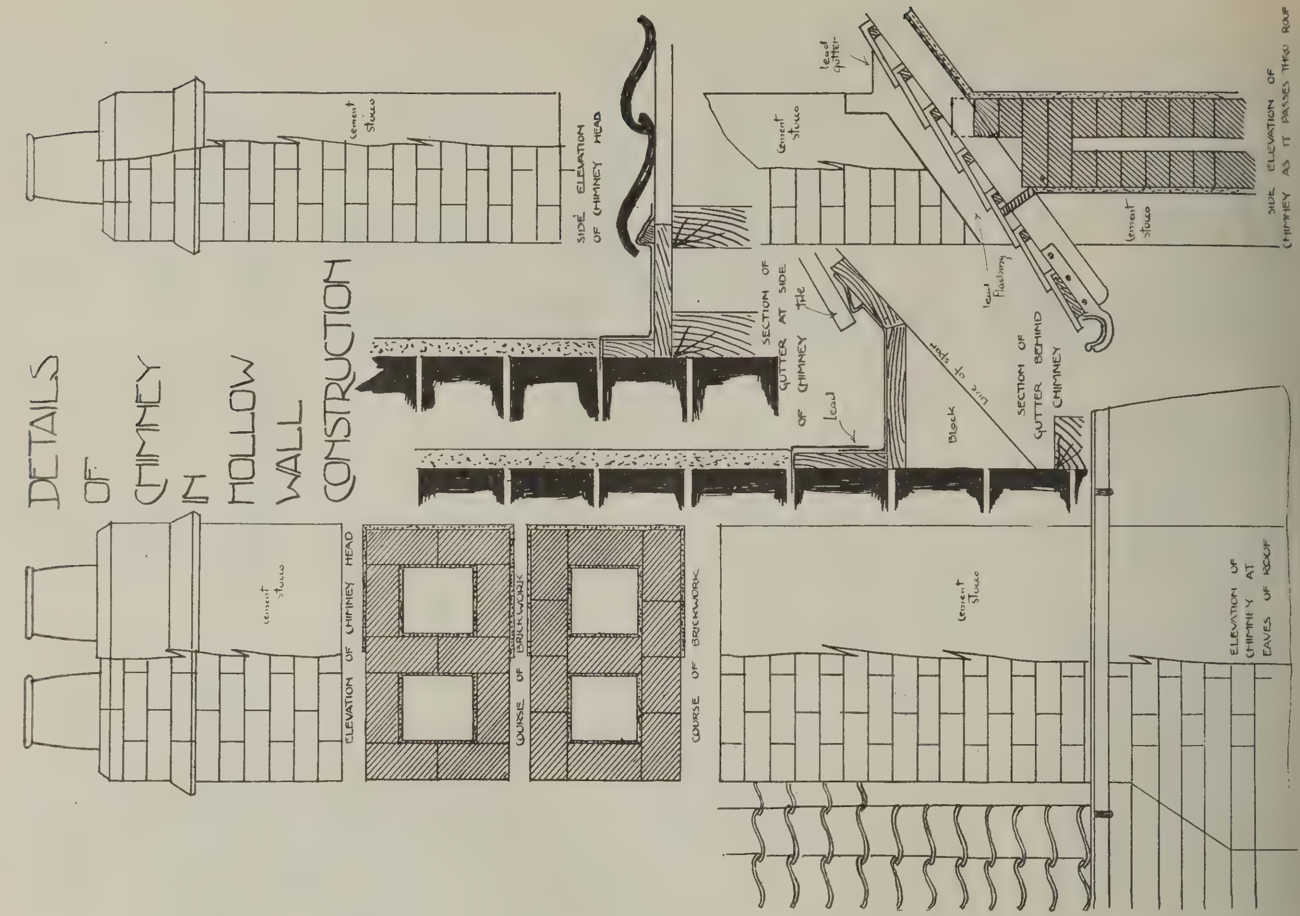
It has been found, however, that the forced use of one class of material for external walls has become an advantage, for the proper placing of the buildings in relation to each other and to the street assumed its proper function. This is brought about by the varying in position, by a change in the position of the main lines of the fabric and by the grouping of the buildings as well as the individual units in the building. In the construction of houses for the worker the extreme necessity of using the minimum of material wherever possible has resulted in the building of thinner walls. This is being forced upon building contractors and architects because any saving in material means not only a saving in its cost but also a saving in handling, transporting, and building the lesser quantity.

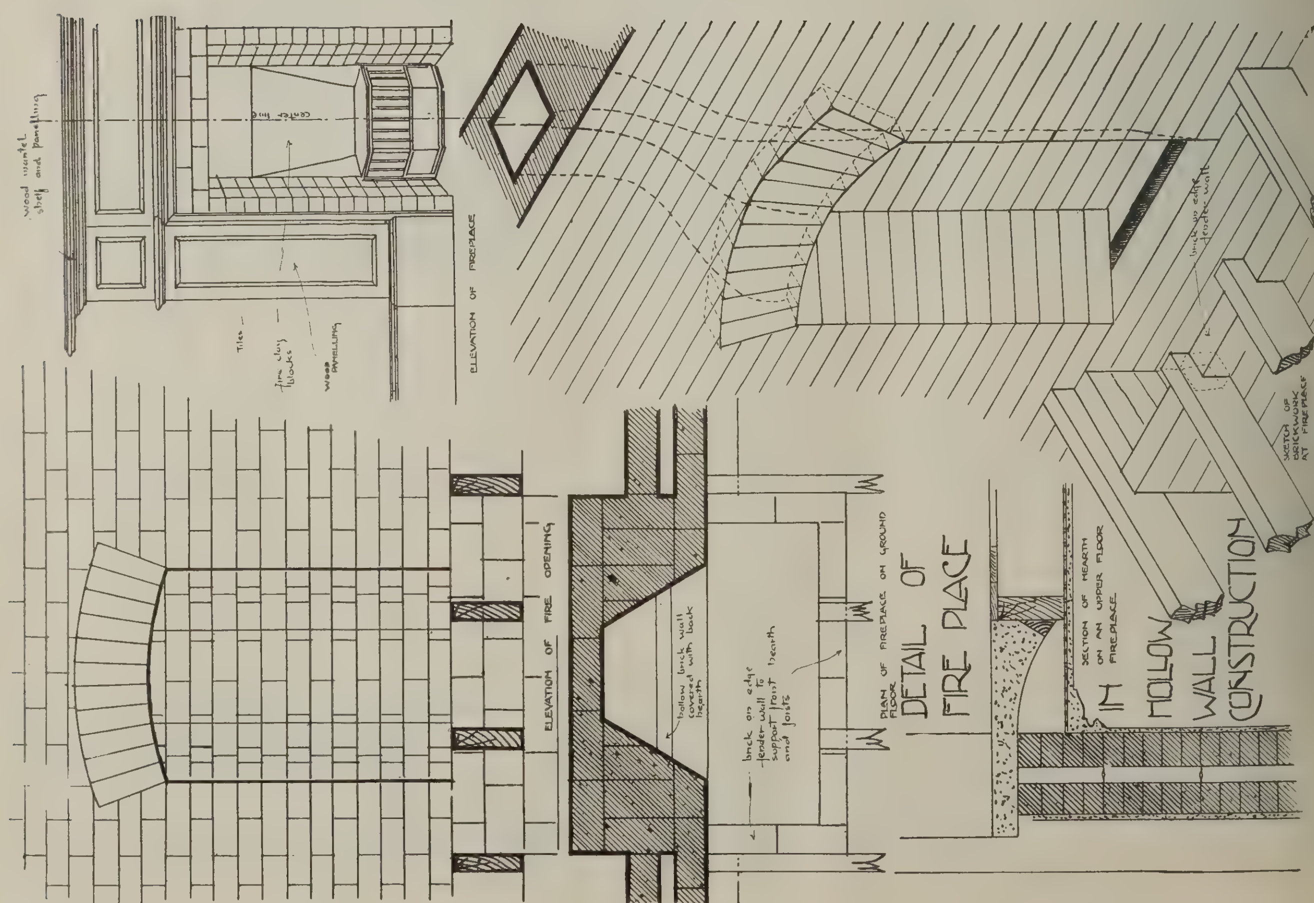
Brickwork in many cases is the groundwork for stucco-finished walls in which the larger wall surfaces allow of a combination of plaster and brick design. In the few halftone illustrations of the English village which are shown the bulk of the houses are entirely covered with stucco. One or two of them have the lower walls of brick and stucco above. In every case the walls are hollow built, having a 4½-inch thickness outer wall and 4½-inch inner wall, with a 2¼-inch space. Where facing bricks have been used in the ground floor walls the lower outer wall is 9 inches thick, 2¼-inch hollow space and a 4½-inch inner wall. On the top story the wall is 4½-inch outer, 2¼-inch space and 4½-inch inner. In this way the thickness of the bulk of the hollow walls which are being built in this country just now are 11¼ inches, that is two half brick on flat skins and 2¼ space and as cheapness is the primary consideration this is all that can be afforded.

The London by-law on hollow walls ordains that when hollow walls are constructed there shall be a wall on one side of the hollow space of the full thickness prescribed for solid walls. In other words, the total thickness of a hollow wall must exceed that of a solid wall for a similar building plus the cavity and the thin skin on the one side of it. In this way hollow walls are somewhat handicapped in London and consequently they are not much in use. Indeed, it is in the exposed situations of country and seaside rather than in the sheltered streets of towns and cities that hollow walls


BRICK BONDS IN HOLLOW WALLS
SECTION OF A HOLLOW WALL
SECTION
PLAN OF COURSE
SECTION OF A HOLLOW WALL
MORTAR JOINTS IN HOLLOW WALLS
ENGLISH CROSS BOND
FLEMISH BOND
STRETCHER BOND WITH BRICK ON EDGE COURSE
MORTAR JOINTS FOR EXPOSED BRICKWORK
KEYED JOINT
RAKED JOINT
TUCK POINTING
V JOINT
HOLLOW JOINT
V JOINT PROJECTING
FLUSH JOINT
STRUCK JOINT
STRUCK JOINT
SECTIONS
ELEVATIONS


BRICK AND STUCCO HOLLOW WALL CONSTRUCTION
lead
VERTICAL SECTION OF WINDOW
cement stucco
concrete lintel
SKETCH OF BRICKWORK ROUND A WINDOW OPENING
PLAN OF WINDOW OPENING
INVERTED SKETCH OF END OF WINDOW LINTEL
water-proofing
air brick
concrete
VERTICAL SECTION OF FOUNDATION
ELEVATION OF ROOF TILES
PLAN OF GROUND FLOOR JOISTS AND WALL
SECTION OF UPPER FLOOR AND ROOF


DETAILS OF CHIMNEY IN HOLLOW WALL CONSTRUCTION
ELEVATION OF CHIMNEY HEAD
COURSE OF BRICKWORK
COURSE OF BRICKWORK
cement stucco
SIDE ELEVATION OF CHIMNEY HEAD
SECTION OF GUTTER AT SIDE OF CHIMNEY
tile
lead
Block
SECTION OF GUTTER BEHIND CHIMNEY
lead gutter
lead flashing
ELEVATION OF CHIMNEY AT EAVES OF ROOF
SIDE ELEVATION OF CHIMNEY AS IT PASSES THRU ROOF


wood mantel shelf and panelling
center line
Tiles
fire clay blocks
wood panelling
ELEVATION OF FIREPLACE
ELEVATION OF FIRE OPENING
hollow brick wall covered with back hearth
brick on edge fender wall to support front hearth and joists
PLAN OF FIREPLACE ON GROUND FLOOR
DETAIL OF FIRE PLACE IN HOLLOW WALL CONSTRUCTION
SECTION OF HEARTH ON AN UPPER FLOOR FIREPLACE
brick on edge fender wall
SKETCH OF BRICKWORK AT FIREPLACE

Semi-detached house built with stucco and hollow brick walls. Each house consisting of four apartments

The house which is of stucco and hollow brick construction is for four families. Two front and two gable entrances

Another example of a foursome house in which the lower walls are brick, hollow built, and the upper walls are stucco on hollow brick construction

Semi-detached stucco and hollow brick house, consisting of six apartments each

Bungalow houses with concrete block fronts and stucco and brick side and back walls

Showing hollow wall brick construction ready for the stucco

are most needed. Where a wall 11¼ inches thick is not sufficient, additional strength is usually gained by increasing the thickness of the skin on one side only of the cavity, and the question is often asked should the thicker skin form the external face of the wall or the internal. The balance of opinion is in favor of the latter alternative as in this way the greater part of the whole wall is kept dry and the floors and roof are more firmly supported "Set-offs" for reducing the thickness of the wall can also be

One of the main streets looking south

Back view of brick and stucco houses

more easily arranged without breaking the continuity of the cavity.

In building hollow walls great care should be exercised that the cavity is continuous throughout the circuit and height of the building. In order to prevent the cavity being bridged with dropping of mortar or brickbats, battens or iron pipes wrapped with haybands should be placed in the hollow space while building proceeds and lifted up when the wall is ready to receive the iron ties. The battens or pipes are then laid on the top of these and the wall carried to the necessary height for the next row of ties and so on.

In order to bind the two skins of a hollow wall together and so strengthen the structure metal wall ties are built in at every fourth or fifth course, sometimes dense bricks are used, and again some builders form the outer and inner skin 4½ inches apart and by building the two skins in flemish bond, allowing the headers to project into the space lapping each other and tieing the two thicknesses of the wall together. This method is shown in the line drawing but the disadvantage with it is that moisture is apt to pass along if not through the wall. Experience has proved it to be better to bind together the two skins with metal ties 6 to 9 inches long. These are generally strips of wrought iron which have been twisted at the middle or shaped so as to prevent the wall passing over them to the inner thickness of the wall. When the bricks are without frogs there should be no turned-down portion on the end of the ties. All strap iron ties should be dipped in boiling tar and sanded before being used, otherwise they will rust and injure or stain the wall.

A few details of the general construction of hollow walls as they are erected in England are shown in the line drawings.

Hollow walls which are erected in two 4½-inch skins are built with stretcher bond, with the ocasional introduction of a header course. This header course is very often laid under the first floor joists with the idea of strengthening the junction of the floor and the wall. The heading course which is shown in this example in the line drawing is built on edge. Of course brick as a rule are very seldom laid on edge in English brickwork and only when they are being used to break the monotony of the continuous lines of brickwork on a large space.

English bond and Flemish bond are very much in use when the outer skin of the wall is more than 4½ inches thick or, in the case of Flemish bond, when the hollow space is made 4½ inches wide and so that the headers on the opposite side can overlap. This type of hollow wall is shown in plan and section in the line drawings, but it is not an arrangement which is very much in use, as English builders prefer the smaller space and thinner wall.

In the section of the wall which is shown with the lower 9-inch outer skin and the 4½-inch outer skin on the top, the lower portion is built with facing brick and all the joints are keyed. The method of finishing both the vertical and the horizontal joint of each type is shown in nine views. Some of the methods of finishing those joints have a very nice effect and have for long been practiced in England although at times such as this they are being severely left alone. The idea just now is to simply flush up the joints. Of course where the wall is to be finished with stucco the face of the joint cannot be left too ragged.

In building the foundation of a hollow wall concrete is much in use and on the top of that comes the few courses of footings. The hollow space starts on the top of the waterproofing and it is usual to run a cement fillet along the bottom of the hollow space so that if any moisture should collect it will run toward the outer skin. In building the door or window the two skins of the wall are carried forward at the sides of the opening and in the case of the door the lintel is set over and the hollow wall started on the top again. With the window opening the arrangement is much the same. The sill course is usually built across the opening and the arrangement of the two skins is shown in the sketch of the window. At the wall head a few courses are built solid and on this the roof is set.

In building the fireplace, which is a very important part of the English house, the extra thickness of the brick wall to receive the smoke flue projects to the outside and the hollow space is brought up as close on each side as is practical. A plan of a ground floor hearth is shown in which a brick on edge wall is built up from the ground to support the front hearth. When the hearth is on an upper floor the floor joists are trimmed and concrete front and back hearth formed as shown in the section. The fire opening or fireplace is built with splayed side and a 9-inch arch is thrown across the opening. The brick flue is then drawn a little to the one side by cutting and corbeling the courses on one side of the flue.

The general finish of the English fireplace is very much as shown, having a wood mantel piece with the fireplace built in and surrounded with tiles between it and the wood finishing.

The top of the chimney is carried a few courses above the ridge. As the chimney is being carried up the wall it is reduced somewhat in breadth and as each break is formed it is weatherproofed so that any rain falling on this part is drained off quickly. A detail of the chimney at the eaves is given along with the chimney top. Where this detail passes through the roof it is surrounded with lead flashings.

A detail is given showing the heat passages at the side and lower down is a detail of the gutter at the back. All the roofs in this English village are covered with tile, having tile ridges, valleys and hips, forming an interesting study in this kind of construction.

Colored Stucco

By Jim T. Pomeroy, Architect

THERE are two general methods of producing special color effects in stucco. One is by the use of sands and pebbles selected for the color that is to be produced; the other method is to add coloring matter to the mortar to give the desired effect. In either case the color treatment is usually confined to the finish coat as there is nothing to be gained by treating the under coats.

The use of colored sands, pebbles, stone chips and so forth, known as the exposed aggregate method, is now receiving considerable investigation and development, and seems to offer a highly satisfactory means of producing colored stucco. The followers of this method claim that the colors thus produced are unfading during the life of a building and that it is much easier to obtain a uniform appearance throughout a treated surface, than is practicable by means of color pigments added to the mortar.

Fig. 1—The stucco panels are colored with ochre to harmonize with the stained woodwork

Fig. 2—White stucco and red brick make a pleasing treatment for business blocks

There are two methods in use for producing colored stucco by means of exposed aggregates. In one method the colored aggregates are mixed with the mortar, which is then floated onto the wall, after which more or less mortar is removed from the surface, thus exposing the aggregate and bringing out the desired color. In the other method the finish coat of stucco is applied to the wall in the usual manner and the colored aggregate is then dry-dashed onto the surface. Which method is to be preferred seems to be determined largely by local custom and training. The latter method, however, seems to give a fresher, cleaner appearance with less manipulation. It is also saving of aggregate, if that be of consequence.

If the scrubbing method of exposing the aggregate is employed, the work should be done after the mortar has become hard enough to offer some resistance to removal. It should not, however, be so hard that unnecessary time and work are required for its removal. Use a stiff brush and plenty of clean water and use care to avoid cutting away too much of the finish coat. If the mortar has been allowed to set too long before scrubbing, a solution of one part hydrochloric acid in four parts of water can be used in the place of plain water for removing the excess mortar. All traces of this solution should be removed from the surface by spraying with a hose after the aggregate has been exposed.

Fig. 3—Colonial yellow was used for this small house surrounded by foliage

Fig. 4—A photograph cannot show the sparkle caused by quartz crystals used as a stucco finish

The dry-cast method is exactly similar to ordinary pebble-dash work. The colored stone particles being thrown against the surface with sufficient force to embed them in the mortar while it is still fresh. If required they may be further embedded by pushing them into place with a clean trowel or float, but no rubbing or working of the surface should be done after the particles are embedded.

Color effects are modified considerably

when viewed from a distance, this making it necessary to caution inexperienced workmen against the deception caused by considering the effect at close range rather than from the distance at which it is to be normally observed.

There are now on the market several stucco compounds in which use stone or marble chips, mica and so forth in combination with cement for producing colored stucco. These compounds come ready to use and offer a variety of colors and effects to select from. The mica and quartz crystals used in these products give a sparkling effect that is pleasing to many people. One of the greatest advantages of the ready-for-use compounds is due to the fact that the ingredients have been selected and combined with great care to provide uniformity of appearance and durability.

When pigments are to be mixed with the mortar to produce colored stucco, the coloring matter should be selected with special regard to permanence. The cost of most color pigments for such use is reasonable and it is extremely poor policy to use inferior grades merely because they are slightly cheaper in first cost. Only mineral colors should be used and the amount of pigment should never exceed 10 per cent of the volume of the cement, as a greater proportion is likely to result in a loss of strength or durability in the stucco. Red lead is considered harmful and should never be used. Dry colors are most frequently used, although some authorities consider that the paste or pulp colors are to be preferred because they may be more thoroughly mixed with the other ingredients of the mortar.

The most durable colors are probably the blacks and browns—carbon blacks are considered superior to lampblacks for this purpose as the latter have a tendency to float. Greens are probably always fugitive; some blues and yellows are practically permanent and fade evenly if at all.

When dry pigments are used they should be added to the cement and sand and all mixed dry until of a uniform color. It is best to experiment with the mixtures before determining on the proportion of pigment to be used, as the drying of the mortar lessens the intensity of the color. A brightly colored wet mortar may dry to a dull weak tint that would prove unsatisfactory if the opposite effect were desired. Sample blocks of stucco mortar should be several feet square, as color is deceiving and may appear attractive in a small sample, only to become hideous when applied to a large surface of wall. Before determining the proportions to be used the sample should be allowed to become thoroughly dry and should be inspected under the conditions of lighting and so forth that are likely to influence the finished work.

The nature and amount of color to be used depends on the effect desired, but the accompanying data may prove of service as a rough guide. The quantities are given for each hundred pounds of cement.

For grays to dark slate use from one-half pound to one pound of carbon black or boneblack.

For blue-black to black use from four to ten pounds of magnese dioxide or carbon black.

For blue shades use from two to ten pounds of ultramarine blue.

For brownish red to brick red use from

Fig. 5—Colored tile inserts are often effective when used with either colored or white stucco

Fig. 6—Contrasting color can sometimes be introduced by means of a colored tile hood or small roof projection

Fig. 7—A stucco frieze colored to match the trim of a brick house offers possibilities

Fig. 8—Colored stucco panels for a half-timber house are one way to avoid monotony

two to ten pounds of roasted iron oxide or metallic brown (oxide).

For bright red to vermilion use from five to ten pounds of raw iron oxide (best quality) or mineral turkey red.

For buff to colonial yellow or yellow use from four to ten pounds of yellow ochre or French ochre (genuine).

For green shades use from four to ten pounds of chromium oxide.

White cements have now been perfected until they form an important and valuable means of producing pure colors for stucco. They are especially useful in obtaining clear tints. White cement used with white sand or marble dust gives almost a pure white finish that offers a striking contrast against heavy foliage. A very small quantity of blue pigment is sometimes added to white stucco to increase its brilliancy.

Ordinary oil paints may be rendered durable on stucco surfaces provided that the surface is coated with a solution of zinc sulphate before painting. If this precaution is not taken, the oil in the paint will be saponified by any free lime in the stucco, thus causing fading, chalking and peeling off. The solution generally recommended consists of sulphate of zinc crystals dissolved in water equal parts by weight. This solution unites with caustic lime, causing a chemical change which results in forming gypsum and zinc hydroxide. These materials are used as pigments in white paint and naturally have no bad effects on oil paints which may be applied over them. In this connection it may be said that there are on the market several brands of specially-prepared paints which may be applied directly to stucco without previous treatment of the stucco surface. These paints give good results at a reasonable cost.

Eliminating Waste in Building

Hoover Committee Reports on Ways and Means

HALF A BILLION DOLLARS a year in wages is being lost in the building industry through unemployment, it is asserted in a report made public by the Committee on Elimination of Waste in Industry of the American Engineering Council, appointed by Herbert Hoover.*

Waste, it is said, is causing huge losses in building which, including all trades and common labor incidental to it, ranks second among the industries and contributes to the wealth of the nation more than $3,000,000,000 yearly. Yearly averages for the past six years show that 32 per cent of the activities of the industry, which employ some 3,000,000 mechanics and laborers in a single year, are devoted to residential buildings and 18 per cent to industrial buildings, "miscellaneous" covering the rest.

The chief sources of waste in the building industry are, according to the report, irregular employment, inefficient management and wasteful labor regulations. Customs or conditions prevailing throughout the industry, and poorly designed equipment are given as secondary causes.

The annual economic loss due to accidents is estimated as high as $120,000,000. Application of safety methods, it is stated, would save to the industry 12,000,000 days a year.

Loss through duplication of estimates and designs, and duplication in bidding, is said to run into the millions.

Result of Seasonal Employment

"The building trade workman," asserts the report, "is busy on the average about 190 days in the year, or two-thirds of his time. A few contractors, individually or associated, are attacking this problem with effective results. The public also must be educated to the need of a sensible distribution through the year of its construction demands and requirements. Idleness, however, is not due entirely to seasonal demands; strikes and lockouts are appreciable causes.

"Haphazard management in planning and controlling work and lack of standards, which often double the labor cost, characterize most construction undertakings. Here again a few builders, recognizing the waste in money and man power, are adopting methods that approach modern factory management.

"Union regulations in the past have produced enormous losses through direct or indirect restriction of output. Workmen and contractors, however, are beginning to appreciate that reduced output reacts in tremendous fashion upon themselves.

"In some construction trades accidents involve losses up to 10 per cent of the labor cost in addition to the human loss of lives and energy. The average loss, computed from insurance statistics, is about 2½ per cent of labor cost. Here also certain contractors have found it possible to cut their accidents in half through special efforts.

"Greater co-operation between the workmen and the employers is an absolute essential. This co-operation must be attained before we can approach the elimination of labor difficulties. Such co-operation, however, is impossible without the removal of causes of friction and the working out of plans to this end.

More Real Contractors

"A striking fact about the building industry is that inasmuch as small buildings require so little capital or credit, and apparently so little technical ability, the field is full of small contractors, many of whom operate for a few years and then fail. In Cleveland, Ohio, for example, out of 4,000 contractors perhaps not more than 400 are needed. From these small firms the range runs up to the highly capitalized company with yearly business in the millions, employing thousands of workers and having a trained technical organization.

Causes of Recent Slump

"The high cost of labor and materials in 1920 and 1921 prohibited bankers from loaning money on ordinary building and dwelling house construction. They reasoned, and correctly, that the price of materials and labor would drop so that buildings erected at a later date would cost less, thus causing a fall in the selling prices. Added to this have been the income tax conditions, so that the funds which were at one time available for mortgages have been forced into tax-exempt securities. Notwithstanding, therefore, the shortage of housing and the need for new construction, the actual work going on has fallen to a remarkably small figure and this in turn has been reflected in unemployment. In certain cases advantage has been taken of the conditions.

"Because of the unprecedented demand, organized labor forced concessions not only as regards increases in wages, which were usually justified by the increased cost of living, but also as regards working rules which led in many cases to curtailment of production. The speed needed on government work to win the war, with the lessened care for cost engendered by the cost-plus contract, resulted in less effective operation. The men naturally became accustomed to this inefficient method of working and it furnished in one sense a standard for future efforts.

"With the depression in business and the lessened demand for all kinds of labor, the average production in all industries is again approaching normal. Certain contractors are again basing estimates on the assumption that labor is normally efficient. The improvement is in part due to the weeding out of misfits in both labor and management.

The Employers' Part

"Inefficient management is blamed on failure to furnish continuity of employment; failure to plan work in sufficient detail; lack of proper schedules to allow

*For the personnel of this committee see p. 15, June issue of National Builder.

proper co-ordination of scheduling, purchasing, delivery, with job requirements; lack of standards and adequate cost methods as a means of checking production; high labor turnover; failure to use proper amount or type of equipment; general failure to develop and use a greater amount of mechanical equipment; and waste of material through careless handling and improper plant operations.

"Wasteful labor regulations consist of requiring skilled men to do work that could be performed by unskilled, restricting individual incentive through requiring uniform wages, limiting the number of apprentices, excessive reduction of working hours, restricting output by prohibiting the use of labor-saving devices, and jurisdictional regulations.

"Additional sources of waste are failure of architects to furnish check plans and specifications, duplication of labor in estimating and often in design, and accidents which are particularly important in the building industry because of the extra-hazardous nature of the work.

"Representative average conditions in the building trades of Philadelphia and vicinity reveal lost or wasted time as high as 44 per cent among iron workers, 37 per cent among cement finishers, 36 per cent among steamfitters, plasterers' helpers and stonecutters, 40 per cent among roofers and 29 per cent among painters and paperhangers. This percentage is based on the relation of the average days worked per year to the number of effective days possible.

"The days at work average 189 per year for the various trades in Philadelphia. The average of estimates reported by contractors is 210 working days a year. Over half of the lost time, it is estimated, is due to bad weather and the balance chiefly in waiting for or looking for work.

"Contractors have given the effect of labor turnover little consideration. In construction work this is particularly hard to determine, especially as the actual percentage of turnover constantly varies as the building progresses and the number of men is increased and then diminished.

Winter Work Necessary

"Although efforts toward reducing seasonal unemployment have been local and often spasmodical, recent developments and conferences have shown the possibilities of vast improvement. The means of bringing about a reduction of seasonal unemployment may be outlined as follows:

"Allowance of a small margin of profit for both labor and capital during winter months, development of methods of conducting the work in cold weather, arrangement of work to provide indoor operations in cold and stormy weather, organization of a clearing house for co-ordination of activities, increasing the usefulness of employment bureaus, and educating the public.

"Contractors must prove to the public that they can carry on operations during the winter period as economically and substantially as during other periods of the year. Old buildings to be demolished to make room for new ones should be torn down in cold weather in advance of the new construction instead of waiting, as is often done, until the new building ought to be under way.

"The education of the public is vital to a sensible distribution of work throughout the year. This applies equally to industrial, public and residential construction and to household repairs and maintenance. Instead of crowding our main construction work into seven or eight months, all that can be deferred from the busy to the more idle season should be so scheduled. Owners making interior repairs or slight additions should be encouraged to have this work done in the offpeak season. Old buildings to be demolished to make room for new ones should be torn down in cold weather in advance of the new construction instead of waiting, as is often done, until the new building ought to be under way.

With a central bureau, under the auspices of the employers, the workmen and the public, these and many other things would be studied with effective results.

The Strike and Lockout Waste

"The number of strikes and lockouts occurring in the building trades increased from 302 in 1914 to 452 in 1919, an increase of 50 per cent. This increase is accounted for in part by the greater demand for labor in 1919, which inevitably makes the requirements of workmen more exacting and arbitrary. Of the 1919 figure, 452, only 18, or 4 per cent, are listed as lockouts, so that the waste due to lockouts is relatively small.

"If the greatest cause, the demand for an increase in wages, could be eliminated, strikes as a factor of waste would shrink into insignificance. The remedy that suggests itself is co-operation. Management and labor must forget the sore spots of past conflicts and through whole-hearted co-operation fix by proper studies a minimum wage to correspond with a standard amount of production, with additional compensation for additional output. This would furnish an incentive to the men and would give recognition to deserving mechanics.

More Mechanical Equipment Needed

"General failure of the building industry as a whole to develop and use a greater amount of mechanical equipment is an established fact. Greater strides have been made in almost every other industry in the application of mechanical means, it is said. Union objections to labor-saving devices is wrong in principle, it is declared, and will be relegated to the past like the restriction of output.

"With thorough co-operation of unions with employers and the development of the old guild spirit, which tends to give a man pride in the quantity and quality of his work, there is the possibility of increasing production and, by these means, of maintaining high wages yet with a resultant lowering of costs. Lower labor costs mean more building and more continuous employment for the worker.

Restriction of Labor Output

"Many union rules are absolutely wrong and uneconomical. Many unions have exceeded the limits of fairness, and partly because of the leaders' lack of appreciation of the fundamental need for high production, have formulated by-laws, and, in individual cases, have formulated demands that have been a tremendous factor, directly or indirectly, in the restriction of output.

"It must be recognized that the unions are by no means alone in their restriction of output. The contractors and builders and supply dealers affect the situation to as great a degree indirectly by maintenance of high prices, collusion in bidding and unfair practices. Collusion between unions and employers also has sometimes raised prices unduly.

Loss from Accidents

Enormous losses are suffered through accidents, the $30,000,000 paid yearly to insurance companies for compensation and liability insurance by no means representing the total lost.

"In the opinion of one of the best authorities in the country the actual cost of insurance represents not more than 25 per cent of the total economic loss, which brings the total cost due to accidents in the vicinity of $120,000,000 per year, a staggering total.

"Great savings are possible. An official of a large insurance company believes that by proper safety measures the waste due to accidents can be reduced 75 to 80 per cent in from two to five years of honest effort, and that construction labor cost can be cut 3 per cent by these measures.

Live Contractors Waking Up

"The most encouraging feature in the building industry today is the action of a few of the builders and a few groups of building trade workmen in making intensive studies of the causes and remedies for irregular employment and haphazard conditions of work. Along with this is the growing appreciation on the part of both labor and management that to build more buildings and maintain high wages it is necessary to attain greater and greater productive capacity per man.

"They see as proof of these facts that the 1921 depression was caused and extended by too high costs of all products, and that business, either in manufacturing or in building industries, is improving only as the costs of material and the cost of labor are reducing. All are recognizing, in fact, that no progress can be made without paying greater and greater attention to the elimination of waste."

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The Situation

PRICES of many building materials continue to recede. Price cuts of a month or two ago in steel are beginning to be felt in the manufactured products of steel. A prominent shovel manufacturer, for instance, has just reduced the prices of all shovels, spades, and scoops $3.40 per dozen, making quotation $8.50 per dozen on fourth grade polished goods and the same pro rata reduction (nearly 30%) on other goods. This is the first price change on these

Cement price reductions continue here and there, but there has been practically no change in the average price of $3 per barrel, wholesale in car-load lots.

Lime prices show radical reductions during the past month. Quotations recently issued by the largest lime American manufacturer, whose business covers the whole northern and eastern half of the country, give plant prices in car-load lots, Ohio finishing hydrate $10.50 per ton, mason's

for cement sand gauging plaster and $11.50 for wood fibre plaster. Keene's cement quotations vary from $15.50 to $29.90 per ton. Corresponding reductions have been announced in wall board and gypsum tile prices. (The building contractor must add freight rates and dealer's commission to arrive at his purchase price.)

Brick and tile manufacturers are generally following the lead of those in the Chicago district who have already reduced the

Left to right (front row)—E. M. Craig, Secretary Building Construction Employers' Association; Thomas S. Kearney, President Chicago Building Trades Council; Ed Ryan and Wm. Gunther of Union Arbitration Committees; Wm. McKinley, Counsel, and Fred Klippel, Sec. Associated Builders, and Judge Landis at right

Courtesy of Chicago Daily News

tools in about a year. Structural steel quotations also show appreciable reductions during the past month.

Lumber prices have not changed appreciably since the quotations for August. Prices in the South show slight reductions, but nowhere is any hope of further radical reductions held out except such as may come from decreased freight rates.

hydrate at $9 and lump lime in bulk at $8. These prices approach very closely those in effect in 1916.

Prices recently announced by the largest gypsum plaster manufacturer, whose operations cover the entire country show important reductions. The f.o.b. plant prices to dealers in car-load lots range from $9 per ton for "stucco" calcined gypsum to $11

price to $12 per M. for common brick. Prices generally range between this figure and $20. Many districts show keen competition between clay brick, sand-lime and concrete brick. The latter are gaining in favor in many localities.

Sand, gravel, and crushed stone continue to show price declines owing to extremely active local competition. No considerable reduction, however, can occur in these commodities, as well as brick, until freight rates are reduced. In general the purchase price of sand, gravel, crushed stone or crushed slag is a less consideration than the transportation costs.

Labor conditions show some improvement. The long drawn out controversy in Boston, Mass., has been ended by the building trades unions declaring the strike lost. The men have returned to work at the scale set by the employers—90 cents per hour. In other places in the East under open-shop management the maximum scale is 85 cents. Minneapolis with a scale of $1 but actually paying $1.12 is high. In Albany, Syracuse, and Rochester, N. Y., controversies are in full swing. In New York City reductions are still talked of but nothing done. Chicago building employees continue to work under the old scale pending a decision from the arbitor, Judge Landis, who has laid down the following rules or principles to govern all labor agreements in the building trades:

Article 1—Monopolistic elements of associations or unions are intolerable unless:

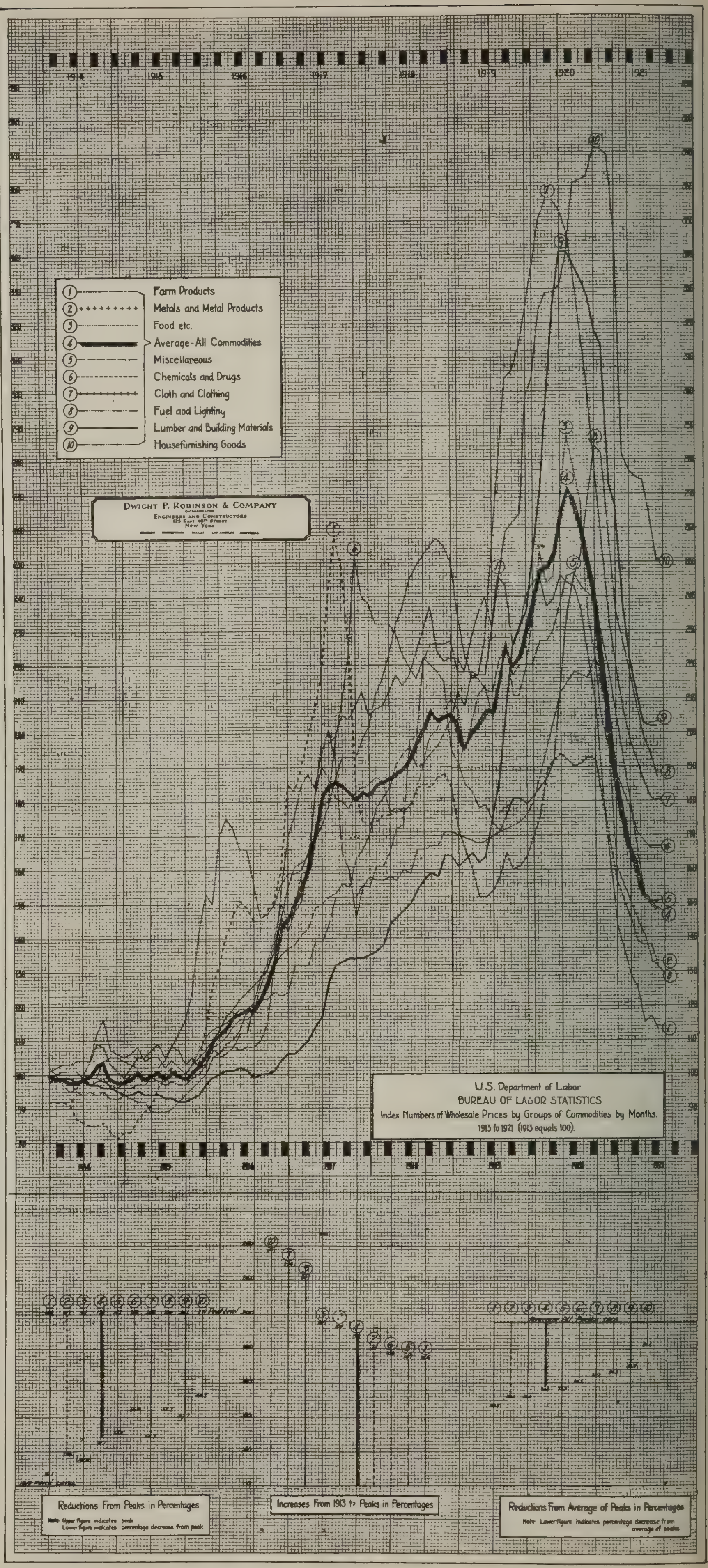
1. The public is served more economically with them than without them.
2. Unless anyone qualified may join them without hindrance or discrimination.
3. Unless they serve any one on demand without discrimination.
4. Unless sufficient apprentices be taught to supply enough skillful managers and workers.
5. Unless working rules and conditions eliminate waste of time, effort and material; increase quality and quantity of product; encourage improved methods, materials and appliances; produce increased skill and contentment of the workers; and help to preserve peace in the community.

Article 2—Other things being equal, trades should have higher wages, or wages above the average.

1. If the work is more hazardous.
2. If greater skill is required.
3. If a longer term of apprenticeship is required to become proficient.
4. If the work is intermittent or unsteady, due to weather or seasonable demand.

Article 3—Other things being equal, trades having rules or conditions that produce or permit waste should have a lower wage, or a wage lower than the average rate.

1. Rules that limit or curtail in any way the amount of work per man, consistent with reasonable comfort and well-being.
2. Rules that require ordinary travel to or from the job to be on employers' time, or otherwise waste time paid for.
3. Rules requiring skilled men or high-rate men to do work that less skillful or lower-rate men could do, or that other trades could do more economically.
4. Rules that expressly or by inference interfere with the manager or foreman in



the dispatch of the work or the use of new or improved methods, materials or appliances.

5. Rules that require work to be done by hand that could be done better or more economically by machinery, tolls or other improved methods.

6. Rules that require work to be done on the building that could be done better or mor economically in the shop.

7. Rules requiring excessive rate of overtime, or overtime rates for shift work.

8. Rules requiring unnecessary foremen, shop or job stewards or pay for men who do not render corresponding services.

9. Rules requiring unnecessary helpers or assistants.

10. Rules that limit the number of members in the association or unions, or unreasonably limit apprenticeships.

Price Tendencies

THE CHART on the opposite page shows that lumber and building materials (9) have receded in price the least of all commodities except household goods (10). While prices of farm products, food and metals have gone back almost to the 1914 levels, lumber and building material prices have gone back only about half as far.

How much farther will the curve of building material prices drop? According to most recent statistics farm-product and food prices have started to mount up again (2 per cent increase in July). Have the bottom points in the other curves been reached?

Recognized experts in the building industry do not believe that the prices of building materials will recede anywhere near the general level of prices for the next few years. Labor, fuel and freight enter into the cost of building materials to a greater extent than most other commodities.

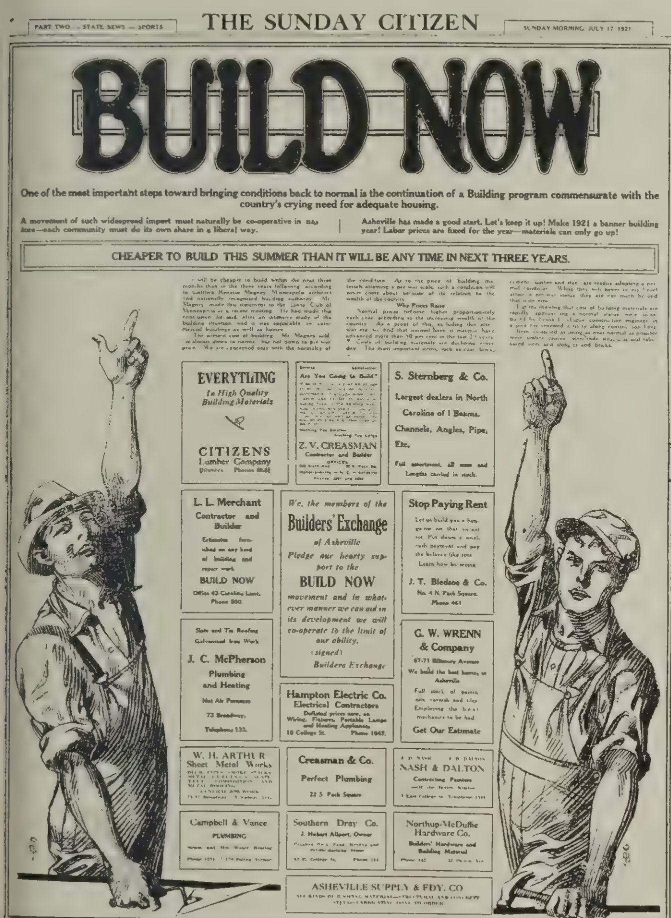
Advertising Campaign

A vigorous local co-operative advertising spirit animates the building interests throughout the country as shown by the full page advertisements in newspapers in every state and in every village, town and city. The manner of presenting the facts in the case may leave something to be desired, and this is due possibly to inability to view the situation from the prospect's position.

As no two men's needs are the same, it is not safe to urge everyone to build until each man has compared his needs with his resources, or in other words to figure what he can gain by building and set against that what he stands to lose by not building. We have heard a great deal about building graft, but that should not shake one's confidence in builders any more than confidence in bankers is shaken because some of them have left the country nor is enjoyment of baseball lessened because some adepts elected to "throw the game."

The average man who should be in the way of owning his own home or developing his property is too prone to absorb the idea that he is playing safe by delay. In point of fact, and as a general truth, there is loss in delay. Why? Because, war or no war, the cost of building and of most other things advance in steady progression from year to year, and the normal price cannot be truly taken by jumping back to 1914 but by adding the normal advances of the intervening years of about 3 per cent a year. Then let the prospect compare his buying power, the wages that are being paid, and that tend to increase instead of diminish, and he will be on a fairly good basis to do his own thinking.

In fact, there is more opportunity to own a home now than ever before, notwithstanding the prices, because better methods and more far-sighted policies have been organized. The prospect may be getting some better prices himself. This is a suggestion for builders' prospects to consider.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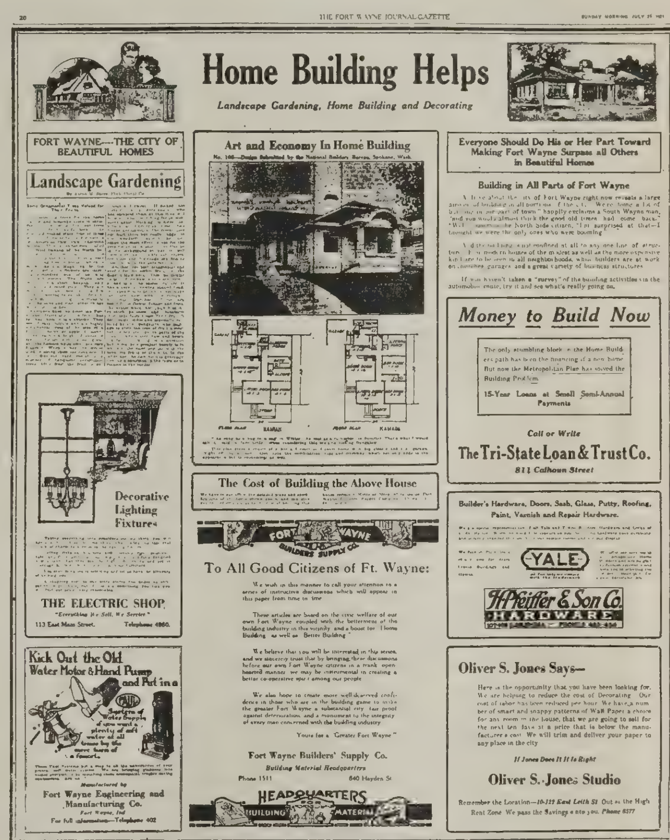
THE FORT WAYNE JOURNAL-GAZETTE

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Landscape Gardening, Home Building and Decorating

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Oliver S. Jones Studio

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From the Fort Wayne (Ind.) Journal-Gazette

Thousands of newspapers throughout the country are carrying full-page co-operative advertisements

A Dutch Colonial House for a Small Family

Designed and built by G. F. Knight

Working drawings of this house are shown in the blueprint detachable insert in this issue


DROP SIDING
8'-0"

NATIONAL BUILDER

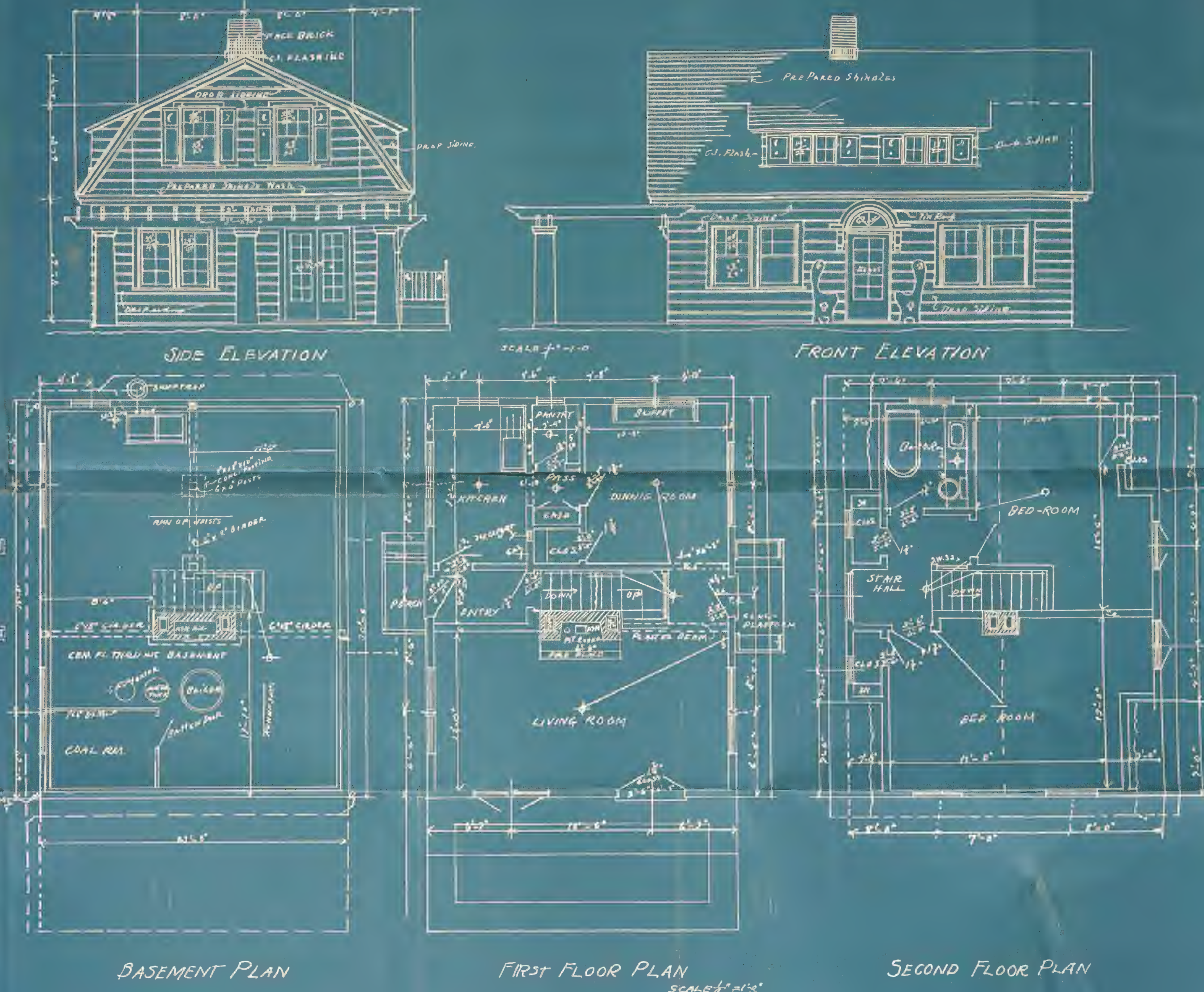
September, 1921

A Small House of Dutch Colonial Type

G. F. KNIGHT
Designer and Builder

Scale: ¼ inch equals 1 foot

See photographs and description in reading pages



A Dutch Colonial House for a Small Family

Working Drawings of this House are Given in the Blueprint Detachable Insert in this Issue

BEAUTY and utility are notable in the Dutch Colonial house designed and built by G. F. Knight, for L. W. Finley in Evanston, Ill., a suburb of Chicago. Here is a very compact little place that would find a warm spot in the hearts of millions of willing home owners—willing in the sense that they would build if they could afford it. This factor, however, has been solved in this home. It cost but $8,000. The exterior photographs show a well balanced house on all sides. The doorway with its sloping roof, the seats on either side, each of which is flanked by two windows, with lattice work introduced in the space between the windows and the ends, all form a pleasant combination. The color scheme is sparkling; the drop siding all around is pure white, the roof red, while the shutters on the second floor windows are painted a dark green. The same general scheme of treatment is provided for the garage in the rear, the driveway to which has a pretty entrance, which is brought out clearly in the accompanying illustrations.

Rear view, showing garage

The house has a frontage of 30 ft. and a depth of 23 ft. There is a living room, dining room, kitchen and pantry on the first floor, and two bedrooms and a bathroom on the second floor. The plans in the blueprint insert in this issue show that the available space has been used to good advantage.

On entering the house, the visitor finds himself in a small hall, a stairway to the second floor facing the doorway, while a living room lies to the left and the dining room to the right. The living room extends the full width of the house, having dimensions of 15x23 ft. It is lighted on the east, south and north sides, and a cozy fireplace has been provided on the west side—practically in the center of the house, so that the chimney extends through the roof at a point that does not tend to unbalance the roof effect. The dining room measures 10 ft. 8 in. by 15 ft. and has a buffet on the west side, above which are two windows. The kitchen is 7x12 ft., at the southwest corner, and a small pantry is provided between the kitchen and dining room, with a china case installed in the passage opposite the pantry. Back of this case is a closet off the dining room.

The second floor bedrooms are directly over the living and dining rooms and are practically of the same dimensions, while the bathroom is above the kitchen. There is a closet in each bedroom and one in the hall, just outside the bathroom.

The house is heated with a furnace. The compactness of the house makes it ideal for furnace heat and satisfactory results have been obtained during the past winter.

Plumbing fixtures include a 1-piece, single drainboard sink in the kitchen, a 2-part laundry tray in the basement, and a 5-ft. bathtub on legs, wall-hung lavatory and low-down tank closet combination in the bathroom.

The trim throughout is birch and floors of oak. Asphalt shingles cover the roofs of both the house and garage and all woodwork was given three coats of paint.

The house is the subject of much admiring comment.

Detail of entrance

Small Concrete Houses in England--By John Y. Dunlop

IT is now more than one hundred years since the discovery of the process of producing cement made concrete possible. While we have been trying our best to mold and arrange concrete for fabric work our progress has been very slow. For, although we have concrete in block, brick, slab and monolith, with or without reinforcement, there has been a great want of architectural expression.

In the early days a few of the building contractors in England made faint attempts to capture the trade of building houses for the people with this material. But as the dominating idea was to get a house at a low cost the result became very much an example of "there it is, take it or want it," and I may say that in those days concrete houses were not wanted and so concrete was very much left.

Of course, there was nothing attractive about those builders' efforts, and even the ornamental tiles which were stuck on the roofs were not sufficient to relieve their stark ugliness.

The idea that any design of a house was suitable for concrete construction had very much to do with the failure of the early concrete housing scheme and thus brought about all over England the general clamor that concrete houses were ugly.

The concrete block house or the monolithic-built house need not be ugly if designed in accordance with the nature of the material, and until architects in this country began to *think in concrete,* in place of in stone or brick or wood, when designing a building of this material, neither the big nor the small building was a success.

Concrete cottages built entirely of concrete blocks. Half-timber gables, slate roof

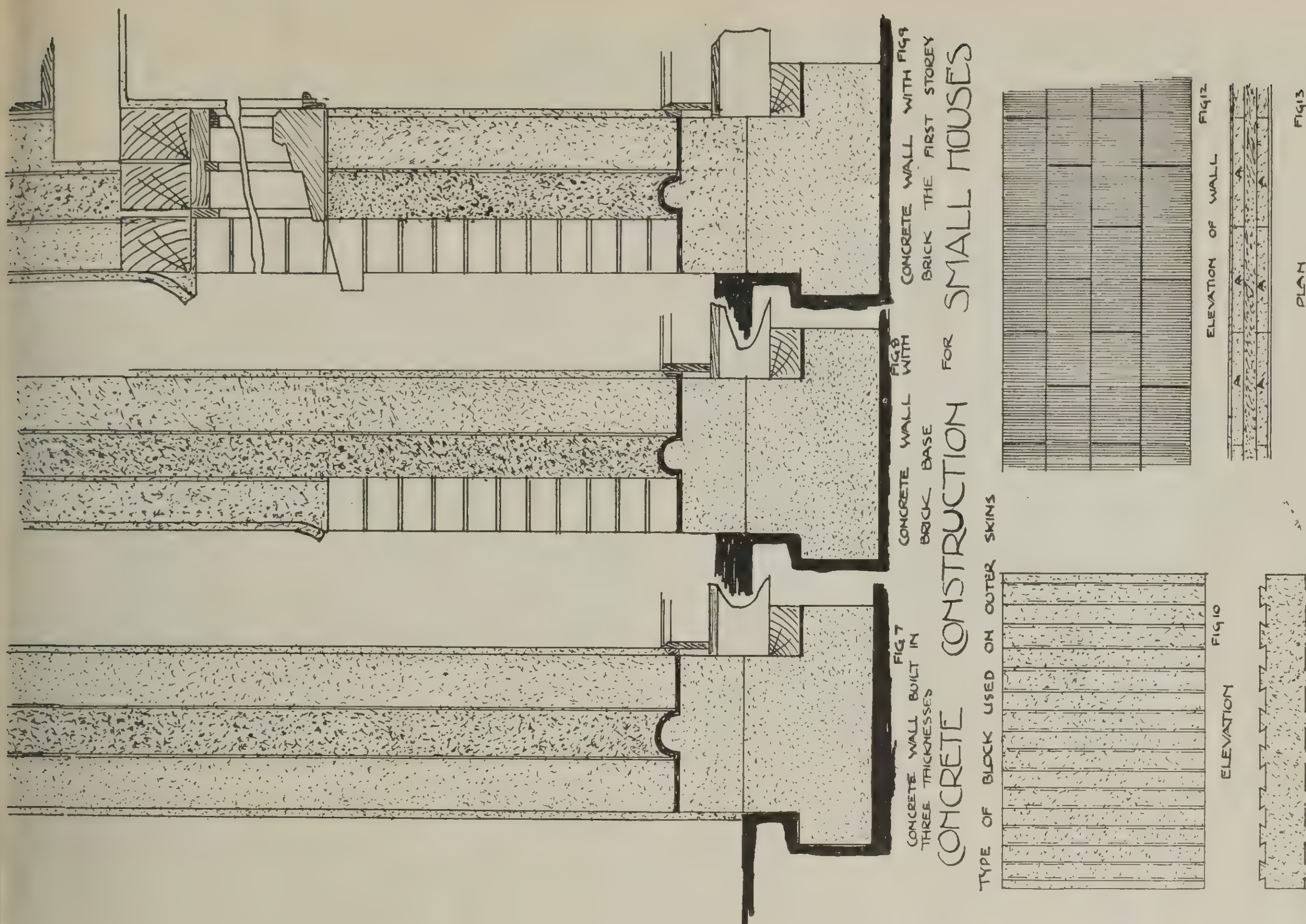
Concrete bungalow. This house is built of monolithic walls and chimneys. The top part of the chimneys are tinted red. Tile roof

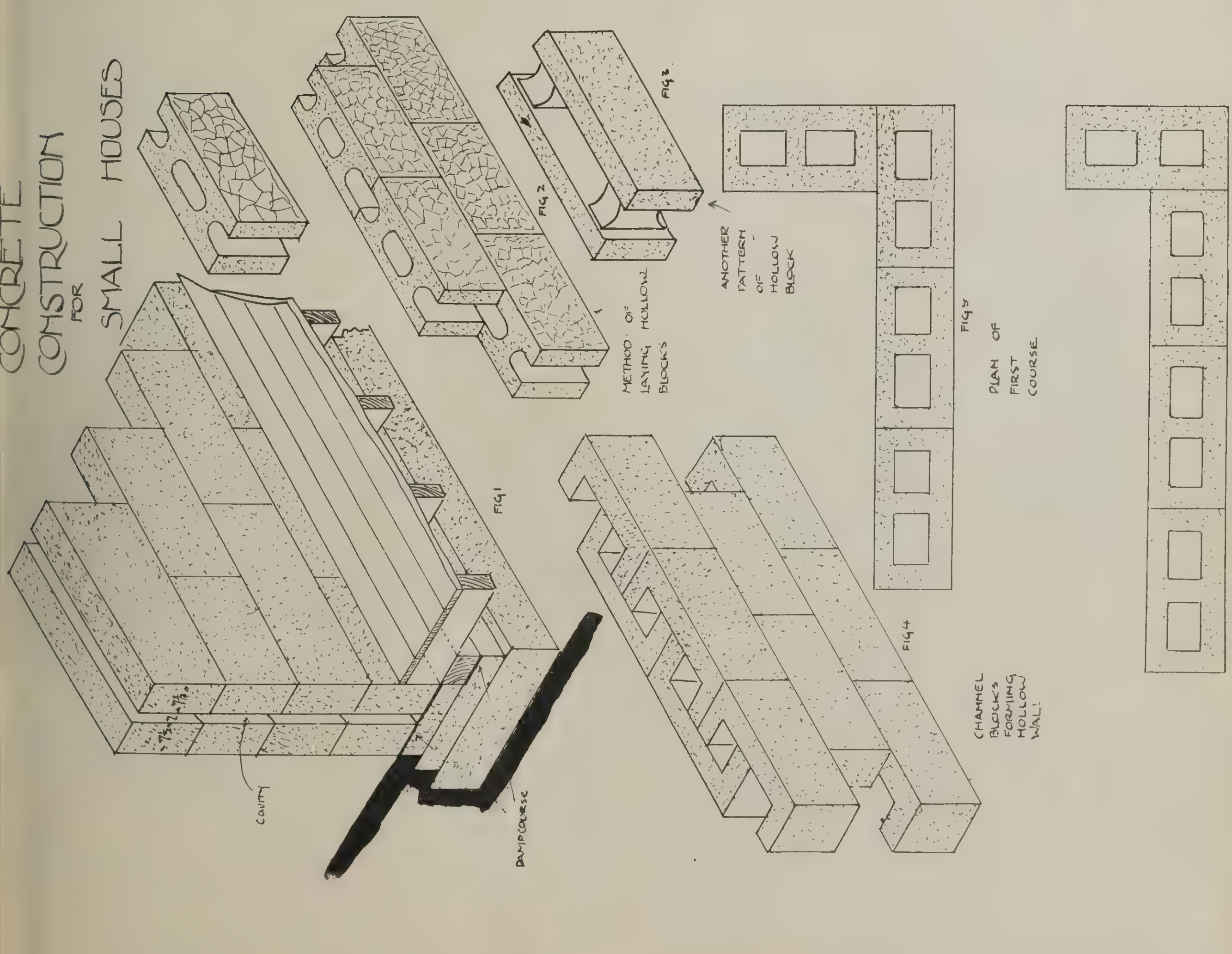
Building concrete cottages. Monolithic walls; tile roofs

Concrete cottage. Monolithic walls and tile roof

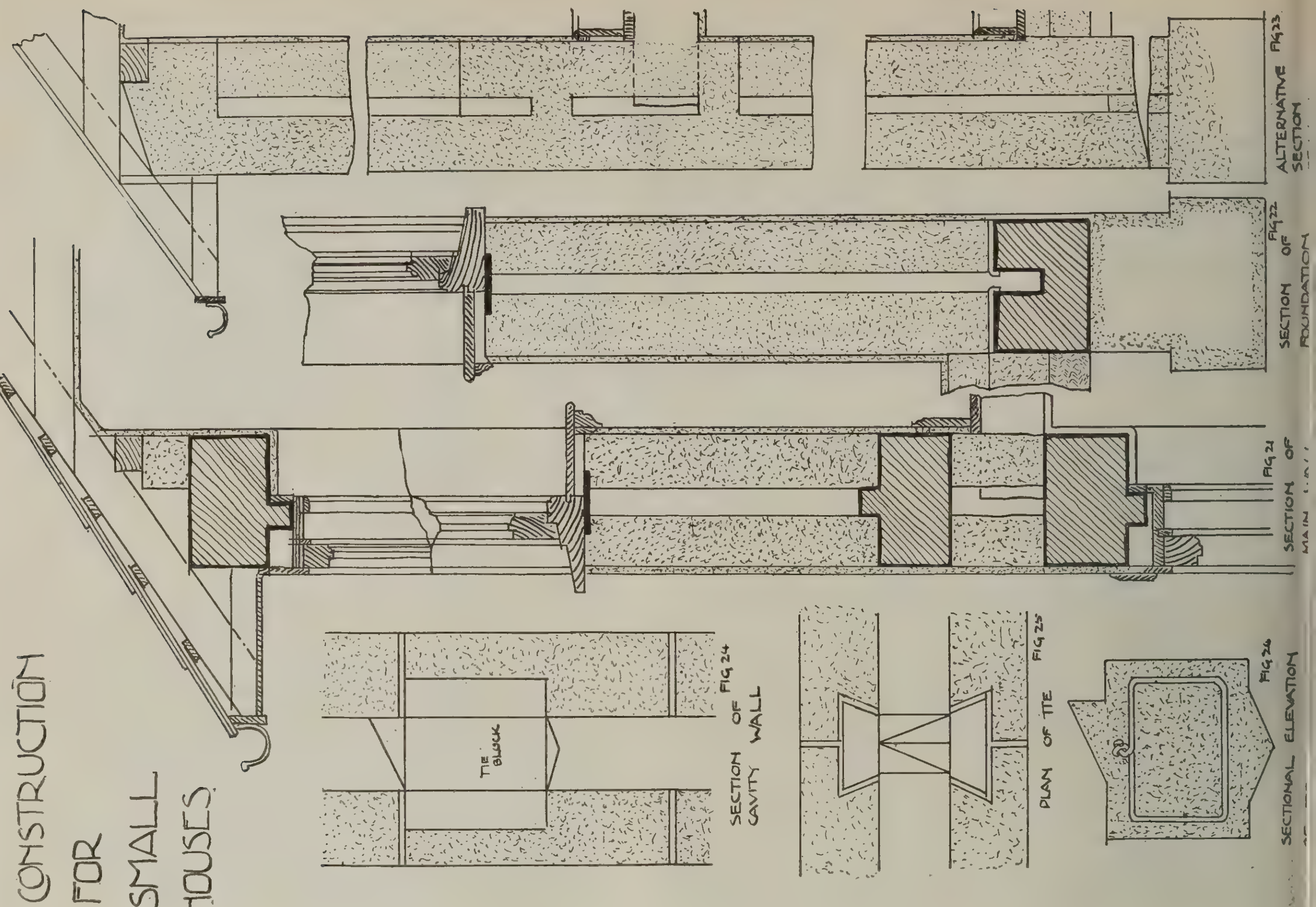
In all cases it is necessary to think well of concrete to get the right clue to its proper architectural treatment and then in some cases due allowance must be made for its coarseness, for although cement can be worked up as smooth as plaster, it does not always follow that a facing material is desirable.

Again there is the force and influence o

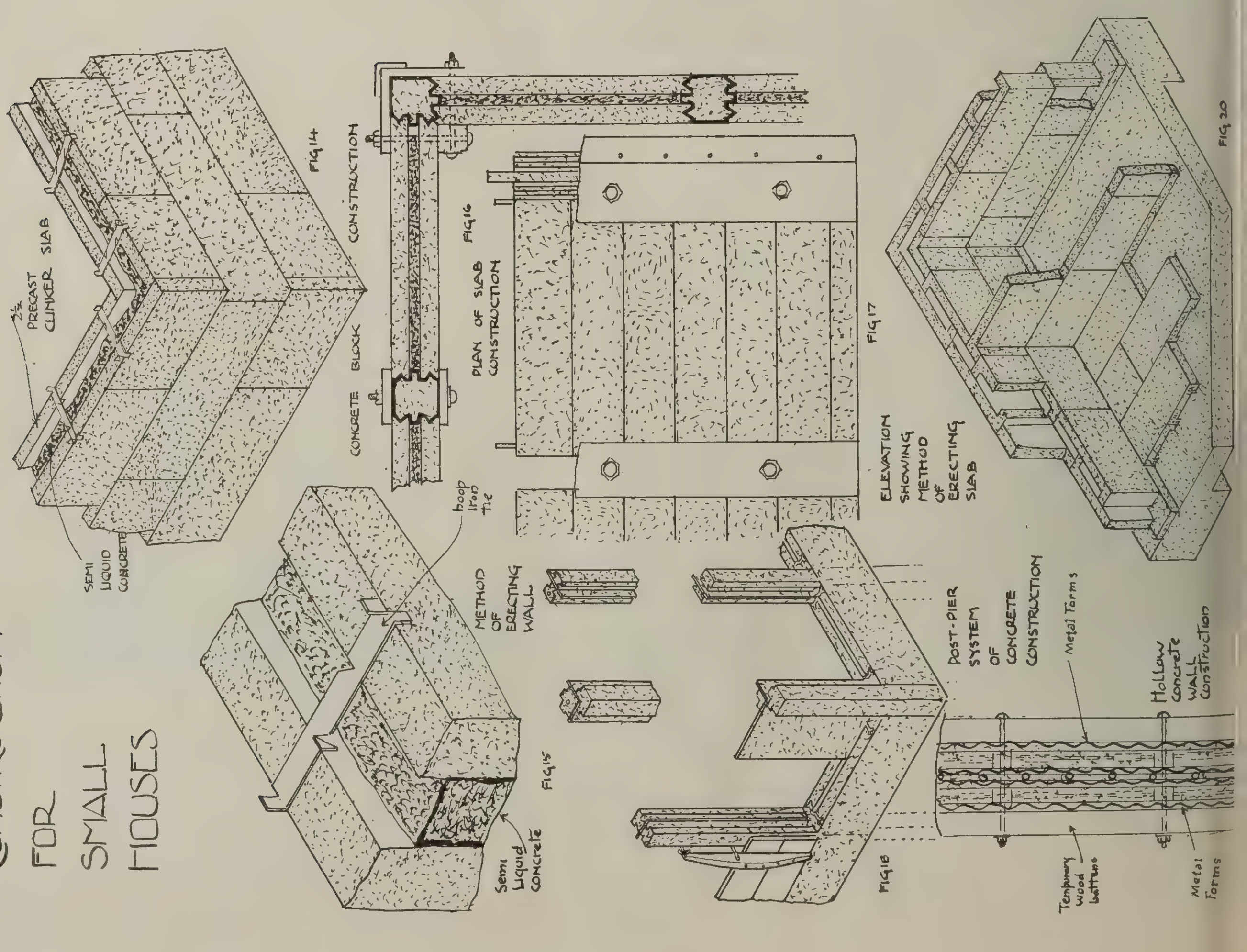

CONCRETE WALL BUILT IN THREE THICKNESSES
FIG 7
CONCRETE WALL WITH BRICK BASE
FIG 8
CONCRETE WALL WITH THE FIRST STOREY BRICK
FIG 9
CONCRETE CONSTRUCTION FOR SMALL HOUSES
TYPE OF BLOCK USED ON OUTER SKINS
ELEVATION
FIG 10
PLAN
FIG 11
FIG 12
ELEVATION OF WALL
PLAN
FIG 13


CONCRETE CONSTRUCTION FOR SMALL HOUSES
FIG 1
CAVITY
DAMPCOURSE
METHOD OF LAYING HOLLOW BLOCKS
FIG 2
FIG 3
ANOTHER PATTERN OF HOLLOW BLOCK
FIG 4
CHANNEL BLOCKS FORMING HOLLOW WALL
FIG 5
PLAN OF FIRST COURSE
FIG 6
PLAN OF SECOND COURSE

CONCRETE CONSTRUCTION FOR SMALL HOUSES



CONCRETE CONSTRUCTION FOR SMALL HOUSES



the weather to be considered, which is a very important point to remember, for unless very carefully prepared and worked concrete does not weather well in all circumstances and positions.

The question of the color of cement concrete has always told very much against arguments in favor of concrete construction. The mass of people are very apt to say concrete is dull and uninteresting, although the same can be said of the color of a stucco house or a stone house, yet none of these have the color bar raised against them, and after all concrete work can be tinted up to retain the natural texture in soft and rich tones as desired.

For the coloring of concrete care is necessary in selecting the coloring material because the addition of this foreign material in many cases causes the cement to disintegrate. Yellow ochres are very suitable and safe and have a considerable coloring power. Burnt umber is safe and gives a very warm tone, but a satisfactory color has not been found in blue or green, copper arsenide gives a fair green but it is not desirable and ultramarine is unsafe. There is no green color on the market which will not fade when mixed with cement and exposed to the light and weather. A clean white cement wall is not obtainable except by using a white cement but a near approach is obtained by using a slaked white lime which carbonates on the surface forming a permanent and almost white color. A cream color which looks very well may be obtained by using slaked lime with a little yellow ochre.

Concrete cottages. Front wall built of concrete blocks in which the cornerstones were tinted a red color. Side walls monolithic; slate roof and dormers

Concrete double house. The front walls and windows are built of concrete block tinted red. The side walls are monolithic. Slate roof

Within this last two years concrete construction has made vast strides in this country with the results that we are having whole districts covered with small houses for the working class put up at the present time.

Concrete construction has come into its own owing to the great scarcity of bricklayers and to an ample supply of unskilled labor, using the different methods of hollow and solid walls, built in blocks, poured and tamped. Of the many varieties of concrete block in use all over England a few are shown in Fig. 1 up to Fig. 6.

The size of the hollow block varies from 32 inches by 9x9 inches to 18 inches by 9 inches by 9 inches, but it is not wise to adopt the largest size, especially in cottage work, as then the size of the blocks appear out of proportion to the scale of the building. Furthermore, they are not economical as they weigh about 135 pounds and require two men to lift them into position. We find the best size is 18 inches by 9 inches by 9 inches which is equal to 12 bricks. The most general size for solid block as shown in the hollow wall, Fig. 1, is 18 inches by 9 inches by 4½ inches for outside walls and 18 inches by 9 inches by 2½ inches for inside partitions.

Concrete double cottages in which the base is formed with a skin of 4½-inch brickwork

Concrete five-tenant houses. Monolithic walls, with tile roof

In the case of hollow blocks the cavity should not be too large and one-third the bearing surface is looked on as a good practical proportion with the material around the cavities 2¼ inches thick at least.

Good, clean concrete blocks can usually be made from material the bulk of which is obtainable in the vicinity of the work to be executed and this fact combined with the amount of unskilled local labor provided there is proper supervision is enabling England today to build cottages at a rate which compares favorably with houses built of other material.

Today we have our best architects designing small houses in concrete.

The whole idea is to build to suit the material. The grouping of the masses and spaces and the simple ornamentations are carefully considered so that this once misused material has become a means of producing a really beautiful type of cottage architecture.

Some of the most recent inventions are shown in the drawings.

In Figs. 7, 8 and 9 a method of building is shown in which the advantages of monolithic construction is obtained without the usual disadvantages involved in the cost of timber for forms. The method consists in first making a cavity wall with concrete bricks provided on the faces with under grooves to form adhesions, and then pouring concrete into the cavity. The pouring mixture thus unites with the blocks on the front and back of the wall or with the bricks on the lower portions into forming a complete wall. The outer blocks of an external wall would be formed of hard concrete and the inner blocks of soft concrete.

The blocks are assembled one course at a time. The concrete is then filled in to fully half the depth of the cavity. In this way the horizontal joints become staggered throughout the full depth of the wall. Figs. 11 and 10 show the shape of the blocks for the outer skins and Figs. 12 and 13 give the elevation of the wall and plan of the outer and inner skin with the filling. The vertical sections show how this system of concrete construction can be linked up with brickwork and as two of the halftone illustrations show workers' houses carried out with brick base and brickwork on the first story there can be no doubt about how this kindred material enhances the design.

Another system which makes use of the block in building and the "in situ" elements is the Fidler method, in which two and a half-inch precast clinker slabs are built above the damp-course level. In this system which is shown at Figs. 14 and 15, the blocks are accurately held in position by a special hoop iron tie that is split at the ends and bent up and down to hold the block immediately above and below. On the inside of the block a small piece is also turned down to grip the inside of the block. Concrete is then poured into the cavity and the clips effectually prevent any movement of the blocks. When the work is complete the clip portions of the ties are then cut off and the external surface of the wall covered with stucco. This system of concrete construction is much in use in the country districts.

Building timber framed and finished bungalows in which the semi-basement walls are formed of concrete blocks

Concrete double house built with a 4½-inch skin of brickwor on the first story. Tile roof

In a large building scheme at Leeds the blocks are made in wet molds and the blocks or slab and monolithic stanchions are combined in position. This system is shown at Fig. 16 and Fig. 17.

The method of erection is to fix temporary timber forms for the piers or stanchions four feet apart. The blocks are laid with the ends some three inches apart behind the forms. The ends of the slabs are temporarily held in position with wood partitions and concrete is poured into the spaces, forming the piers and binding the whole into a monolithic structure.

The blocks or slabs, eight inches in depth by three inches thick, are made in batches of 36 on the site near the house. The mixture is placed in 12 molds, each divided into three compartments by wood partitions. As each mold is filled and tamped it is covered with paper and another placed on the top of it, and as soon as the set has begun to take place the molds are unhinge and reused.

Most satisfactory work has been carrie out by this method of building and it i being found very suitable for cottage work As in certain block systems, solid piers ar used at intervals, the intervening bays onl being built in blocks, taking the place o the forms in some monolithic systems wher block piers are made to support the forms

Formwork is considerably simplified if solid instead of a cavity wall is to be built

With Messrs. Dry Walls, Ltd., system which is shown at Fig. 18, they have a ver tical damp course of bitumen sheeting sus pended down the center of the wall b patent clips.

Each sheet is properly lapped both at th horizontal and vertical joint.

The wall is made six inches thick, whic is the size of the piers set up to which th boarding is fixed against, and the liqui concrete is poured in on each side of th vertical water-proof layer.

This system has been largely adopted b the London County Council, who have large number of houses finished and occu pied.

At Deptford, which is another district i London, we are having concrete houses pu up monolithic structure with hollow wall The hollow concrete wall is obtained fo the outside walls by means of the Forrest Marsh system of ties and metal forms a shown at Fig. 19. The forms are made u of corrugated iron, to which is welde metal plates. Patent distance pieces hol the forms apart and to those pieces clip are fixed, pierced to take the reinforceme rods. During the erection, temporary ba tens are used on the outside. The wal are constructed in heights of four feet si inches and doors and window frames ar built in as the work proceeds.

One of the most recent methods to b used is that shown at Fig. 21 to Fig. 2 relating to cavity walls built with concre ties. Fig. 24 shows a section of the wall showing one of the ties in position. This wall is made up of outer slabs with hard concrete and the inner slabs are made from soft concrete. The ties which are shown in the plan are cast in the wall during the process of pouring for the inner thickness of the wall. The tie block is reinforced and is provided with dovetailed ends. The upper surface is formed with a nose or tetrahedral form, for the purpose of deflecting toward the outer wall any water or other matter that may fall on it and to prevent so far as possible any moisture which may run down the inner surface of the outer wall from creeping across the tie. The under surface of the tie is formed with a drip edge to cause moisture coming onto the tie to drip to the center of the cavity.

The system consists of a concrete foundation, on which is placed the bottom block of the cavity (see Fig. 22), upon each side of which the outer hard shell and the inner soft shell is built.

The two skins are closed at the level of the window sill with a tile and similarly closed around the side of the opening by the back of the window frame. The lintel is then formed by a cast beam (Fig. 21), completely closing the cavity under the floor joists. Above the member formed at the level of the ground floor window lintel are placed outer and inner wall shells, which are provided at intervals so that the cavity containing the end of the floor joists is ventilated. This open cavity is closed by a block above the joists, and the remainder of the wall is formed with a closed cavity to the eaves. The closing block or beam acts as a support for the roof timbers.

Fig. 23 shows an alternative section of the wall taken clear of openings.

The Reading Home Builders

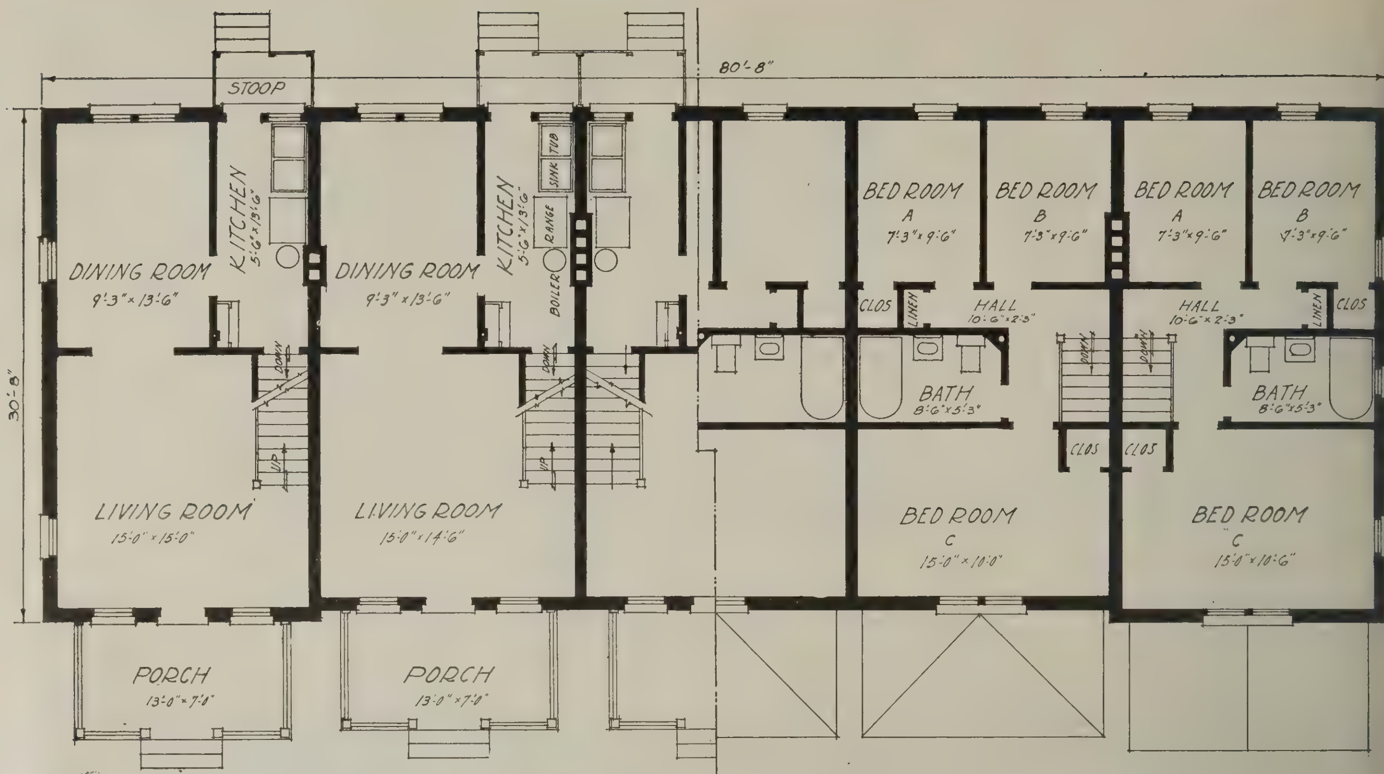
By C. H. Thomas

EARLY in the year 1920 the Chamber of Commerce of Reading, Pa., planned to solve the very urgent need of homes in that city along the Schuylkill River, above Philadelphia. They formed an association called the Reading Home Builders, whose business it was to draw up plans and suggestions, and to start a number of reasonably priced houses for the relief of the many who had no place in which to live. A unit of twenty-five houses, which were to be the first of a total of about one hundred and thirty, was started. A meeting of the representative business men of Reading was called at first, and their support asked on this proposition. The result was that twenty-five men were found willing to subscribe five thousand dollars each to finance the construction of twenty-five houses. The contract was given to the Lynch Construction Company of New York City, as the local Reading contractors were at the time over-burdened with their own work and they did not wish to engage in additional contracts. The contract that the Reading Home Builders had with the Lynch Construction Company provided that the company should import all their labor so as not to disturb the local labor market. The men received exactly the same rate paid to the building trades in this city, so that this amicable adjustment was satisfactory all round and no trouble resulted.

The houses are built in blocks of five

The houses, which are now completed, after a quick summer's work, are of brick construction, two stories, and contain six rooms and bath. They are built in blocks of five and make a very attractive appearance. The end houses are selling for $5,500, and the inside houses for $4,750, which represents the actual cost of construction, no profit being made by those interested in the building. The contractor received $400 per house, which included everything, such as engineering, architecture, grading, sales force, etc. The first house to be finished was completely furnished by local dealers as a sales medium and this helped the prospective purchaser to visualize just how his future home would appear when he took hold. A matron was put in charge and each interested visitor filled out a blank form, and this was followed up by the salesman. The selling plan is as follows:

		Year	Month
1st Mtge. 60%	$2,850.00	$171.00	$14.25
B. and L.	950.00	121.80	10.15
Notes, etc., reduced by saving fund — $2.00	450.00	104.00	8.67
Cash	500.00		
	$4,750.00		$33.07



HALF of FIRST FLOOR PLAN HALF of SECOND FLOOR PLAN

This plan would require monthly payment of $33.07 for first 5 years.

Next six years cost would be $24.40 per month.

After eleven years cost would be $14.25 per month.

There was some difficulty in securing 60 per cent first mortgage from local banks, so the twenty-five men who originally subscribed five thousand dollars have offered to carry the first mortgage. The second loan is taken care of by a Building and Loan Association. Four hundred and fifty dollars is a note to be reduced weekly by the purchaser and a five hundred dollar cash payment is required. This plan is simply one example of how a modern, up-to-date Chamber of Commerce has gotten busy and actually helped to relieve a difficult housing situation in a prosperous Pennsylvania city, and by their plan they have given the working man or other home buyer a chance to locate in a delightful location and to have every modern convenience at a small outlay while he goes along.

Laying Linoleum on Uneven Floor

Frank Deline, Ojai, Calif., writes: "I have in time past received many helps from the 'Questions and Answers' department. I notice that C. A. C., Holliston, Mass., asks about laying linoleum on uneven floors. I had a job of this kind, laying linoleum over a very uneven floor. This is the way I did it. I took some wallboard in large sheets and tacked it down over the rough, uneven floor and laid the linoleum over this. This was done nearly two years ago and the job has proved very satisfactory. The wallboard must be of the waterproof variety or it may rot. As it is always desirable to pad under linoleum with newspapers or felting paper, I went a step farther and a floor that was easy and quiet to walk on was the result."

A Thatch Roofed Shelter

A shelter with an inexpensive substitute for shingles, suggesting that in various types of sheds on the farm and elsewhere it is possible to use plant growth as a roofing, somewhat after the fashion of old-style thatching

Thatch roofing and similar shelters have so long been out of fashion that the excellent uses which can be made of various plant materials as a substitute for shingles are almost forgotten. The accompanying illustration shows a shed or shelter for bicycles which most builders would have covered with shingles or roofing paper. But since economy was desirable he conceived the idea of utilizing palm branches, a product abundant in California where this shelter was built. Coarse grasses or straw can be used to serve the purpose equally well.

Where Remodeling Saved Sixty Per Cent in Cost

Henry K. Holsman, Architect

WHEN the new Methodist church at Morgan Park, Ill., was completed, the old frame building was deserted and the property sold to the Christian church at the price of the lot alone. Instead of wrecking the old building it was decided to remodel and enlarge it for use as a Christian church.

The old church at the time it was abandoned. Though the appearance of the remodeled building is entirely different, the manner in which it was developed may be seen in the illustration below

I investigated the old frame structure and found it to be sound in every way. Though no basement had originally been provided there was an excavation sufficiently large to permit the installation of a furnace. The floors were generally sound, though in the main auditorium they were badly worn. By grinding, staining and varnishing them they were rendered practically as good as new.

The steeple was taken down and all the shingles and the mouldings on the exterior were torn off. The walls were extended above the roof at the gables, as shown in the illustration on this page. Wire woven into sheathing paper was applied over the siding and plastered with cement plaster. The new roof was laid with asphalt slate shingles and the chimney was rebuilt to conform to the new design.

The addition to the old building extends across the front and along one side of the main auditorium and has a lobby, a parlor, and rooms for Sunday School. Toilet rooms were also provided in this part. In the old building the Sunday School was in the wing to the right. This part was converted into a modified transept.

The seating capacity of the auditorium is about 250. The transept, Sunday School rooms and parlors all open into the auditorium by means of folding doors and increase the actual seating capacity to about 600.

A careful consideration of the factors which controlled the remodeling of the old building resulted in a suitable, attractive church at a saving of more than 60 per cent in cost

A kitchen and dining hall are located at the rear of the pulpit. The remodeling included the installation of all necessary plumbing, the furnace, and an electric circulating fan.

As the church is now arranged it is possible to pass from the front vestibule directly into the auditorium, the transept, the Sunday School or the toilets.

The total cost of remodeling, making all the additions, and installing plumbing, heating and electric lighting equipment, was $11,270. The estimated cost for a similar building new was $30,000 at the time this work was done. As the property was purchased at the price of the land alone a remarkable saving was obtained by remodeling the old building, and it has served its purpose satisfactorily since it was completed.

Movable Stairs

A builder in California wants information on how to make a disappearing stair. He wants a stair that will fold up in the ceiling out of sight. Whether a builder or carpenter makes a success of constructing such a stair, the fact should be known that there is at least one such stair on the market, patented, and manufactured to the specifications of the builder. The stair has a baluster or hand-rail, and the whole affair automatically folds up, slides in between the floors, and the ceiling is covered to an even surface. The inquirer has been supplied with the manufacturer's literature.

A Two-Room School of Colonial Type

THAT the colonial style is adapted to the design of school buildings as well as homes is shown by the Lakewood school designed by Frank M. Riley, architect, of Madison, Wisconsin.

"Homewood" is a typical Southern mansion with the main portion of the house flanked by pavilions on either side and all connected by enclosed corridors. In his adaptation Mr. Riley has employed only the somewhat plainer cornice for the elaborately carved and moulded cornice used on the main building of "Homewood." This cornice, however, is similar to that used on the wings of the original and although a

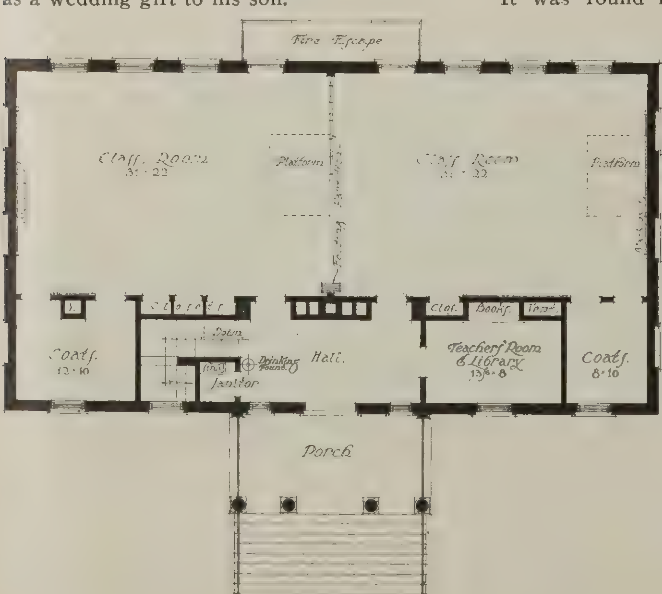
Fig. 1—Such an expression of the spirit of early American architecture has an important influence on a community

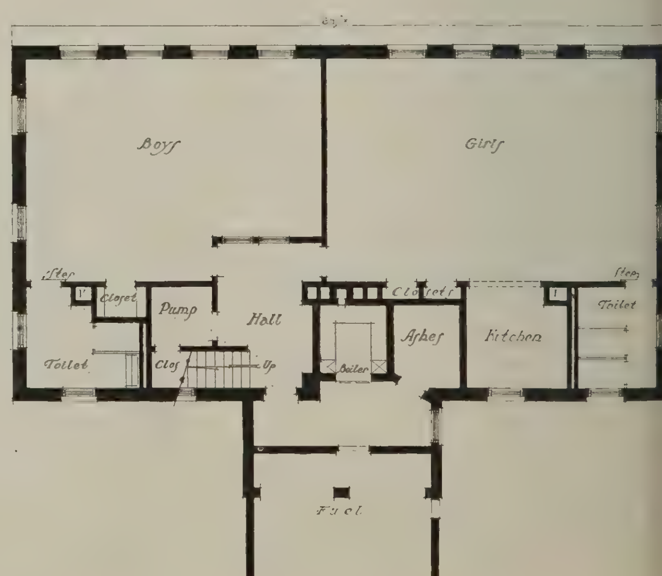
In this building Mr. Riley has drawn his inspiration from "Homewood," that colonial masterpiece located in Baltimore, Maryland, and built in the early years of the nineteenth century by Charles Carroll "of Carrollton" as a wedding gift to his son.

central or main portion of the original, omitting the flanking wings. The building has been made some ten feet longer and is also shallower in depth. The heights and other proportions are about the same.

It was found necessary to substitute a trifle small seems well suited to the building.

In general the porch is a careful reproduction, with the exception that pilasters are substituted for engaged columns at the wall. The pediment is also made plainer than in the original. The only disturbing





feature of this porch is the iron railing which is secured to the columns. This produces an unpleasant sensation suggesting a knife thrust in one's vitals and is avoided at "Homewood" by carrying the railing outside of the columns along the edge of the floor.

The panels over the windows, the pediment, the wall at the entrance and other trimmings are of stucco, as in the original, and offer an inexpensive and effective means of providing ornaments. In this case its use might even have been extended to the sunk panels at the ends of the building.

The position and size of the chimney is unfortunate, as it almost dominates the roof and detracts from the effect of the porch. This chimney suggests first period Colonial work rather than the third period to which "Homewood" belongs. The use of English bond rather than Flemish bond for the walls has no great effect on the

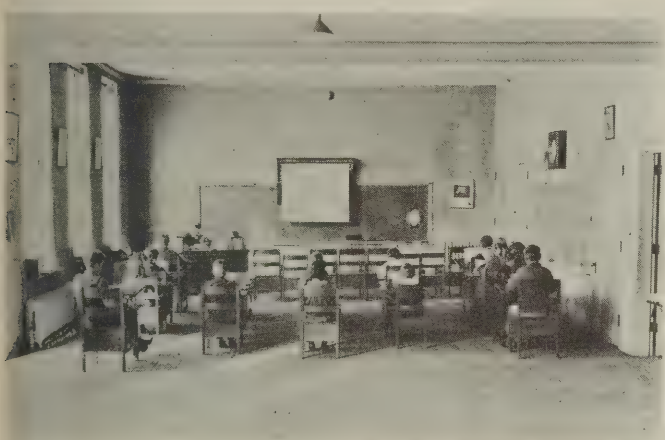


Fig. 2—In addition to the influence of an attractive building, these children enjoy the benefits of the practical features of modern instruction

Fig. 3—From all sides the building appears sturdy enough to resist the storms of a good many winters

general appearance of the building, but it seems that in such a sincere copy the original method should have been adhered to.

Taken in all, however, the adaptation is a remarkably clever and successful one. The wide difference in the requirements to be met by the two buildings, the necessity for economy, and the probable indifference of some of those who were responsible for certain portions of the work, all combined to complicate the problem and make its solution difficult. It offers a convincing example of the possibilities that lie in Colonial work for adaptation in buildings other than dwellings, to which its use is at present too closely restricted.

As a matter of fact too many people are making much to do about Americanization in our schools and are ignoring the influence that the building itself has on such a movement. A Classic, or a collegiate Gothic or Tudor design is not American in sentiment. If we should exert more of our energy toward developing designs for public buildings along Colonial lines, we would find that their influence would go far toward the creating of national pride and the gaining of the respect of the foreign element. The recent action of the State of Delaware in basing its standard school designs on the Colonial style is a step in the right direction.

Aside from its interest as an adaptation of the Colonial style, the Lakewood School has interest as an example of a thoroughly up-to-date rural school.

It contains two class rooms separated by a folding partition so that they may be thrown into one large hall for school entertainments and other community gatherings. The class rooms are equipped with movable desks so that the floor may be readily cleared. Each class room has a separate coat room and teacher's closet. Emergency exits are provided at one side by French doors leading to a reinforced platform.

The teachers' rest room also does duty as a library which serves the surrounding community as well as the school. This is in line with the tendency to design schools that will serve a community throughout the year instead of merely during the school period.

A janitor's closet is located at the left of the main hall. The basement stair also leads from the hall.

The basement contains two large play rooms, one for boys and one for girls. The toilet rooms open from the play rooms and are equipped with modern toilet facilities which are supplied with water by a pressure system provided by a tank and pump located in the pump room. The sewage system consists of a septic tank and drainage system located outside of the building. In view of the present development of water and sewer systems for isolated locations, it is difficult to understand why so many rural schools are built without this simple and inexpensive means of sewage disposal.

The play rooms also serve for manual training and domestic science classes. Closets are provided for the storage of supplies and the girls' play room has a completely equipped kitchen at one side. The kitchen may also be used for neighborhood socials and suppers held at the school. The boiler room, fuel room and ash bin are enclosed by brick walls on all sides and have fire resistant ceilings. The ventilation is effected by means of direct-indirect steam system for which the radiators and planum chamber are located immediately above the boiler.

The construction is of red brick with white mortar joints. The basement floor is of concrete and the first floor is maple. The porch is wood and roof shingled.

The building was erected in 1919 at a total cost of $13,477.14:

Mason	$ 4,747.30
Carpenter	4,316.51
Plasterer	574.00
Sheet Metal	119.00
Painting and Glazing	432.20
Plumbing	825.00
Heating and Ventilation	1,452.00
Electric Wiring	46.50
Electric Fixtures	61.00
Electric Bulbs	11.00
Electric Call Bells	8.80
Window Shades	62.55
Grading	150.12
Architect	671.36
Total	$13,477.14

The mason work includes septic tank; carpenter work includes flag pole; plumbing includes well, pump and motor.

Covers the Building Field

National Builder brings the experiences of builders to the aid of each other. Readers will note that questions sent in by a builder in one section of the country are often answered by a builder in another far-off section, and if there is anything in the idea of fraternity in craftsmanship it is certainly shown in this spirit that gives as it receives. Note that National Builder doesn't merely pass the information along but pays the fellow that has the sand and get-up to give out what he knows will be helpful. If you know a better way to do anything in the building line, send it in.

Two Small Bank Buildings

Fig. 1—The First National Bank, Elkhorn, Wis. James R. and Edward J. Law, architects

THE two banks shown in the accompanying illustrations were designed by James R. and Edward J. Law, architects, of Madison, Wisconsin.

The First National Bank of Elkhorn, Wis., is two stories in height; the first story being given over to banking purposes, and the second story divided into offices for rental purposes. This type of building is quite popular among bankers, as, although its first cost is greater than for a building to serve the bank only, the income from the rented portions usually offers a paying investment, and the larger building is held to imply a prosperous condition and an added importance.

The street front of this bank is of stone with copper trimming and frames around the openings. The lettering is of cast bronze. The construction is fireproof throughout, with brick sidewalls, reinforced concrete slab and girder system for the floors, and hollow tile and gypsum block partitions.

The entrance to the bank is at the center with the entrance to the second floor offices separate at one corner. At the other corner is an entrance to the light court along one side of the building. This method of masking the light court and passage by a blank wall is good, as the treatment adds to the apparent size of the building and makes a symmetrical design possible.

The bank is designed to serve an agricultural community and is provided with a smoking room for men and a rest room for women, where rural customers may gather.

The women's room has a toilet at one corner and a wide seat set in a niche along one wall.

The customers' room is for the transaction of business of a semi-private nature.

The directors' room is paneled in oak and contains a coat closet and has a large seat similar to that in the women's room. There

Fig. 2—Detail of entrance. First Nationa Bank of Elkhorn

Fig. 3—View of banking room. First National Bank of Elkhorn

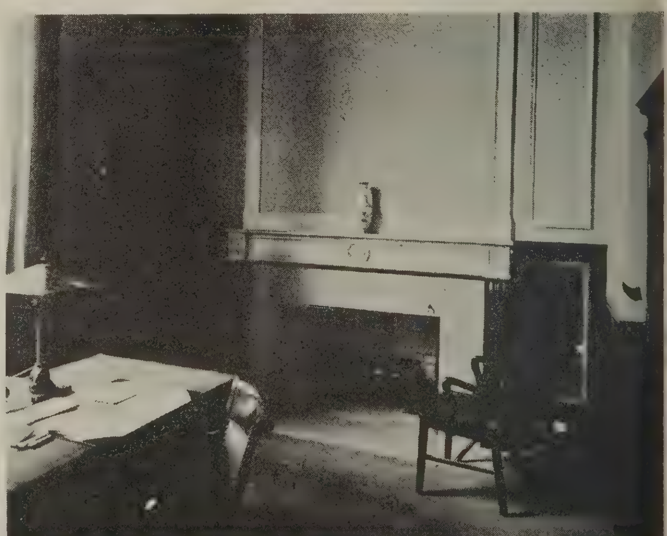
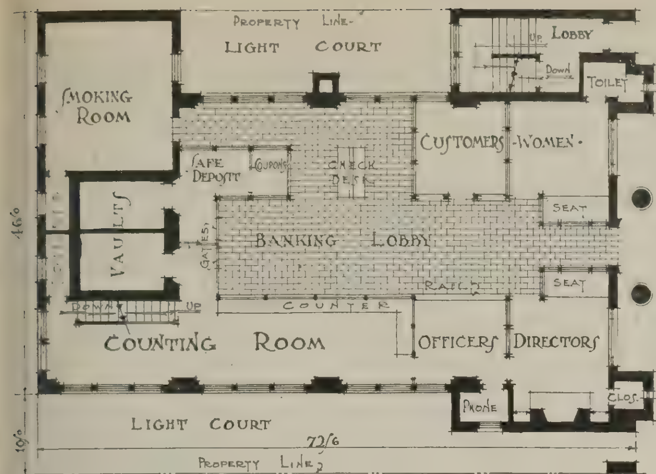
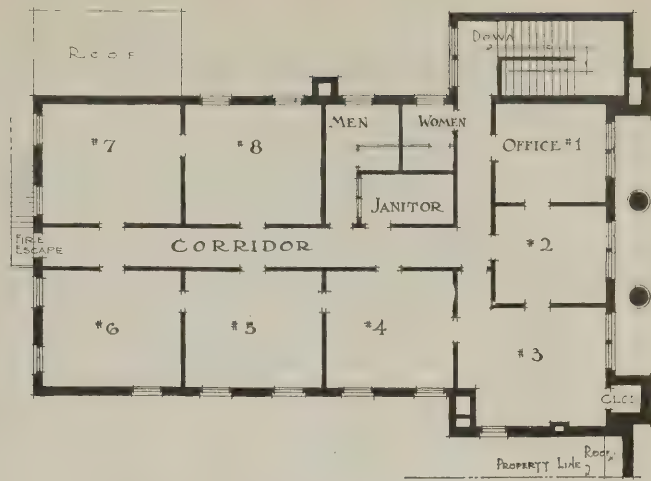


Fig. 4—View of directors' room, First National Bank of Elkhor





is also a large fireplace flanked by built-in bookcases. A door at one side leads to the officers' space which is separated from the banking lobby by a low railing. A private 'phone booth opens off the officers' space.

Fig. 5—Randall State Bank, Madison, Wis. James R. and Edward J. Law, architects

The counting room takes up the remainder of this side of the building. The counting room is exceptionally well lighted by large windows and has stairs leading to the basement and to the small mezzanine floor above the vaults. There is a small toilet room at one corner. The vault is divided into two compartments and is of heavily reinforced concrete construction with a hollow tile lining to increase the fire protection. The safe deposit department and the coupon booth are placed convenient to the vault.

The smoking room has an oak cornice and beamed ceiling and opens into a toilet room.

The banking lobby and toilet rooms have marble tiled floors. The smoking room and customers' room have floors covered with battleship linoleum. The other rooms have cork carpeted floors.

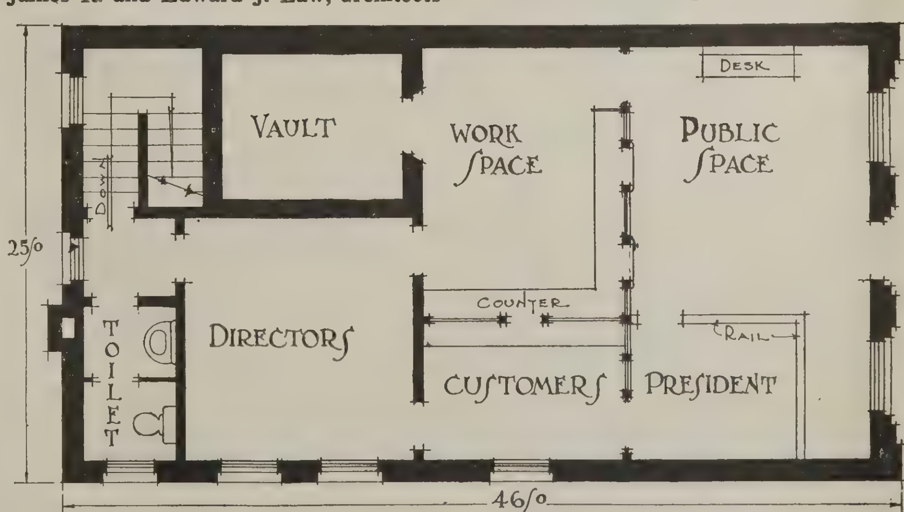
The banking room partitions are of marble on the lobby side and of wood to match the trim on the room sides. The sections are glazed where required and a bronze grille is placed at the end in front of the vaults. There is also a bronze railing along the front of the mezzanine floor.

The second story contains eight rooms connected by communicating doors so that they may be arranged in suites as desired. Each office is provided with an individual lavatory. The corridor leading to the offices opens on a fire escape at the rear of the building. Toilet rooms for men and for women are provided on this floor and there is a large closet for the janitor's use.

The Randall State Bank Building is located in Madison, Wisconsin, and is of the one-story type designed for banking purposes only. The exterior is of stone and is simple in design without being crude. Taken as a whole it is a dignified small building free from the shabby tricks of detail which so often disfigure buildings of this kind, when an effort is made to make them appear "classy."

The vault is of heavily reinforced concrete construction and has a lining of 3-inch hollow tile to give the contents added protection in case of fire. There is a similar vault in the basement for the less important books, documents and so forth.

The banking room is finished with marble and ornamental plaster and has a plaster cornice at the ceiling.



Questions, Answers, Kinks and Discussions—V. L. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

Projection Drawing

In conversation the question came up about reading blue-prints. A friend remarked that while nearly every man could read blue-prints there were occasions when a few of the fundamentals in projection drawing might help to straighten out some rather obscure point.

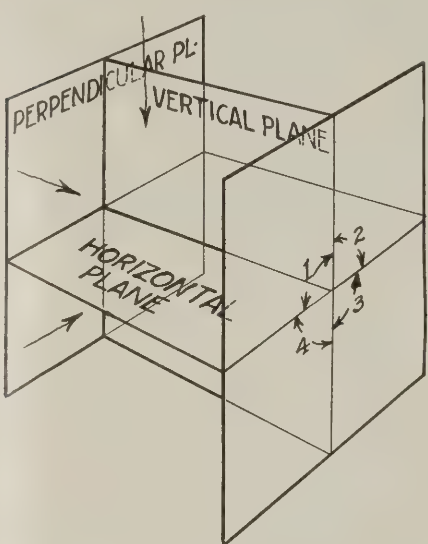


Fig. 1

"The basis of projection drawing is a transparent box with the object inside, but how do the draftsmen perform some of their weird feats in getting views; and why is the plan view of a bridge, for instance, placed below the elevation; and why, in English publications, do you find the plan below the elevation and the side views appearing reversed?" There were more questions asking about the odd arrangement in some sheet metal drawings.

The best way of getting at the fundamentals in projection drawing is the simplest way. In all mechanical methods the simplest method is the best. To begin you build two transparent planes in your imagination. See Fig. 1. One plane is vertical, and is so called. Another plane is horizontal, and is called the horizontal plane. These planes intersect each other midway. At each end another transparent plane is placed perpendicular to the first planes. These planes are named the right perpendicular plane and the left. (At this

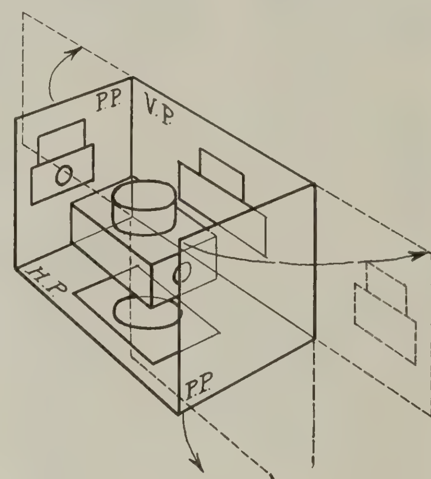


Fig. 2

point it is well to point out that the word "perpendicular" in drawing means at right angles to or at ninety degrees to. It does not mean vertical as generally accepted.)

This imaginary structure will enclose four quadrants or angles of projection, so named, the first, second, third and fourth quadrants. In England the first quadrant is used. That is why you see the views apparently reversed in their prints. In Fig. 2 notice how, in unfolding the planes, the horizontal plane drops below the vertical plane, and how the side or end views

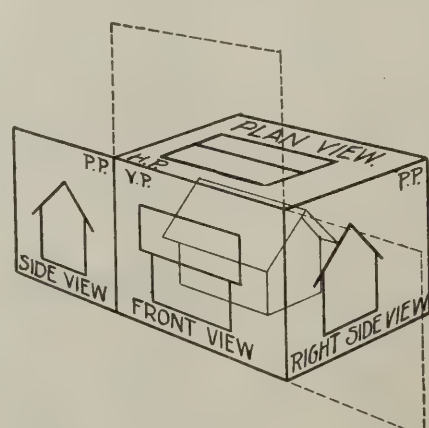


Fig. 3

show that end of the model away from the plane upon which they are drawn.

Here the third quadrant is used. Notice Fig. 3. You draw from the front what you see of the model on the vertical plane. This is the "front elevation." You look at the model from the sides and trace on the perpendicular planes. Then you look down from the top and draw the plan view. When these imaginary gymnastics are done you swing the planes out into line with the front view and they are then all in one, as in Fig. 4.

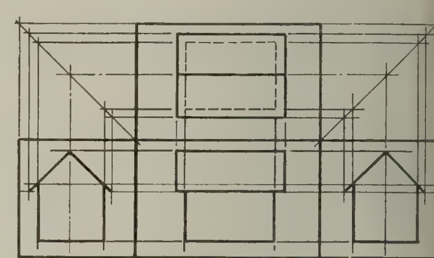


Fig. 4

In drawing up a house four sides are shown; the rear elevation merely completes the fourth side of the box and swings into position at one side or the other.

The various views and developments in sheet metal drawings, which my friend mentioned, are slightly different. Like tool drawing in machine shop work, the work in sheet metal requires various views that are taken through what are called auxiliary planes. See Figs. 5 and 6. These planes may be placed in any position desired but must swing into their position with regard to the other planes by using the line of intersection as a turning axis. Something like the cover on a cellar door.

So far as "weird" arrangements are concerned my friend evidently meant the mixing of views in what is seemingly one plane. This can be answered best by saying that a view is best placed when it shows most clearly just what its relation to another view is. For instance, in sheet metal work a development of some part is shown rolling right off one of the views. See Fig. 7. Unless the development so shown makes for a difficult pattern that is the best place for it. The worker will have very little trouble in tracing back any doubts, and the relation of one piece to another is clear.

If you have difficulty in imagining these plans a very useful device is an illuminated box with four screened sides on hinges. A model can be held inside the box and the

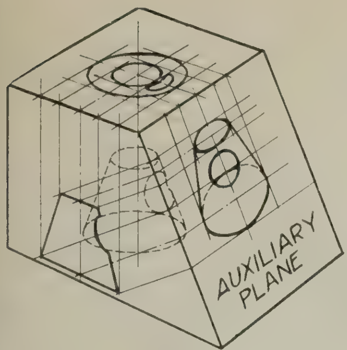


Fig. 5

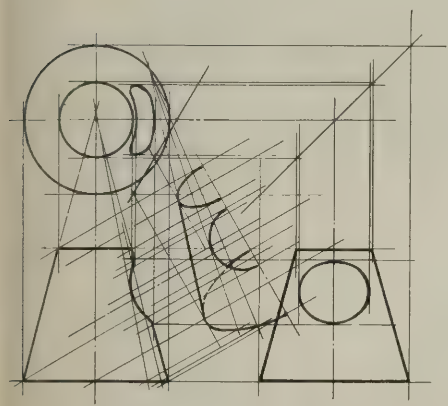


Fig. 6

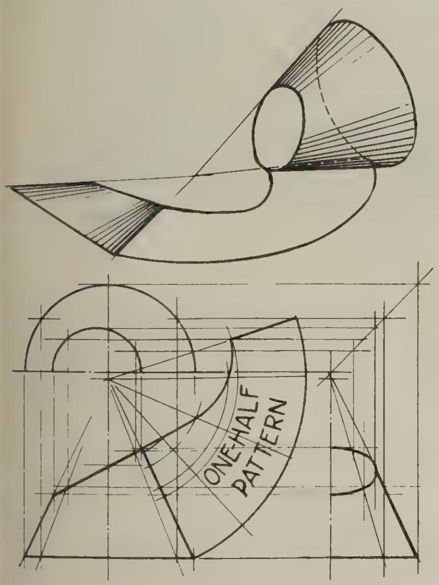


Fig. 7

view traced in chalk on the screen. When the views are completed the sides are swung into position.

Determining the Center of a Circle

J. M. C. writes that in looking over his boy's geometry lesson he ran across the proposition that if one side of a triangle represented the diameter of a circle and the opposite corner of the triangle lay on the circumference the triangle must be a right angle triangle. So the next day he used that little proposition to locate the center of a circle very accurately and quickly. Fig. 8

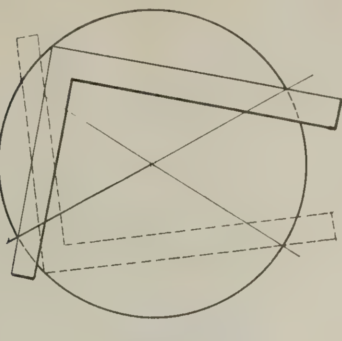


Fig. 8

shows the method. The intersecting lines locate the center of the circle.

The Octagon Post

F. H. Bogle's octagon post problem in the June number brings a simple construction of the octagon from J. R. S. In Fig. 9

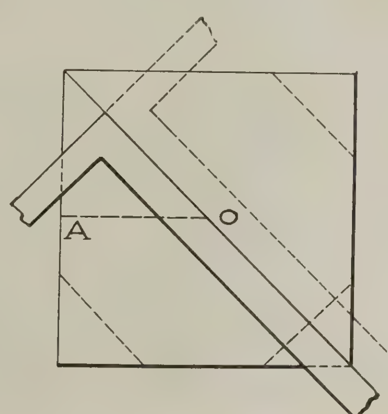


Fig. 9

the square is marked for the length of the line A O, and is then placed on the diagonal of the section. When one side is marked the square is turned over and the other side is marked. This method gives very accurate results.

Areas of Circles

One use of the square always brings up another use, a good deal like the fish story, but this old one may save someone a little

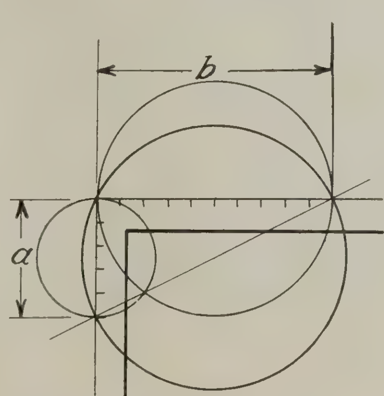


Fig. 10

time in figuring circle area sums. It runs on the principle that the areas of similar figures varies as the square of their respective dimensions. In Fig. 10 the letters a and b represent the diameters of two circles, say five and ten inches. To find the diameter of a third circle with an area equal to the first two combined, lay off a and b, or five inches and ten inches on sides of a square and take the hypotenuse as the diameter of the third circle.

The Human Equation and Building Material

H. O. Johnson, of Minneapolis, an agent for certain lines of building material, in discussing the standardization problem with a writer for National Builder, said: "My business is largely with products into which cement, sand, gravel and reinforcing enter, and in these combinations the human equation enters greatly. If we want to make a serviceable roofing slab of concrete, the human equation enters in the form of the man that does the mixing. To produce the best quality of concrete, it must be manufactured with the greatest of care, and everything must be done as it should be. This mixer has to be depended on to put the right proportion of cement with the aggregates, and to have the aggregates consist of the right amount of the properly graded gravel and sand. He has to be depended on to mix it thoroughly; for if it is not mixed enough the concrete is going to show weakness at some point. Then, after the concrete slab is made, it must be kept moist for at least 24 hours. Now this man who represents the human equation may be a careful man or he may be a careless man or forgetful or lazy, and the slab of concrete may turn out to be good or it may be worthless, having dried out too quickly in the open air.

"And there comes in the gigantic problem of the building contractor, whose biggest task is to control and use this human equation. Profit or loss on any job lies with this human equation.

"A building contractor takes a contract to roof a building, and some of the men he hires are careless and break a good many of the tile or slabs, and, as a result, he runs short of tile or concrete slabs before the job is completed. It may mean a long delay before he can get more of the roofing material, and that delay may mean loss of profit to himself.

"We are so much impressed with the importance of this human equation problem that we do not sell material to go into a roof unless we can put on the roof ourselves; for we have made it a point to reduce as much as possible the loss arising from the inefficiency of the human equation. We have our own force of men permanently employed, who will break as little as possible of the material and will have an interest in laying the material as it should be laid. Thus, if an outside man is laying slabs and sees one slightly cracked he will let it go in as it will not be noticed, while by our own men it will be rejected.

"We have worked out the human equation problem to a point where we can tell just what the breakage of material is going to be, and we send along enough more to offset that loss; by which means we keep the human equation from delaying our work. The average breakage is, for standard roofing tile, 2 per cent; roof slab tile, 1 per cent; trimming tile, 5 per cent. Those proportions do not apply to drain tile or to ordinary building tile, in which the loss is very large. This loss in turn is due to the man representing the human equation, who puts the tile into a car without any packing and with no provision to prevent the tile moving about with the jarring of the car in motion. And many tile are broken by the men that unload these common tile from the cars and haul them to the jobs.

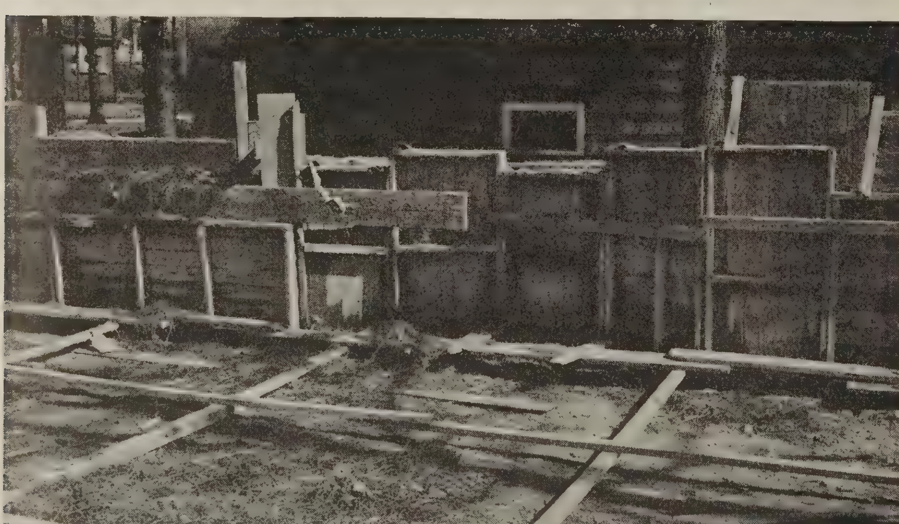
"So our success or failure in the building business is largely determined by the way in which we work out the human equations connected with it."

To the above may be added: The greatest single factor in standardizing the human equation is permanency of employment, which condition is not yet possible generally in the building trades.

Saving Money on Form Work

The accompanying illustration shows how one contractor handles his form work on house construction. The forms shown are merely sections built of scrap lumber and are of different shapes and sizes. They are made during odd moments, or as needed, and are moved from job to job.

It is very easy to set these forms, for the bracing is simple. The outer form is set first and braced to stakes outside of the building excavation. Each section is fastened to the adjoining sections by means of 1-inch strips. The inner forms are then set up, spreaders placed to hold the forms at the right distance apart, and braced as shown. The bracing consists of spliced 2x4-inch timbers running from one side of the foundation to the other. Notice how the 2x4-inch pieces are fastened to planks near the forms. These planks fit tight against the forms and prevent their twisting. The whole operation of setting and bracing is very simple and undoubtedly saves time.



The finished wall is much smoother than first glance at these forms would indicate. No wiring is required, owing to the stiffness of the sections and the short height of wall, so that removal of the forms is simplified. Scrap lumber can be used.

One contractor, operating on a fairly large scale, has this method on a systematic basis. Taking the plans for a certain job, he has one of his engineers make a form plan. This form plan shows the sizes and kinds of sections to use in every wall. They are numbered for simplicity and the foreman merely sorts out the sections called for by the form plan. A little time spent on such a plan has saved money.

A modification of the above system may be useful for smaller jobs, especially if you have a foreman who is a little slow at reading plans. It is also to be recommended on account of the labor involved. The common laborer does most of the work while the higher-paid carpenter does the shortest job—bracing and aligning.

The advertising contractor

The Advertising Contractor

Cecil C. Rulaford, general contractor and builder, Toppenish, Wash., makes his service car a permanent advertising medium. The photographs he submits show how he does it, and also one of the houses he has built for a local druggist.

A New Idea in Farm Homes

By Robert E. Jones

State Land Colonization Brings Forth a Plan

ECONOMIES of war-time plus the State Land Colonization movement have brought about some changes in the attitude toward and the planning of the farm home. The California Colonization Commission now has a farmstead engineer, Max E. Cooks, who also is an architect. Cooke's work has attracted widespread attention, because he has recognized in a practical way the important part played in rural life by the farm home and its surroundings. Cooke, too, has evolved a type of farm home that grows with the needs of the family.

This article is about the work of this interesting young man who was raised and educated in the city but forsook a promising career there to help work out some problems on the farm. Cooke did his pioneering work in farmstead engineering and designing rural homes at Durham, where the first California Land Colony is located, and is now developing it further at Delhi, where the second colony has been established under the leadership of Dr. Elwood Mead.

For fear the reader is not familiar with the state land settlement idea, I shall explain it briefly and then go on. These state colonies are backed by state credit. In other words, the state buys the land, prepares it for the settler—starts ready-made farms, in a word—and then sells to actual farmers on the amortization plan, with payments running over twenty to thirty years. The first payment down is but a twentieth or a thirtieth of the entire price of the property and the interest rate is 5 per cent. Upon improvements, however, a 40 per cent payment is required. That is the State Land Colony idea in a nutshell—a way of providing ready-to-go farms for hard-working men without sufficient capital to buy the property outright.

At both Durham and Delhi, I saw some of the Cooke houses and farmstead arrangements and was impressed with the simplicity and convenience of these. We sat down together after an inspection trip and I asked Cooke to explain some of his ideas for your benefit.

"What can be done to beautify and improve existing farms and to avoid mistakes in building new farms?" he was asked

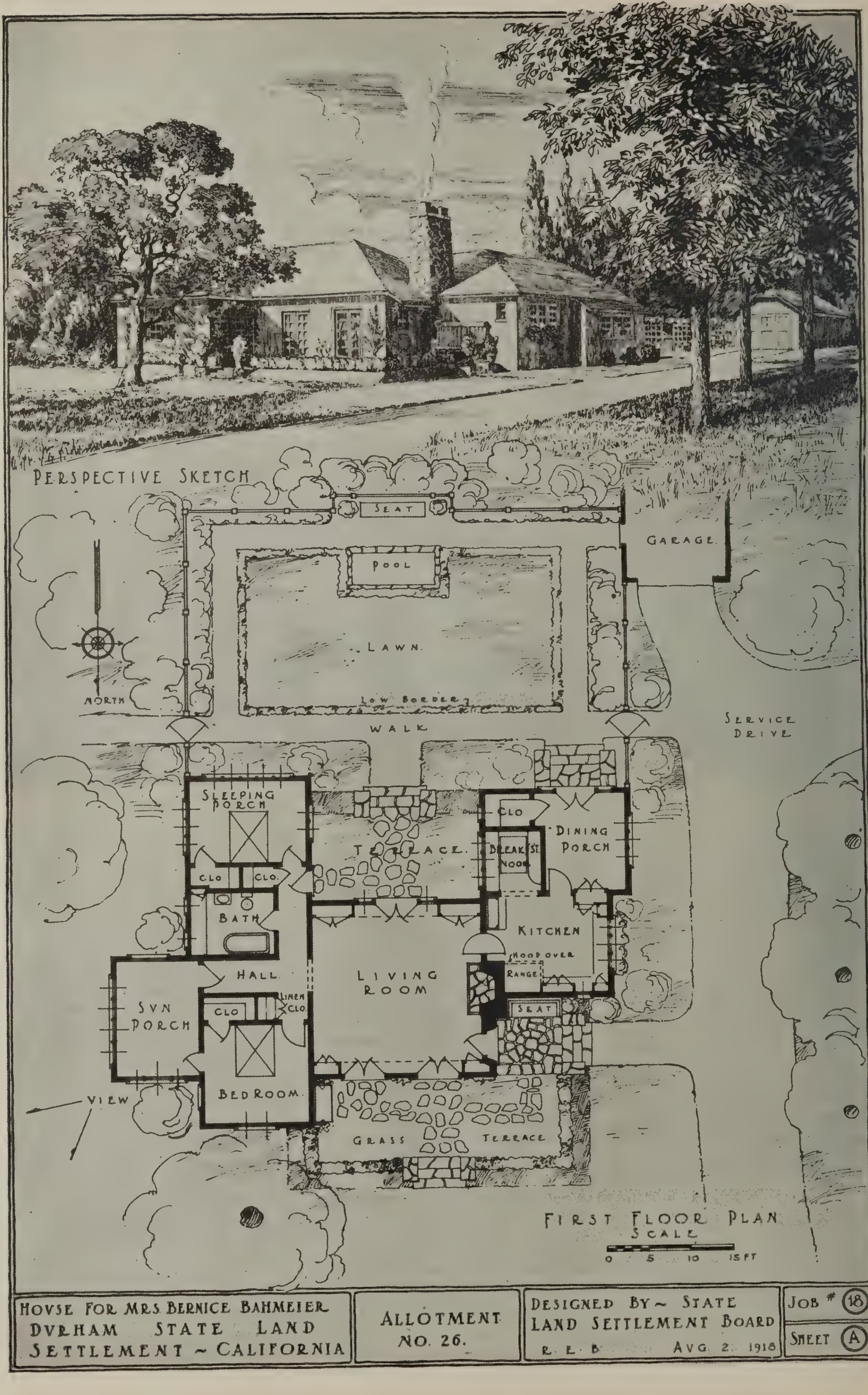
"A different problem is presented on different farms," was Cooke's reply. "It is impossible to lay down hard and fast rules, but it is possible to give an outline of laws governing good arrangement, subject to topographical and geographical locations, and local conditions and methods of farming."

Cooke spoke as an architect naturally would, following out a definite plan. We shall try to give his outline as he explained it.

"First, we have the matter of location," he said. "From a standpoint of working the farm, particularly if it is a large one, a central location is desirable to make all fields as readily accessible as possible. With such a location, crops may be harvested and brought in at a minimum expense and the stock may have the run of all fields through lanes requiring the least amount of fencing.

House planned for a Durham settler

"Notwithstanding the merits of the central location, there are advantages in location closer to the highway. A location closer to the highway promotes sociability and community life. It is closer to the school, church, market and community center. The passing neighbor or stranger is often of interest to the farmer. The farm seems more accessible from the outside, which, in the case where produce is for sale to the public, is often of vital importance. These are all vital factors in a contented rural life. On the other hand, the site should not be objectionably close to the highway. If it is close to an unpaved highway, dust will be very objectionable. If on a main highway with heavy traffic, privacy will be sacrificed and there may be borrowed wrenches, etc., that are never returned. Conveniences will be so close at hand as not to be appreciated as private property. One hundred feet from the highway should be the very minimum. A hundred and fifty to two hundred feet would be better.


PERSPECTIVE SKETCH
SEAT
POOL
GARAGE
LAWN
LOW BORDER
NORTH
WALK
SERVICE DRIVE
SLEEPING PORCH
CLO
CLO.
BATH
TERRACE
CLO
BREAKFAST NOOK
DINING PORCH
KITCHEN
HOOD OVER RANGE
HALL
LIVING ROOM
SUN PORCH
CLO
LINEN CLO.
SEAT
BED ROOM
VIEW
GRASS
TERRACE
FIRST FLOOR PLAN
SCALE
0 5 10 15 FT
HOUSE FOR MRS. BERNICE BAHMEIER
DURHAM STATE LAND SETTLEMENT ~ CALIFORNIA
ALLOTMENT NO. 26.
DESIGNED BY ~ STATE LAND SETTLEMENT BOARD
R. E. B. AUG. 2. 1918
JOB # 18
SHEET A

"Now as to the matter of elevation. Natural advantages should be embraced to insure comfort and sanitary buildings. Low places are damp in winter and hot in summer and very little, if any, warmer in winter than higher places with a pleasing outlook. The farmstead should not be located on top of a high hill, because of exposure. A southeast slope is best, a south slope next, southwest third, southeast fourth, and west fifth. Northeast, north and southwest exposures are undesirable; a level site, artificially drained, would be better. Buildings in the shade but with no breeze are warmer than those in the sun getting the benefit of prevailing breezes. The house should be placed on the highest ground, not only to insure drainage away from it but to obtain a good view of the surrounding landscapes. It has been proven conclusively that pleasing surroundings in our great industrial plants net big returns. The women on the farm spend much of their time in the house. Do not forget that a pleasing vista toward the highway, a view of a pond or lake in the meadow, or the mountains in the distance have real inspirational value and can do much toward relieving monotony of routine duties and increases enjoyment of leisure hours.

THE DEVELOPMENT OF DURHAM'S FIRST SETTLER, CARL NEILSEN ~ ALLOTMENT NO. 10, DURHAM STATE LAND SETTLEMENT, DURHAM, CALIFORNIA, U.S.A.

"The custom in the city of squaring the house with the highway, with the most important rooms facing it, is not the law without recourse in the country. If a finer scene or a better exposure is in another direction, reverse the order. And do not impose a view of the pig pens from the kitchen windows. A woman on the farm spends much of her time in the kitchen.

"The matter of drainage must be considered. A sandy soil drains well and washes slowly if not too steep. The land on which the buildings are located does not produce crops and this therefore may be the poorest soil. It is, however, unwise to select the poorest soil for the building site with this alone in mind, for poor soil can be built up, whereas a poor building site is beyond redemption. Too much slope in the barnyard will lead to loss of valuable manure through leaching, although a dry footing for animals in the winter is of vastly more importance.

"All barnyard and septic tank disposal fields should slope away from the house and well. The disregard of this self-evident law is appalling. Farm homes in every state are supplied by wells loaded with contamination from the pig pen, the kitchen sink and worse. Eave troughs emptying into drains will eliminate much mud in the yards and keep the buildings dryer and cleaner. Concrete walks or gravel do much toward eliminating tracking of dirt and barnyard filth.

Designed for a Durham settler

"Now as to the relationship of buildings. Do not place the house where flies and odors will travel with the prevailing winds from the barn buildings and yards. Take advantage of the summer breezes by keeping the buildings open to them and in turn have them form windbreaks to yards against the winter winds.

"The barn should be at least 150 feet from the house. It is desirable to have the barn in view from the house, but the yards should be concealed rather than face the house. At this distance fire risk is not great and many steps are saved. Actual observation has shown that proper relationship of the buildings may save miles of walking every week, running into thousands of miles over a term of years. Factories save thousands of dollars by recognizing and devising short cuts. The various units of the farmstead should be so arranged as to reduce the travel to a minimum while attending chores. There should be no backtracking.

"The garden should be convenient to the kitchen and preferably with a southern exposure.

"The poultry house may be nearer the house than other buildings for the convenience of the housewife, who generally cares for the birds, but it should be fenced against the garden and the house grounds. Chickens do not improve the condition of the backyard and doorway when permitted their freedom.

Elevation of a unit plan house

"The garage should be convenient to the house with shop combined or close to the shop and implement shed.

"The silo and granary will be located best to suit individual requirements, depending on demands. They should be centrally located to the barns and lots which they are to serve.

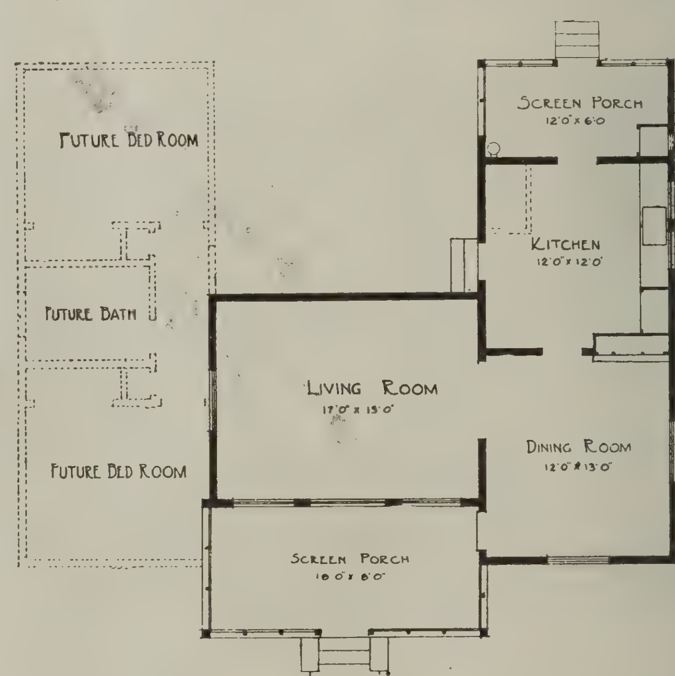
"Summing up, the buildings should be located for convenience, economy of space, protection, outlook, exposure, and last but by no means least, beauty. They should appear to belong together and should be of design and materials that harmonize."

"Now that you have given us the farmstead let's put the home in it," I suggested.

"The farmhouse has many functions to fulfill," Cooke continued. "It should be designed to perform these functions with economy, harmony and convenience. It is not alone a place of shelter, but is also a social center, a place of business and a food factory. The farmhouse holds a more important place in our lives than the city house. The city house has degenerated into a condensed apartment where people sleep and eat part of the time, seeking amusement and education elsewhere. The farmhouse is the center of all human life on the farm. The planning of it; the design and equipment are of even greater importance than the city houses. Too little thought is expended in its planning.

"There are thousands of farms on which the stock is better housed than is the farmer's family. This is a deplorable condition. It may be good economics and in order for the young farmer and family starting out to put up with lack of conveniences, for they are encouraged by visions of what the future holds in store. But the surroundings may still be made sanitary and attractive. The consideration of a real home should forever be kept in mind. It should not be regarded as an expenditure to be made in proportion to the amount of capital invested in other buildings.

"The farmhouse should be considered a social investment, the same as the city home is regarded. It is the greatest and the safest insurance against failure, the best paying investment on the entire farm. The farmer should put into his house all that he can afford. He should be careful in the beginning of a new farm not to part with his working capital to be sure, but as soon as profits accrue the house should be improved according to a predetermined plan which should ever be in mind.



Floor Plan

"The simple, straightforward, well designed and convenient farmhouse costs no more than an architectural misfortune and, in fact, ultimately costs less beyond comparison. If capital is limited in the beginning, the house should be planned so that a portion of it may be built as a nucleus of what is to follow. The farmer may then add to it as he is able, and as required, always having in mind the ultimate possession of a worthy home.

"First and foremost, the plan must be flexible to permit of future additions and improvements; a great many of which may be made by the farmer himself. It is only through intelligent planning at the outset that such improvements and additions may be added from time to time with a final result that is successful, both from an architectural and a utilitarian viewpoint.

"In brief, the following includes a few of the more important considerations that demand attention in the planning of the farm home. They are all subject to individual taste and special requirements.

"The kitchen is the center of activities. Three square meals being the order of the day on the farm necessitates the most careful consideration of kitchen conveniences. It is a mistaken belief held by some that a model kitchen can be evolved and standardized like a piece of machinery. Before this can be done we will be obliged to standardize the size and movements of our busy farmers' wives. Here in the kitchen individual requirements must be given most careful attention. There is no best height for the kitchen sink; no best way for the kitchen door to swing, but to suit the user.

"The kitchen in particular should not be used as a thoroughfare to gain access to other parts of the house.

"There should be convenient means of disposing of ashes, of disposing of garbage and of supplying fuel.

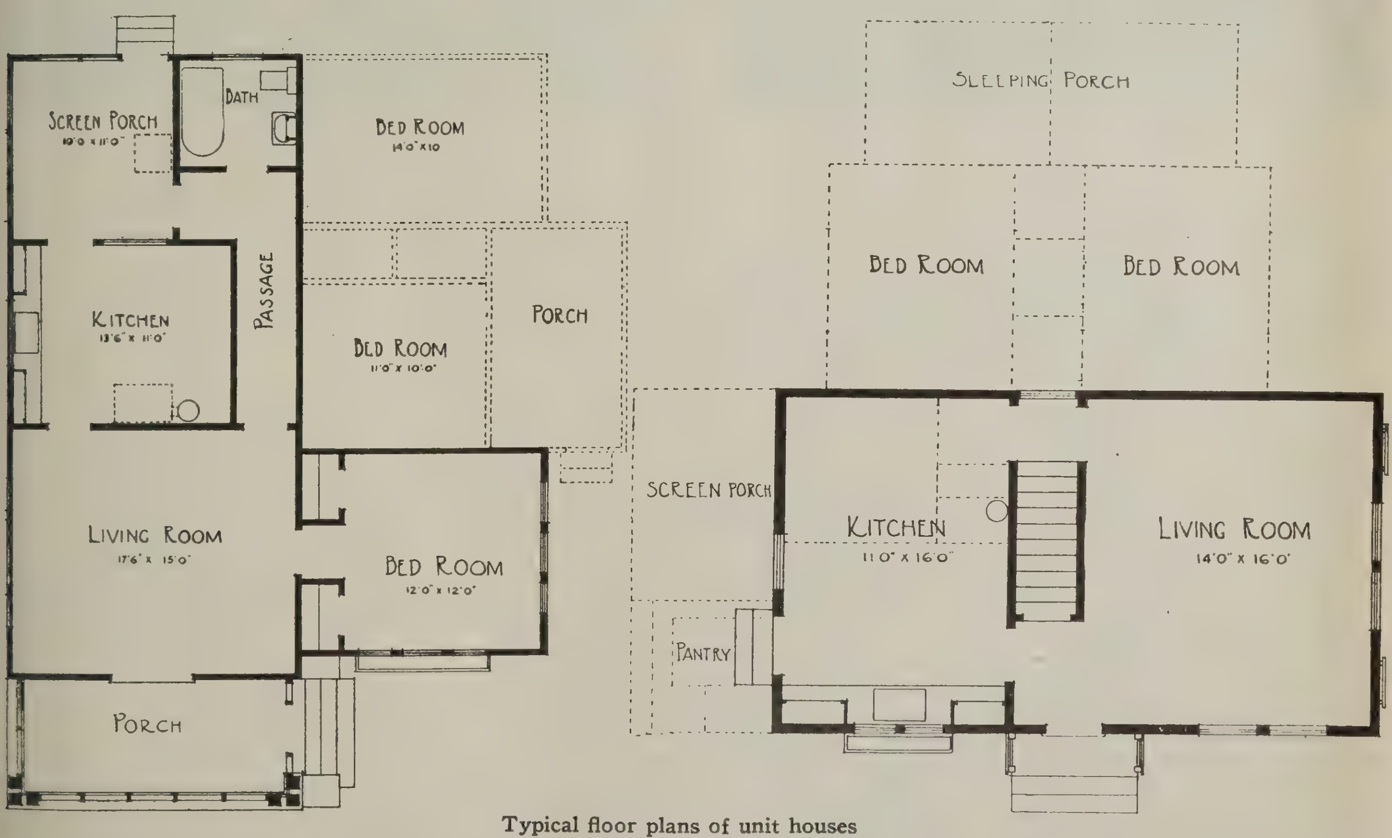
"Larger food storage spaces, convenient to the kitchen, are required for the farm home than for city or suburban dwellings.

A unit plan house

"Dining porch and dining room should be equally accessible for serving from the kitchen.

"Kitchen screen porches must be of practical size and be of genuine value.

"The kitchen should have pleasing outlook, commanding a view of the main road, driveway or landscape. The dining room or dining porch should be accessible to the men from the field without their passing through the kitchen or other main rooms.



Typical floor plans of unit houses

"Light, cross-ventilating and freedom from excessive summer heat are essential.

"The bathroom should be accessible to all rooms without the necessity of passage through bedrooms, and it is a decided advantage to have an entrance from the exterior or back porch without entering the house proper.

"It is a mistake to sacrifice great convenience for the sake of centralizing plumbing fixtures. The extra initial cost of separating bathroom and kitchen is generally much exaggerated.

"The various porches might well be designed to permit of putting them to more than one use in case of emergency, either as sleeping porches, dining porches, living porches, or by the addition of sash, as separate rooms.

"Stock plans have great suggestive value, but they are made to meet imaginary conditions. The natural controlling factors peculiar to any given building site and the peculiar requirements of the farmer and his family vary in each individual case and are anything but imaginary."

"Of course the immediate surroundings of the house should be made attractive to fit in with this desirable home," I put in.

"Yes, the farmer too often neglects beautification of home grounds," said Cooke. "A small lawn well kept is far better than a broad expanse poorly kept. Do not overplant the lawn. Plant so as to permit good circulation of air and plenty of sunshine.

"Keep an open front with trees and shrubs in groups rather than in stiff, regular rows. Plant along the sides to border and separate the house from the business of the farm.

"A few trees should be planted to the rear of the house to give shade and form a background as in a picture.

"Plant a good windbreak on the two exposed sides of the farm to shelter against winds and form future woodlot. Plant trees and shrubs so that they will conceal unsightly views.

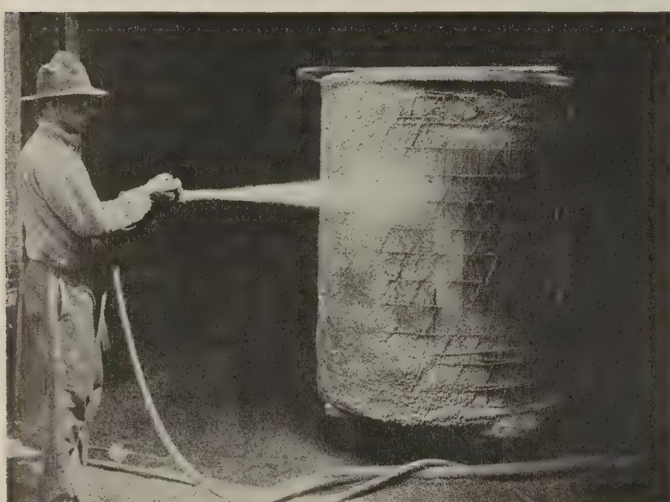
"Avoid straight lines. A straight line approach is stupid and uninteresting.

"Beds of ornamental flowers should be placed near the border of the lawn, in front of the shrubbery, and not placed so as to cut up the lawn and leave unsightly holes through the winter months. The use of hardy perennials obviates the expense and trouble of repairing beds annually. Flowers grown for cut flowers should be in a garden where they can be cultivated."

Sewage Disposal for Country Homes and Schools

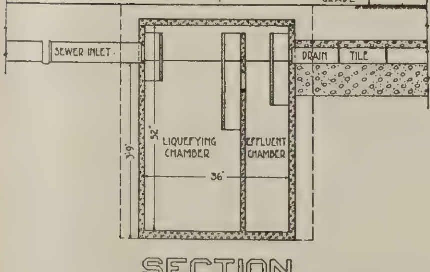
Ready-Made Septic Tanks in Both Clay and Concrete are Now Regular Articles of Commerce

NOWADAYS every one wants running water and a bath room, whether they live in the city, the suburbs or the real country. Many cities grow faster than the sewers are extended and some sort of residential sewage disposal may be necessary in outlying parts, even though only as a temporary expedient. In the country it may be possible to lead the sewage away from the house into a nearby large stream without treatment, but ssuch a case is a rare exception.



Making reinforced "Sanisep" tanks with cement gun

"Sanisep" tanks completed and crated for shipment



1. A "Sanisep concrete septic tank sufficient to accommodate seven users (dwelling house) with one bath, lavatory, toilet and equivalent sanitary plumbing

For years the only way to have water closets and other toilet facilities in a house which had no sewer connection was to pipe the sewage and waste water to a cesspool. Cesspools are of two types, those laid up with open-jointed walls and those laid up with tight joints, or waterproof walls of concrete.

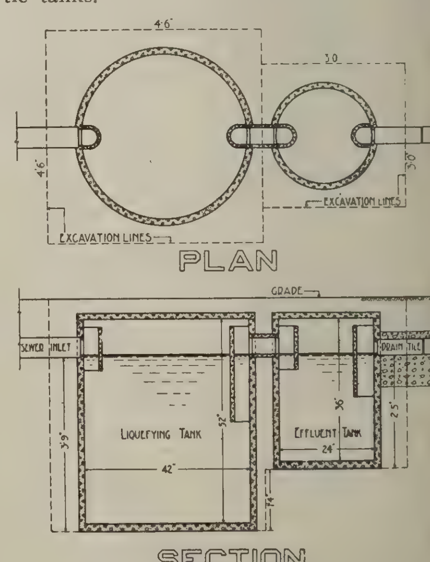
The open-jointed cesspool is designed to allow the water and sewage to seep out into the surrounding soil. The tight cesspool is designed to be pumped out regularly and its contents disposed of.

Cesspools Out-of-Date

Either type of cesspool is a nuisance and both are universally considered out of date. Septic tanks are almost as simple in construction and properly designed and installed discharge an effluent, or waste, that does not constitute a nuisance even when discharged into brooks or streams, provided the water is not used for drinking purposes.

A simple septic tank is nothing but a modified cesspool of the water-tight variety. The first residential septic tank, indeed, came from observing the operation of a tight cesspool. This cesspool was of extra large size and when it started to overflow an investigation of its contents was made and it was found that there was little or no solid matter. The overflow was practically clear water.

The action of bacteria (microbes) in decomposing sewage had long been known, but it was not realized up to that time that this could be made use of for treatment of residential sewage on a small scale. The subject has now been fully investigated by the United States Public Health Service, Treasury Department, and the Department of Agriculture, Washington, D. C., both of which have issued booklets describing the method of constructing these small septic tanks.



2. A "Sanisep" concrete septic tank for a large home, school or boarding house with capacity for sewage of 12 to 18 persons; or the sewage of two or three flow drain, to insure regular discharge of effluent when water reaches a certain elevation

Principle of the Septic Tank

All sewage is alive with bacteria, or microbes, and if the sewage is held in a tight receptacle long enough certain ones of these bacteria act to decompose or "rot" the solid matter in the sewage.

The more concentrated the sewage, that is the more solid matter, the better the bacterial action. Hence it is better not to discharge bath water in with the water closet waste, although many do this successfully. Greasy, soap water from kitchen and laundry drains should never be discharged into the septic tank because alkali in the soap and the insoluble greases prevent the bacteria from developing in the sewage, and do not allow the septic tank to operate as it is intended to.

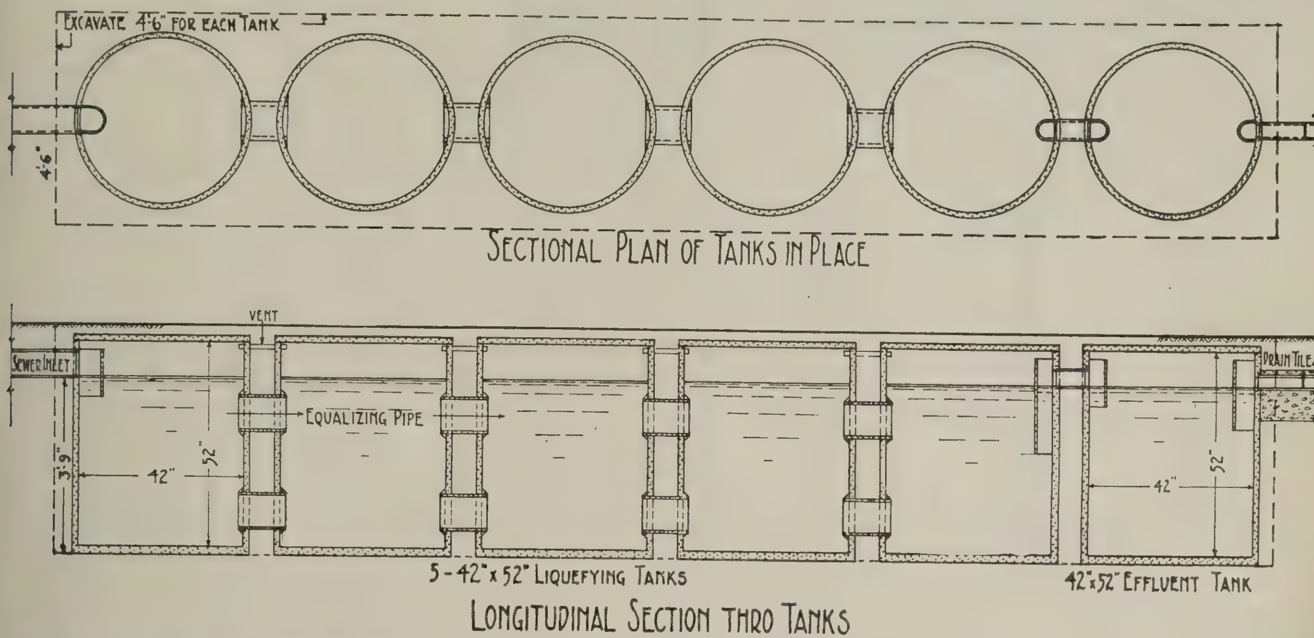
Bath water, sink and laundry wastes, not being offensive, may be discharged into the drainage system on the outflow of the septic tank, thus by-passing the tank proper.

Ready-Made Septic Tanks

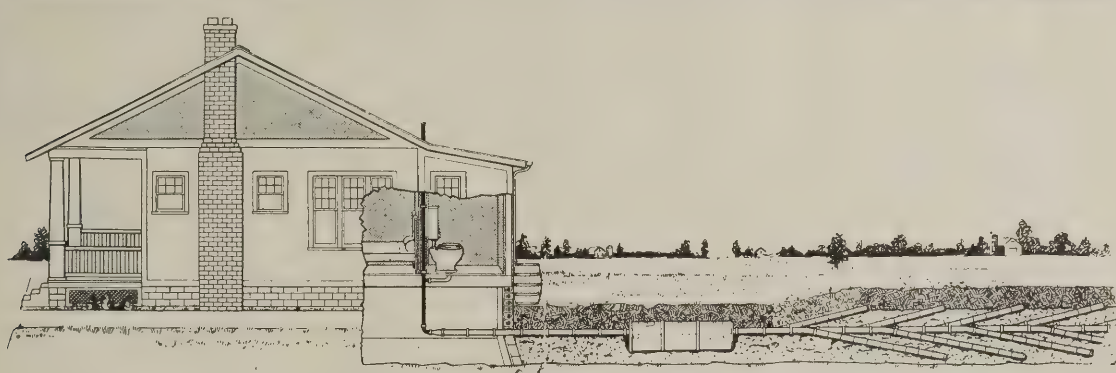
While the principle of a septic tank is simple and any contractor could build one of his own design, there are a number of ready-made ones on the market, which have improved and patented features, and there is no more reason why a builder should spend his time designing and building a septic tank than there is in his making his own sewer pipe.

These ready-made septic tanks are built with two or more compartments so that the bacterial action will be more thorough and there will be no chance of the sewage solids floating into the effluent, or overflow, before they are digested or rotted.

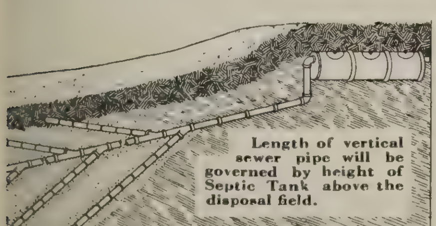
The size, of course, depends on the number of persons using the toilet facilities. Usually 5 cu. ft. of tank space is allowed for each person using the facilities. The tanks should be deep and of small diameter rather than broad and shallow. The accompanying illustrations show both clay and concrete septic tanks which may be purchased as readily as ordinary sewer pipe in most parts of the country.



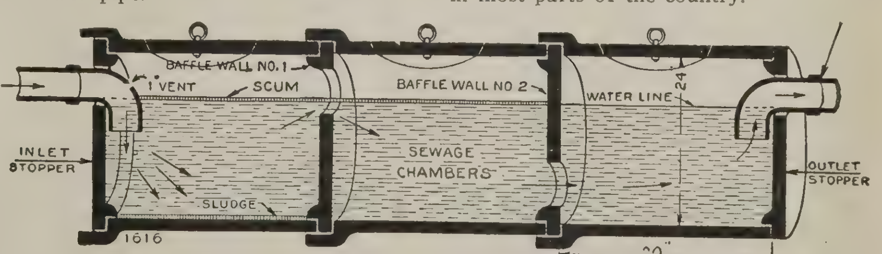
3. A battery of "Sanisep" concrete septic tanks for country hotels, hospitals schools, factories, etc.; six 42x52-in. liquefying tanks and one 42x52-in. effluent tank accommodate from 100 to 200 persons (100 in dwellings, 200 in day schools)



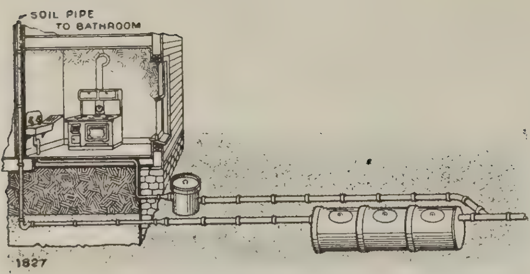
4. Method of installing a "Dickey" vitrified-clay septic tank for a small dwelling



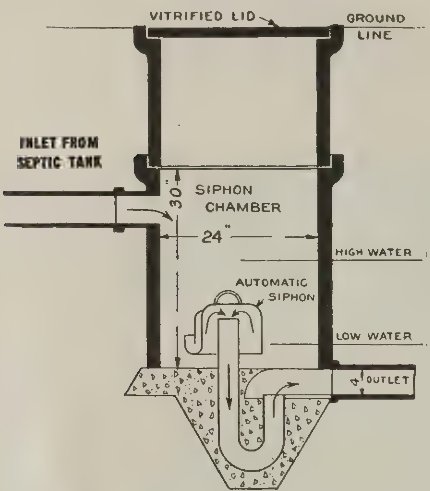
Method of disposal of the effluent or overflow of a septic tank



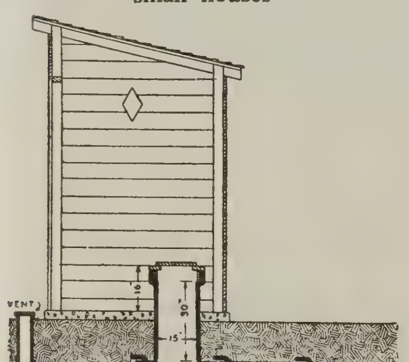
6. Details of a "Dickey" vitrified-clay septic tank with three chambers, each made of a 30-in. section of 24-in. vitrified sewer pipe with special patented features



7. Method of taking care of kitchen and laundry waste



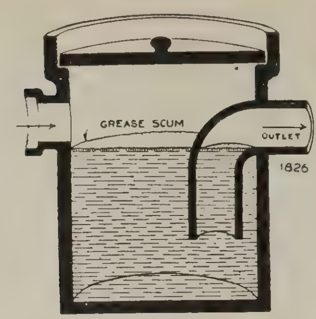
9. Syphon between septic tank and over-small houses



10. A "Dickey" vitrified-clay septic tank used with an outdoor privy

These illustrations show the method of connecting the tanks with the house drains and the essential construction details for the overflow disposal. The effluent or overflow may be piped off to a stream or water course, or allowed to soak into the soil. This effluent is not purified unless filtered through sand after leaving the tank and therefore must not be allowed to get into wells or drinking water.

Keep Catalogues on File—If you have no system in keeping your catalogues for ready reference it will pay you to start one. A simple way is to number them and have a reference index.



8. Grease trap made to go with a "Dickey" septic tank installation on kitchen sink waste

Preparation of Lime Putty

The following directions for slacking and preparing lime putty for use are taken from the tentative specifications of the American Society for Testing Materials as contained in the report of the Committee on Lime for 1921:

Introduction—Different kinds of lime vary considerably in the way in which they behave with water. A little supervision over the operation of slaking will amply pay for itself by insuring the production of the greatest possible quantity and the best possible quality of putty. To find out how to slake a new lot of lime, it is safest to try a little of it and see how it works. Since different lots of the same brand of lime vary somewhat, and since the weather conditions at the time have a decided influence, it is wise to try a sample from each lot used, whether familiar with the brand or not.

Classification of Limes—In a bucket, put two or three lumps of lime about the size of one's fist, or, in the case of granular lime, an equivalent amount. Add enough water to just barely cover the lime, and not how long it takes for slaking to begin. Slaking has begun when pieces split off from the lumps or when the lumps crumble. When warm water is used the slaking is accelerated.

If slaking begins in less than five minutes the lime is quick slaking; from five to thirty minutes, medium slaking; over thirty minutes, slow slaking.

Directions for Slaking—For quick-slaking lime, always add the lime to the water, not the water to the lime. Have enough water at first to cover all the lime completely. Have a plentiful supply of water available for immediate use—a hose throwing a good stream, if possible. Watch the lime constantly. At the slightest appearance of escaping steam, hoe thoroughly and quickly, and add enough water to stop the steaming. Do not be afraid of using too much water with this kind of lime.

For medium slaking lime, add the water to the lime. Add enough water so that the lime is about half submerged. Hoe occasionally if steam starts to escape. Add a little water now and then if necessary to prevent the putty from becoming dry and crumbly. Be careful not to add any more water than required, and not too much at a time.

For slow slaking lime, add enough water to the lime to moisten it thoroughly. Let it alone until the reaction has started. Cautiously add more water, a little at a time, taking care that the mass is not cooled by the fresh water. Do not hoe until the slaking is practically complete. If the weather is very cold, it is preferable to use hot water but if this is not available, the mortar box may be covered in some way to keep the heat in.

White Coat—After the action has ceased, run off the putty through a No. 10 sieve and store for a minimum of two weeks.

Base Coats—After the action has ceased, run off the putty through a No. 8 sieve. Add sand up to equal parts by weight, all of the hair required, and store for a minimum of two weeks.

Masons' Mortar—After the action has ceased, add part or all of the sand required, and store for a minimum of 24 hours.

Painting Iron and Steel Surfaces

FACTS regarding the painting of iron and steel of value to builders and contractors have been developed by a committee of the American Society of Testing Materials from an elaborate series of field tests. The following important points have been developed:

1. The thorough methods of preparation, *i.e.*, sand blasting and pickling, show no superiority over ordinary methods of removing loose scale, rust and dirt by scraping, brushing and wiping. This applies to both new steel and old steel which has been in service.

2. Weathering to permit loosening and partial removing of mill scale before painting is inimical to preservation.

3. Painting in a cold dry atmosphere gives results as good as in warm dry atmosphere, or on heated steel. (This may be due to the greater thickness of coatings applied in the cold atmosphere.)

4. The preparation of old painted steel surfaces which have bare rusted spots, by brush coating with benzine over and around the rust spots, burning the benzine off and then scraping and wire brushing, gives better results than scraping and wire brushing without the benzine treatment, and better results than sand blasting.

5. There is no difference observable in the results of the application of the same methods to old and to new steel.

How Do You File the Data on Jobs You Have Completed?—The information you want about jobs you have completed some years ago may be wanted for use or another similar job. How do you take care of that contingency?

Finishing Interior Wood Trim

By A. H. Burt

An Interesting Discussion of Materials and Methods

THE interior trim of a residence might be likened to the frame of a picture. Either can greatly enhance the beauty of the effect, or can seriously detract from it. For this reason the selection of the type of finish to be used on interior trim is of major importance. The unwise selection of but one material entering into the finishing, such as stain, can ruin the whole effect. Knowledge of the peculiarities of materials used in interior finishing is therefore equally as important as knowledge of finishing methods.

There are three popular methods used today in finishing the interior trim of residences. These finishes are the stained and varnished finish, the stained and waxed finish and the enamel finish. The first two finishes can be used to advantage on any kind of wood, whereas the enamel finish is very seldom used on anything but close-grain woods. In considering the finishing of interior trim, it is best for the purpose of discussion to divide the woods into two classes, namely, open-grain woods and close-grain woods. A list of the woods used for interior trim in this country is given below, divided into the two classifications:

Open-Grain	*Close-Grain*
Ash	Bass wood
Butternut	Beach
Chestnut	Birch
Elm	Cedar
Mahogany	Cherry
Oak	Cypress
Rosewood	Fir (Oregon Pine)
Walnut	Gum
	Holly
	Maple
	Pine
	Poplar
	Redwood
	Spruce
	Sycamore
	White wood

The first step in the finishing of interior trim with stain and varnish is to be sure that the surface to be finished is in proper condition—that it is dry, sanded smooth and clean and free from stains. Stains on the trim can usually be removed by sanding, although in the case of grease, stains can be removed more easily with benzine or benzole, while paint spots are best removed with turpentine and then sanding. The next step after the trim is in condition for finishing, is the application of a stain.

Stains can be grouped under three classifications: acid, oil and spirit (penetrating). Each of these three classes of stains has a use for which it is particularly adapted, and under certain conditions will produce a more satisfactory effect than either of the other two stains.

Acid stains are stains made with water soluble dyes, and have water for their vehicle. This type of stain raises the grain of the wood, which makes it necessary to take more pains in the finishing where this type of stain is used. Where acid stains are to be used, most finishers will sponge the surface of the wood to be finished with clear, cold water, in order to raise the grain. When dry the wood is sanded, then when the acid stain is applied, there is little or no tendency to raise the grain. This extra operation in sponging and sanding the wood adds to the cost of the finishing, and in some cases it is not justified, due to the fact that just as attractive effects can be secured with the other types of stains. Due to their tendency to raise the grain of the wood, acid stains are seldom used with any degree of satisfaction for the finishing of soft woods.

Acid stains would not be popular if it were not for the fact that they have certain advantages which offset their disadvantages. For example, red mahogany acid stains are almost invariably more fast to light than the red mahogany stains which are found in the oil stain or spirit stain groups. This makes it a distinct advantage to use this type of stain for the finishing of surfaces which are to be subjected to strong sunlight, such as exterior doors and the trim in show windows.

Oil stains are made with oils as a vehicle. These stains are ideal for soft woods, but hardly suitable for hard woods, where deep stained effects are desired, due to the lack of penetrating power of this type of stain. Oil stains do not raise the grain of the wood, and in their way are a preservative to the wood itself. They are very slow in drying, and the surface stained with oil stains is almost invariably wiped with a soft cloth about 30 minutes after the stain has been applied, due to the fact that there is usually a presence of pigment which has not been dissolved into the vehicle, which remains on the surface of the wood. If the surface were not wiped, a clear-cut stained effect could not be secured. Fully 24 hours should be allowed for the drying of oil stains before subsequent coats are applied.

Spirit stains, or so-called penetrating stains, are made from spirit soluble dyes. The vehicle in the stain is of the spirit type, frequently alcohol. Spirit stains can be used for finishing all kinds of woods, although the best effects are secured on hard woods—soft woods being more porous, take a darker effect. Spirit stains will not raise the grain of the wood, but differ from oil stains in that it is necessary to "seal" them into the wood with shellac in order to prevent them from "bleeding" into the subsequent coats of varnish, and impairing the drying qualities thereof.

Generally speaking, spirit stains are the most popular of any of the three types of stains. The colors of this type of stain are generally the richest. About the only difficulty experienced with spirit stains is that some of the red mahogany shades are not entirely permanent.

The next step in the finishing of the trim differs in the case of open-grain woods and close-grain woods. In both cases, however, all nail-holes and cracks in the wood are filled to a level surface with pure lead and oil putty tinted to match the finish. On close-grain woods, the next operation is the application of a thin coat of shellac—white or orange, depending upon the color of the stain. In the case of open-grain woods, the next operation after staining is the filling of the pores of the wood with paste filler. Fillers are applied in order to fill the pores of the wood, and bring them to a level surface, so that the subsequent coats will not sink into the pores of the wood, and produce an uneven effect. Where paste filler is omitted, a coat of shellac and a coat of flat drying varnish is usually applied to produce a so-called "mission" effect.

Paste fillers come in paste form and are reduced with benzine to the consistency of cream by the finisher, and then applied with a brush. The filler is allowed 30 minutes to "set up," or to dry out, and then is wiped off across the grain of the wood with burlap or excelsior, leaving the pores packed with this material. The wiping off of the paste filler tends to scour the surface of the wood, and bring out beautiful highlights in the wood. Since paste fillers are sold in various colors, they are sometimes used alone without stains for producing delicate stained effects on open-grain woods.

In selecting paste fillers, it is greatly to be desired that nothing but the best quality Silex filler be purchased, because a great part of the unsatisfactory finishing results are due to the use of cheap paste fillers, which either swell and cause little ridges to appear in the finished surface, or shrink and cause the varnish coats to sink into the pores after them. Unsatisfactory results are also sometimes secured with high quality fillers, due to the fact that sufficient time is not permitted for drying. Where possible, it is desirable that a period of 48 hours be allowed between the application of the paste filler, and the application of the subsequent finishing coat.

As stated before, a coat of shellac is the next coat to follow the stain on close-grain woods, while on open-grain woods paste filler is applied after the stain, and the shellac coat follows the paste filler. Expert finishers maintain that the shellac coat should be as thin in consistency as it is possible to have it, and yet serve to seal the wood thoroughly. The reason for this is that shellac is quite brittle, and differs of the varnish coat which follows it.

The number of coats of varnish which are to be used, depends entirely upon the quality of finish desired. On the cheaper grade of work, one coat is usually all that is applied after the shellac coat. One coat, however, does not admit of satisfactory rubbing to a dull finish, hence where but one coat of varnish is to be used, and a dull finish is desired, it is best to use a special flat-drying varnish, which produces an imitation rubbed effect, of which there are several satisfactory brands on the market. While in the better class of finishing, three coats of varnish are sometimes used, it is pumice stone rubs down the gloss. Rubbing oils are preferred by some finishers, due to the fact that one does not have to be so careful about rubbing through the varnish coats down into the finish. Where rubbing oils are used, it is desirable to use either pure linseed oil or a high grade of rubbing oil.

The method of building up a waxed finish is similar to that of the varnished finish. Due to the fact that wax dries almost immediately after application, it requires a shorter period of time for finishing. The varnished finish is more durable and is probably more popular for this reason.

The selection of the right type of finish for interior trim is of major importance

greatly in elasticity from the finishing coats of varnish which follow it. If a *heavy* coat of shellac is applied, one has a brittle foundation for the varnish, which means that the finish will mar easily, because while the varnish may be tough, the shellac which is under it will splinter and powder, if the finish is subjected to a knock or a blow, resulting in an ugly effect in the finish, and making it appear as if the varnish itself is at fault. When thoroughly dry, the shellac coat should be sanded with No. ½ sandpaper, in order to "knock off" the gloss and rough spots, and to expedite the taking hold the writer's personal experience that two coats of varnish will produce a high class and satisfactory finish. Where two coats of varnish are employed, sufficient time should be allowed for drying between coats, and the first coat of varnish should be lightly sanded when dry with No. 00 sandpaper to "knock off" the gloss.

The dull-rubbed finish is the popular finish today. This effect is secured by rubbing the final coat of varnish, when sufficiently hard, with powdered pumice stone and water, or oil. The water tends to harden the varnish, while the powdered

Where a waxed finish is desired, wax coats may be substituted for the varnish coats. The finish should be built up for this type of finish in the same manner as it is built up for the varnish finish, up to and including the coat of shellac. Two coats of wax should be applied for a high quality of waxed finish. A high grade, prepared paste wax is generally used, and is applied with a soft cloth. The surplus wax should be removed and about ½ hour allowed for drying, after which the surface should be polished by briskly rubbing with a brush of the stiffness of a shoe-brush, finishing with soft cloths. The brisk rubbing hardens the wax, and gives it its polish. This same operation should be repeated for the second coat of wax.

There is one other slight advantage that prepared waxes have over varnishes. This occurs where it is desired to finish the interior trim in a room where the temperature is below 50°F. Varnishes are very sensitive to the cold, and many times unsatisfactory results in finishing are due to the application of varnishes in a room where the temperature is low. Best results are secured when finishing with varnish where the room temperature is approximately 70°F. Waxes are not affected by the degree of temperature of the room. Just as satisfactory results are secured at 45°F. as at 70°F.

In cold weather varnishes should always be stored in a warm place to prevent them from becoming "chilled." Where chilled varnish is brought from a cold storage room into the room to be finished, and not allowed to become warmed to the temperature of the room, the finish will appear to be full of tiny specks or particles of dirt. This is due to the fact that when the varnish becomes chilled, the oil in it congeals. For this reason the finisher should be careful to watch the temperature of his varnish quite as carefully as he does the temperature of the room when he starts in to finish the interior trim on a cold day.

Care should be taken to eliminate drafts as far as possible in rooms in which varnish is drying, as drafts and changes in the atmospheric condition during the drying of the varnish sometimes causes "pitting," or "pin holing." In a case of this kind, the finish appears to be full of tiny holes as if it had been pricked with a pin, and the resulting effect is far from attractive. Pitting can also be traced occasionally to the use of inferior paste fillers, or to the improper thinning of varnish.

When speaking of varnish "deviltries," it might be well to mention the matter of "deadening" of a varnish finish. The term "deadened" is applied to a finish from which the life or gloss of the varnish has disappeared. The cause of this is usually that sufficient time for drying has not been allowed between coats, although this deadening sometimes is due to the fact that the finisher has endeavored to secure a finish with an insufficient number of coats. One of the most important points in finishing is to allow sufficient time for each coat to dry. Give the stain, filler and each coat of varnish time to dry, then you will have a good start in itself toward a satisfactory finish.

What Is "Kalamein"?

A contractor and builder in Kentucky writes that he has a contract in which the specifications call for kalamein doors "covered with kalamein metal." He says that architects and manufacturers are unanimous in stating that "kalamein" refers merely to a type of door covered with sheet metal. The American Rolling Mill, the Cambria or Carnegie companies, or any other source cannot give information where "kalamein metal" can be obtained. The Century Dictionary says: "Kalamein: A compound of tin, antimony, bismuth, lead and nickel, used in the manufacture of a particular form of galvanized iron." The term "kalamein" has under various spellings come to be known in the trade as a wood core covered with sheet metal. The manufacture of these is a special industry. See Sweet's catalogue.

Strength of Screw Fastenings in Plywood

If the screw fastenings in plywood construction are to be as strong as the plywood itself, it is important to adapt the size of screw, spacing, and margin to the particular species and thickness of plywood used. Tests made at the Forest Products Laboratory have shown that the commonly used plywood species may be divided into the following groups, all woods in any one group requiring the same screw fastening to develop maximum strength use with each species and plywood thickness will be found in the following table. The gauge is the smallest that can be used with the thickness specified and not cause failure through breaking of the screw when the full strength of the plywood is developed. The length of screw is the shortest which will prevent the screw from pulling out before the full plywood strength is reached. The margin is the smallest distance from edge of hole to edge of plywood which will insure against failure by shear. The spacing is the distance from center of screw holes which gave maximum strength per linear inch.

Size and Spacing of Screws for Maximum Strength in Plywood

Species of Plywood	Thickness of Plywood in Inches	Gauge (Number) of Screw	Screw Length in Ins. Species Receiving Point: White Ash	Screw Length in Ins. Species Receiving Point: Spruce	Margin in Inches	Spacing in Inches
	3/30	4	1/2	5/8	1/2	3/8
	3/24	5	1/2	5/8	5/8	1/2
	3/20	6	5/8	3/4	5/8	1/2
GROUP I	3/16	7	5/8	3/4	5/8	5/8
	3/10	9	3/4	1	3/4	3/4
	3/8	11	1	1 1/4	3/4	3/4
	3/30	5	1/2	5/8	1/2	1/2
	3/24	6	5/8	3/4	5/8	1/2
	3/20	7	3/4	7/8	5/8	5/8
GROUP II	3/16	8	7/8	1	5/8	3/4
	3/10	10	1	1 1/4	3/4	3/4
	3/8	12	1 1/4	1 1/2	3/4	7/8
	3/30	6	5/8	3/4	1/2	1/2
	3/24	7	3/4	1	5/8	5/8
	3/20	8	1	1 1/4	5/8	3/4
GROUP III	3/16	9	1 1/4	1 1/2	5/8	3/4
	3/10	11	1 1/2	1 3/4	3/4	7/8
	3/8	13	1 3/4	2	3/4	1

GROUP I
Low Density

Basswood	Hemlock
Cedar, Spanish	Pine, sugar
Cottonwood	Pine, white
Cypress, bald	Poplar, yellow
Douglas fir	Redwood
Fir, true	Spruce, Sitka

GROUP II
Medium Density

Ash, black	Hackberry
Ash, pumpkin	Magnolia
Elm, white	Mahogany
Gum, black	Maple, soft
Gum, cotton	Sycamore
Gum, red	Walnut, black

GROUP III
High Density

Ash, white	Cherry, black
Beech	Elm, cork
Birch	Maple, hard

The screw sizes, margin and spacing for

About equally good results were obtained with flat-headed screws without washers and round-headed screws with washers. Round-headed screws without washers proved an inferior means of fastening. The spacing given in the table is for screws in a single row, but staggering is recommended wherever possible.

In the tests the size of frame members to which the plywood might be attached was necessarily a secondary consideration, and the block of wood in which the screw points were held was simply made large enough to prevent failure occuring in it. Until further information is obtained, designers must take particular care that the frame is not split or weakened through the use of the size of screw and the spacing necessary to make the fastening as strong as the plywood.

The Versatile Stave

SIXTEEN years ago when Sterling T. Playford was running a general carpenter shop in Cassopolis, Mich., the demand for concrete stock tanks on surrounding farms became so brisk that Mr. Playford was kept busy building tank forms. Soon he found it more profitable to keep on hand a few stock forms for rental and reuse, but the demand was for a considerable range of sizes and obviously there was a limit to the number of forms he could keep on hand. Mr. Playford used to ponder on the problem over his school books at night, for the restless ambition which

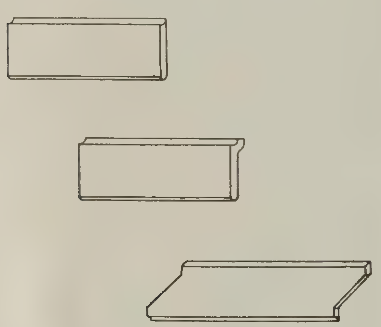


Fig. 1. Three of the most commonly used types of concrete staves are shown in the above diagram. All are laid up in practically the same manner without mortar, as explained in the accompanying article

impelled him to seek a schooling by correspondence also told him that there was a way out of his tank form difficulty.

One evening he set his books up in a circle so that the convex edge of one fit into the concave edge of the next and presently found that he had solved his tank problem by building the tank of a number of concrete book tile or staves. He soon found that it was possible to successfully build tanks of many diameters with staves of one size and he immediately commenced manufacturing the units, which he sold to the farmers at 30 cents each with necessary hoops and directions for building the entire tank including laying of the floor. Shortly thereafter Mr. Playford built a small silo of this construction which, while entirely satisfactory, was so simple and so economical in cost that it thoroughly demonstrated the possibilities of the concrete stave for silo construction.

From that small beginning the concrete stave industry has grown until today there are in operation from New York to California 250 factories specializing in the manufacture of staves with an output of 10 to 800 silos per plant, in addition to other classes of work built of staves. Since Mr. Playford's original patent, he and others have brought out many refinements in the units, so that at the present time some eight or ten slightly different designs of staves are in use. So far as the principal types are concerned, one is about as good as another. Figure 1 shows the three most common shapes of staves.

The early concrete stave plants were so busy collaring the silo business that for

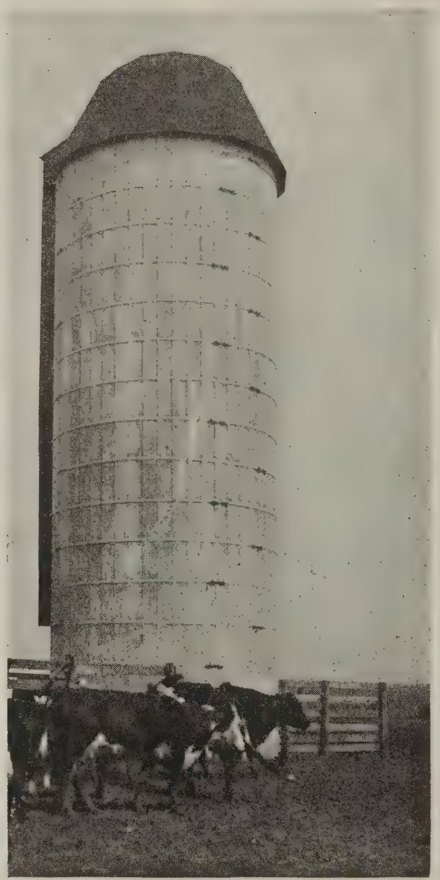


Fig. 2. Typical concrete stave silo, on the farm of J. G. Fuller, Oxford, Ind., constructed of interlocking staves and banded with galvanized hoops. Height 40 feet, diameter 14 feet, 720 staves required

several years they remained serenely indifferent to the obvious possibilities of this construction for use as circular containers of almost all kinds. In those days it meant hard work and no profit to get a silo contract away from a competing type; today there is undoubtedly a larger business being done in concrete stave silos than in any other type. So after several years devoted in breaking into the silo business, the concrete stave finally appeared two or three years ago as the formidable competitor of other types of construction for grain tanks, corn cribs, coal pockets, water tanks, cement, sand, phosphate and other bins, barns, small farm buildings and other rectangular buildings and walls of enclosures.

The Stave an Interesting Unit

The concrete stave is an interesting unit. The length is 30 inches in most systems, and in others 28 to 32 inches. The width is usually 12 inches, but in one system it is 14 inches. The thickness is 2¼ inches except in the ribbed type of stave, where it is 1⅞ inches. The more common types all weigh in the neighborhood of 72 pounds. Because of the relatively sharp concave edges, the mixtures used are necessarily restricted to particles of small size, very few if any particles over ⅜ inch in diameter being used. One part cement to 3 or 3½ parts of mixed sand aggregate usually comprises the mixture. The aggregate frequently consists of clean, well-graded concrete sand, to which 1/3 to ½ volume of fine plaster sand is added as required to produce sharp corners. For this purpose an excess of fine particles is required. Thirty to 32 staves are made from each barrel (4 sacks) of cement. Staves are made both with hand and power tamping machines and in wet-mix molds. An average size silo takes around 800 staves and many stave yards at the opening of the season contain stocks of 50,000 to 100,000 staves.

How the Silos Are Erected

When the farmer buys a concrete stave silo, he contracts for the structure complete with the exception of hauling the staves from the nearest railway station. When he pays for his silo, he gets a guarantee which covers erection and workmanship as well as material, and takes care of workmen's liability insurance. A substantial foundation of monolithic concrete ex-

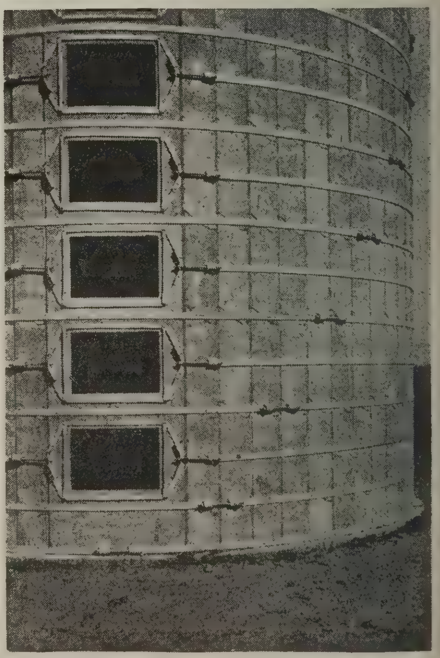


Fig. 3. Detail showing "double hooping" and steel spreader frames at the door openings, in a large concrete stave silo

Fig. 4. A tall concrete stave silo on an Iowa farm. These silos are built to a height of 65 feet with a capacity as great as 300 tons of corn silage

tends from a point below frost to the approximate grade line. Whole and half staves are set up alternately in a slight groove in the top of the base, and reinforcing bands placed loosely around, then

Fig. 5. Concrete stave crib for ear corn storage at the left and grain tank at the right. The mechanical conveying equipment is housed in the little cupola above. A decidedly practical equipment for the moderate sized grain farm in the corn belt

tightened until the staves take a vertical position.

The staves are laid up without mortar, successive courses being laid up identically like the first. Greatest care must be exercised in getting the first few courses exactly perpendicular, as deviations in the lower courses are magnified greatly higher up. Reinforcing bands are of such size that the required strength is obtained when the bands are a stave length (usually 30 inches) apart, as shown in Figure 2. On very tall or very broad silos the bands are often placed one-half stave length apart, as shown in Figure 3. The bands are most commonly of round steel rod heavily coated with asphaltum, or flat bands heavily galvanized.

After the staves are all set up the interior is treated first by moistening and then

Fig. 6. Grain elevator at Washington, Ind., which has four concrete stave grain tanks, subdivided by means of plank partitions in several bins each. The owners. Elmer Keith and Co., have found concrete stave tanks satisfactory in every way for the storage of grain

by painting with a thick creamy wash of cement and water to which has been added a small quantity of alum. The wash fills and seals all small openings on the interior surface and produces a very smooth, flinty covering. Inspections of silos in use 13 years show this covering to be in perfect condition.

Concrete Stave Corn Cribs

Throughout the corn belt the very large demand for ear corn storage which is proof against fire, decay and rodents, has led to the recent introduction of several types of concrete stave corn cribs. The primary necessity of storage for corn on the ear is ventilation. This is provided by means of openings through the staves, so shaped and arranged that the corn cannot get out and rain cannot get in. A few lower courses of staves have heavy screening in the openings to keep out rats and other rodents. The staves are laid up in identically the same manner as silo staves. Figure 5 shows a very successful type of corn crib under the same roof as the grain tank. Notice

Fig. 8. Type of chute used with concrete stave coal pockets showing dust screen and counterbalanced spout

Fig. 7. Coal handling and storage installation of the Haskell Coal Co. of Cedar Rapids, Iowa, which includes three large concrete stave tanks. The four trucks of the company can be loaded simultaneously at the rate of a ton a minute each, at a fraction of a cent per ton

Fig. 9. A concrete stave barn in North Dakota with double stave walls. One of thirty barns of this type built last year by the Valley Silo Co., Fargo, N. D.

that the last two courses in the crib are made with regulation silo staves.

Grain Tanks

Figure 6 shows an installation of four concrete stave grain tanks in connection with a country elevator. These tanks are constructed in the same manner as silos, with reinforcing bands adjusted to give the required resistance to the pressure of loose grain. Openings are made as required for the grain chutes and clean-outs, special staves and frames being cast for this purpose.

Silos for the Storage of Coal

Tremendous increases in the cost of coal during recent years and consequent reduction of the domestic consumption have made serious inroads in retail coal dealers' profits. The only possible way for the retail merchant to keep even is to reduce the cost of handling the product from the railway car to the customer's bin. The concrete coal pocket offers a quick solution at a cost so low that any dealer handling 3,000 tons or more per season cannot afford to be without one. Equipped with a mechanical conveyor, one man can unload a car of coal in an hour, at a cost of 2 or 3 cents per ton, and can unload 5 tons in 5 minutes in each of as many as 5 trucks at the same time. This means a lot when labor is scarce and expensive.

Coal is protected against fire and deterioration; labor of loading and unloading is reduced; speed of unloading and loading is increased several hundred per cent; lost time in loading of trucks or teams is practically eliminated, and the volume of business which can be done on a given space is very much increased. Owners of these pockets say they effect a saving of 50 to 60 cents a ton in handling alone and that the speed and ease with which customers can get their own coal by simply driving up to the pocket greatly attracts this class of trade.

The coal pocket is constructed in the same manner as the silo, having no openings, however, except the one or more in each tank through which the coal is chuted into the wagon or truck. Each tank may be divided into several vertical bins, usually by plank partitions. The pocket often has a flat concrete floor at grade, filling with coal from that point. Coal too low to flow into trucks by gravity is kept in reserve. Other pockets have elevated hopper floors, which are convenient but do not make use of the space between grade and hopper floor. The device used at the hopper opening is clearly shown in Figure 8.

Rectangular Wall Construction With Staves

Rectangular wall construction with concrete staves is also quite a recent development, but demonstrated sufficiently to prove its feasibility for a wide variety of strucural purposes. The principle is simply to weave the staves in between small slotted reinforced columns which are either made in the factory or cast in place, sealing up around the slots with mortar. Figures 9 to 13 show typical farm construction made with ribbed staves. The interior of these walls is quite smooth and satisfactory for general purposes without plastering. For factories and residences, sometimes for barns, the upright members are double-slotted and two rows of staves are used, these being produced with rough surfaces to take plaster on the inside and stucco on the outside. The double stave wall has very high heat insulation value.

Fig. 10. Concrete stave hog house built of ribbed staves and cast-in-place columns. A quickly erected although permanent improvement on an Illinois farm

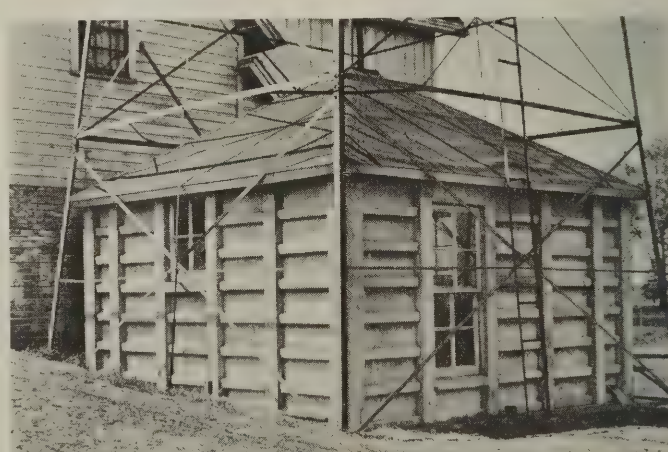


Fig. 11. Milk cooling house of construction described in accompanying article. Notice the use of half staves on the near side of the house. Every dairy farm is a potential market for a milk house and several other small buildings

Fig. 12. Poultry house with walls entirely of concrete staves. A coat of cement plaster on the inside insures a dry interior. Erected by S. T. Playford, inventor of the original concrete stave

Fig. 13. Partitions in the piggery are made permanent and sanitary at a minimum of expense by the use of concrete staves

Advantages of Stave Construction to Contractor and Owner

One of the most obvious advantages of concrete stave construction is the saving of labor effected by its use and the speed with which a given job can be put up. Large silos are erected in 2 to 3 days as against one to two weeks for any other concrete or masonry type; this makes a strong appeal to the farmer's wife who dislikes to feed and perhaps shelter a gang of silo laborers for a number of days. A single silo erecting crew will erect 25 silos in the season with reasonably good luck as to weather and lineup of jobs. For a small rectangular building such as shown in Figure 11, the first day's work completes the footings, erection of column molds and filling of column molds; the second day's work (with one day intervening in reasonably warm weather) the staves are put in, column forms removed, column surfaces rubbed and painted and all pointing attended to. The building of the roof and the setting and fitting of windows and doors remain to complete the structure.

Quick completion of work means quick pay for the contractor and freedom from the necessity of keeping large sums tied up through extended periods. These are important considerations, but hardly more important than the advantages which the concrete stave contractor has if he will make the bulk of his staves during the winter when labor is more plentiful and material moves more freely, devoting most of the summer season to sales and erecting.

A Plan to Reduce the Time and Cost of Air Seasoning Wood

In co-operation with the sawmills and wood utilization plants throughout the country, the Forest Products Laboratory, Madison, Wisconsin, is organizing an extensive field study on the air seasoning of wood. This study, it is believed, will be of extreme interest to the lumber manufacturer and to the wood-using industries. The purpose is to determine the piling practice which will result in the fastest drying rates consistent with the least depreciation of stock, the least amount of required yard space, and the least handling costs. The study will be carried on concurrently on both hardwoods and softwoods. All the important commercial woods of the United States will eventually receive consideration.

The air seasoning of wood is an old practice. No systematic attempt has ever been made, however, to work out the exact conditions under which drying time and drying costs can be reduced to a minimum. It is not actually known which of the numberless methods of piling will give the quickest and the cheapest results under given climatic conditions. The new project will furnish a comparison of the effects of such piling variables as sticker heights, the spacings of boards in layers, the heights of pile foundations, and the directions of piling with relation to prevailing winds and yard alleyways.

The study is expected to decide whether from a business standpoint lumber should be dried partly at the mill and partly at the plant of utilization, or whether it should be completely dried at the mill. The data collected will also go a long way toward showing whether air seasoning or kiln drying is the more profitable.

A tentative working plan of the air seasoning study has been prepared by the Forest Products Laboratory, and copies are being sent to the secretaries of the various lumber and wood-using associations, state foresters, forest school heads, and others eminently qualified to comment on the plan.

Co-operation in the air seasoning study is being offered on every side. As yet the plants at which the work will actually be done have not been definitely chosen, but the extreme interest already manifested indicates that there will be no difficulty in securing co-operation with plants ideal for the study. Actual field work will soon be well under way.

A Short Contract Form

THIS AGREEMENT made the .... day of .... in the year Nineteen Hundred and .... by and between .... hereinafter called the Contractor, and .... hereinafter called the Owner, WITNESSETH, that the Contractor and the Owner for the considerations hereinafter named agree as follows:

ARTICLE 1. The Contractor agrees to provide all the materials and to perform all the work shown on the Drawings and described in the Specifications entitled The General Contract, excluding Heating, Plumbing, Wiring and Painting, prepared by ...., acting as, and in these Contract Documents entitled the Architect, and to do everything required by the General Conditions of the Contract, the Specifications and the Drawings.

ARTICLE 2. The Contractor agrees that the work under this Contract shall be substantially completed ....

....

ARTICLE 3. The Owner agrees to pay the Contractor in current funds for the performance of the Contract .... subject to additions and deductions as provided in the General Conditions of the Contract and to make payments on account thereof as provided therein, as follows: ....

....

ARTICLE 4. The Contractor and the Owner agree that the General Conditions of the Contract, the Specifications and the Drawings, together with this Agreement, form the Contract, and that they are as fully a part of the Contract as if hereto attached or herein repeated; and that the following is an exact enumeration of the Specifications and Drawings: ....

....

The Contractor and the Owner for themselves, their successors, executors, administrators and assigns, hereby agree to the full performance of the covenants herein contained and including the Standard Documents and General Conditions of the Contract issued by the American Institute of Architects.

IN WITNESS WHEREOF they have hereunto set their hands and seals, the day and year first above written.

In Presence of

....,
Contractor.

....,
Owner.

A Patio Dwelling in Wisconsin

TO those whose taste leans to the exotic in architecture the success attending the construction of a California patio residence in Northern Wisconsin as here described and illustrated will be interesting. This patio residence was built 10 years ago in Marinette, Wis., for Frank Laureman, and was ers inside the line of 12 columns supporting a handsome cornice to the skylight opening, of 18x24, having sash which slide on and off, and over the skylight a handsome awning is stretched tight. The awning sets up above the glass 3 feet, or high enough to allow the sun's rays to travel around it. feature of this dwelling and has been admired by hundreds as a most impressive and charming feature. The building is heated by steam and in such a way that the temperature reaches 70 and more on the coldest days in the winter with the roof covered with snow and ice.

Patio residence in Marinette, Wis.

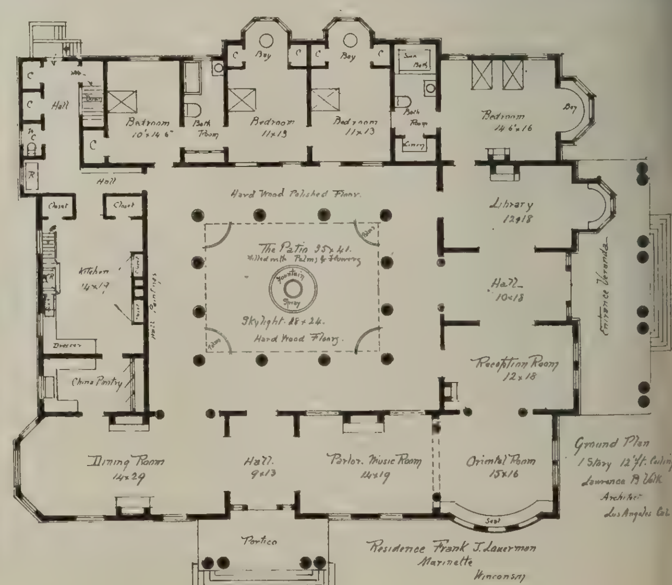
designed by Lawrence B. Valk, architect, Los Angeles, Calif., and the satisfaction of the owner is expressed in his assertion that if he had to build again he would duplicate his present home.

This building is frame, stucco, plastered outside and sits on a concrete foundation. The patio is 35x41 with fountain and flowThe rooms are all large as will be seen: Four bedrooms, two baths, large kitchen to large dining room, parlor and oriental room, library, with abundance of closets, all these rooms have 12-foot ceilings and above 3-foot space for ventilation.

All the main rooms open into the patio with glass doors. The patio is the leading

This dwelling exemplifies the accomplished fact of family comfort, in extreme cold weather, and flowers all in bloom all the year round. All the main rooms open to the patio—with glass doors with the result that all the rooms have a constant flow of fresh air all day and night. The cost of such a building depends on size and finish.

All the main rooms open on the patio



Announcements and Publications

Operating a Home Heating Plant, Bulletin No. 1194, of the United States Department of Agriculture, by A. M. Daniels, assistant mechanical engineer for the Bureau of Public Roads, discusses the requirements that should be met in order to heat the home satisfactorily. Advice is also given concerning the selection, installation and operation of home-heating plants.

Journal of the American Society of Heating and Ventilating Engineers of April, 1921, contains the official reports of the research laboratory at the United States Bureau of Mines on the subject of Heat Transmission Through Building Materials and Heat Loss from Buildings. Single copies of the Journal may be purchased for 35 cents.

Investigation of Warm-Air Furnaces and Heating Systems, by A. C. Willard, A. P. Kratz and V. S. Day, is the third of a series of bulletins on warm-air furnace research published by the Engineering Experiment Station of the University of Illinois, at Urbana. The principal objects of the investigation are briefly stated as follows: 1. To determine the efficiency and capacity of warm-air furnaces. 2. To determine satisfactory and simple methods for rating furnaces. 3. To determine methods for increasing the efficiency and capacity of furnace equipment. 4. To determine the heat losses and the value of insulating material. 5. To determine the proper size of leaders, stacks and registers. 6. To determine the friction losses in cold air or recirculating ducts, and their proper size and arrangement. 7. Eventually to make a study and comparison of outside and inside air circulation as affecting the economy and operation of furnace systems. The bulletin discusses the results obtained from these investigations. The discussions are made more clear by the use of tables, sketches and graphic charts. Copies of this Bulletin No. 120 may be had without charge by addressing the Engineering Experiment Station, Urbana, Ill.

Concrete Designers' Manual, by George A. Hool and Charles S. Whitney, is a practical, non-theoretical compilation of diagrams and tables for use in the design of reinforced concrete structures. For some time the authors have been preparing and using various tables and diagrams in their own practice with a view to obtaining the most complete and most valuable data possible for designing engineers and to putting these data in the most convenient form. The text is limited to explanations and specific illustrations where such are necessary. And the whole is in accordance with the Joint Committee Recommendations, the American Concrete Institute Recommendations, the New York Building Code Requirements, and the Chicago Building Code Requirements. Some of the tables and diagrams are of such a general nature, however, that they can be used when the designing rquirements are different from those mentioned. Among the subjects treated of are: Slabs, flat slabs, rectangular beams, doubly reinforced beams, T-beams, shear reinforcement, columns, bending and direct stress, footings. 276 pp., 6x9; 66 diagrams, 54 tables. $4.00 net, postpaid. McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York City.

Handbook of Construction Equipment, by Richard T. Dana, is offered to the public in place of a new edition of the author's "Handbook of Construction Plant." It is aimed to assist the contractor and engineer in the selection and application of the best methods in the least time, and contains in convenient alphabetical order complete cost data on every kind of construction equipment, with descriptions of the equipment and directions for its proper use. The costs are itemized so as to show materials, machines, tools, labor, repairs, depreciation, etc., separately. Comparisons of various methods are given and specific directions are included in many instances: Air compressors, blacksmith shop outfit, blueprint machines, cableways, cement apparatus, conveyors, dredges, engines, grading machines, hoists, horses and mules, machine shop outfit, paint spraying equipment, plant rental charges, road making equipment, sand blast machines, stone boats, stump pullers, surveying equipment, tents, tractors, wheelbarrows, winches. 849 pp. 4½x7. Flexible. 351 illustrations. $6.00 net, postpaid. McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York.

The Badger Concrete Mixer Company of Milwaukee and Watertown, Wis., announce the recent purchase of a 27½-acre tract at Winthrop Harbor, Ill., where they expect to erect the first unit of their new factory and have it equipped and ready for occupancy early this fall for the manufacture of Badger Concrete Mixers and Badger Pavers, and the McVicker tie plates for the Railway Safety Tie Company. A part of this tract will be utilized for houses for the workers and officers, which the company will build, and for a community park.

The Practical Book of Garden Architecture, by Phebe Westcott Humphreys, is a comprehensive book which has had for its inspiration not only years of art study by its author, but unusual opportunities for viewing intimately and painstakingly many rarely beautiful examples of the landscape gardener's art. While dealing almost entirely with large and elaborately planned estates, the book is full of practical and stimulating suggestions to anyone who has a bit of land to improve and the taste and will to take pains with it. The architect and designer will find interesting devices by means of which house and landscape may be made to harmonize more completely and with marked individuality, while the owner of the small farm or country estate, who is interested in developing and enhancing its natural beauties will find some delightful ideas, many of which can be carried out without undue expense. The author stresses particularly the beauties of the informal and irregularly planned garden which develops from the natural lay of the land, and with the aid of properly chosen and designed accessories, its character and charm. The book is profusely and beautifully illustrated. 328 pp. 7x9. 125 illustrations. Published by the J. B. Lippincott Company, Washington Square, Philadelphia. $7.50.

Carpentry for Beginners, by William Fairham, has a four-fold aim. For the average handyman who wishes to make for his own home many of the plainer woodwork fittings and conveniences which he would otherwise have to buy, a clear and complete guide is offered. Simple, practical articles are suggested for making, which are in themselves useful and stimulating to more ambitious efforts. The use of tools is stressed, many of the illustrations being drawn especially to show *how* each tool is used for different purposes. This clear, detailed explanation makes the book of infinite value to the twelve- or fourteen-year-old boy who wants to know the why and the wherefore and the how of handling tools. Apprentices in carpentry, joinery, cabinet-making, pattern-making, as well as apprentice wheelwrights, millwrights, coach-builders, shipwrights, will find practical assistance there, as will also the handicraft instructor and his pupils, for the problems are arranged in progressive order and are so illustrated that pupils with little or no idea of orthographic projection can construct them from the sketches and dimensioned diagrams. Chapters are given on economical marking out, gauging and marking, saws and sawing, planes and planing, chisels and chiselling, boring and boring bits, the spokeshave and its use, filing and sandpapering, the screw and the screwdriver, glue and how to use, wood finishing, hints on timber, the woodworker's bench, tools and accessories. There are 217 pages, profusely illustrated with sketches and diagrams. "Carpentry for Beginners" is one of The Woodworker Series, which comprises "Details of Cabinet Construction," "Fretwork, Fretcutting, Overlaying and Underlaying," "Staining and Polishing," "Wood Joints," "Wood Turning," published by J. B. Lippincott Co., Washington Square, Philadelphia, Pa., at $1.50 each.

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NATIONAL BUILDER

Volume 64 Chicago, October, 1921 Number 10

The Situation

PRICES of building materials other than lumber continue to show declines in various localities. Cement prices in the Eastern section of the country dropped 30 cents a barrel on September 17. One of the principal cement manufacturers in the Middle West, with mills near Pittsburgh, Chicago and Duluth, has announced price cuts of 10 cents and 15 cents a barrel. About the same time one of the principal West Coast cement manufacturers announced a 25-cent cut.

Duluth, with a price of $1.95 a barrel net, in carload lots, without bags, now has the lowest price on cement. Next is Chicago with a price of $1.97.

Lime and gypsum plaster prices also show declines, here and there. Sand, gravel and crushed stone prices continue to recede.

With the exception of cement, however, the price declines of the past month have not been of any importance.

While the country is approaching what is believed to be a period of increasing buying of building materials, and experience shows that such periods are accompanied by rising prices, the tendency of such increase will be governed to a certain extent by the briskness of the general demand. The absorption of overhead expense by an assured market permitting a higher percentage of production will probably have the effect of holding prices at a healthy level, just to producer and consumer alike.

Transportation—Reductions in Rates

Indications that the railroad interests are looking beyond traditional railroad economics and obtaining a larger view of the interdependence of transportation and the construction industries, are shown in announced reductions in freight rates for all building materials of from ten to fifteen per cent on certain lines, and an offered reduction of eighteen per cent on sand and gravel on practically all lines, with an ultimate reduction by some of the roads of twenty-three per cent. Any cut in transportation rates means a great deal with such commodities as sand, gravel, crushed stone, brick, etc., where freight rates are often fifty per cent of the price to the consumer.

National Conference on Unemployment

Announcement was made about the middle of the month that President Harding had called a meeting of representative citizens to confer on all sides of the present conditions causing unemployment and to make such recommendations as may tend to inform the public and aid in directing a definite course to betterment. The conference will be held in Washington, D. C., September 26. Since the first list of conferees was announced ten additional appointments have been announced. A full list of the members of the conference is given on page 49 of this issue.

Labor Conditions

The storm center of the labor situation is with the carpenters. It appears difficult to obtain the necessary subordination to the rulings of the national executive officers whose acts are subject to review by the national conventions, and so many restrictions and qualifications are placed upon the actions of the carpenters' officials as to lead to delays and indecision in conferences with the allied industries seeking constructive co-operation. The results are that the carpenters are not participating in the work of the National Conference on Jurisdictional Awards and as an organization are not comprehended in the Chicago trade arbitration agreement handed down in the decision of Judge Landis.

The interests of the building industry has been centered on the Chicago situation since Judge Landis was accepted as an arbitrator to clear up conditions. Immediately after the judge's decision was announced protests poured in from various unions and rehearings requested. These requests Judge Landis acceded to until he learned that some of the trades had struck work, whereupon he rescinded his consent to rehearing. On this announcement executives of several of the trades succeeded in inducing their men to return to work. The situation is expressed in a question addressed by the judge to President Kearney of the Chicago Building Trades Council:

"In case the carpenters and plumbers do not accept the wage scale set and refuse to work, what will you, as a business agent, do if non-union men are put on the job? Will you advise your men to go ahead and work with the non-union men?"

"When we accepted you as an arbiter," said President Kearney, "we did so intending to abide by your decision, win, lose or draw. We can do nothing but accept your terms, distasteful as they are to certain workers."

At the time of writing, however, non-union men are being chased off the jobs.

Complete Text of Judge Landis' Decision

This is an arbitration of wage differences between employers and employees in building construction.

The agreement was entered into between the Building Construction Employers' Association, the Associated Builders, and the Chicago Building Trades Council after several weeks of idleness in the industry, and authorized the undersigned, as umpire, to fix the wages to be paid in the several trades represented, the award to become effective when made and remain in force until May 31, 1922. It was also agreed that on or before Feb. 1, 1922, the umpire shall determine the rates to control from May 31, 1922, for the period of one year.

Further, there was a provision that the principles and conditions of all trade agreements shall be made as nearly uniform as possible, and the parties stipulated that should any trade arbitration board be unable to agree upon any provisions of their agreement involving conditions, working rules, etc., such dispute should be submitted to the umpire for his final decision. This latter decision was most important, for it put in the hands of either the employer or the employee the means to free any trade from all detrimental working rules and conditions by the simple process of withholding assent to such provisions.

Intolerable Conditions Demanded Remedy

It is the violation of no confidence to say that building construction had gotten into bad repute in this community. There was a general disposition to keep away from it as a thing diseased. Capital avoided it. The wise dollar preferred almost any other form of activity, or no activity. And this applied to the whole range of building construction from the cottage to the skyscraper.

This attitude of the public, added to the profound commercial and industrial depression generally existent, resulted in a virtual famine in housing accommodations and brought about the idleness of many thousands of men willing to work.

It was in view of these conditions that the umpire conceived it to be his duty to aid these parties to rehabilitate the industry in the esteem of the public, the great unrepresented party to this arbitration, but nevertheless the one upon whom the consequences of the award would fall.

This loss of the public faith was not due entirely to the wage question. The mere making of a wage award would not have placed the industry on solid ground. Reliable testimony showed that a 20 per cent reduction in wages, other conditions remaining the same, would produce but a 6 or 7 per cent reduction in building cost. The real malady lurked in a maze of conditions artificially created to give the parties a monopoly and in rules designed to produce waste for the mere sake of waste, all combining to bring about an insufferable situation, not the least burdensome element of which was the jurisdictional dispute between trades members of the same parent organization.

It is not possible that all has been done that might have been done, nor that no errors have been made in these agreements, but it is my judgment that the numerous corrective provisions that have been included in the more than forty trade agreements, if carried out in good faith, will produce savings and economies to the public far greater than would have resulted from a 20 per cent wage reduction, other factors and conditions remaining the same.

Some Trades Hold Aloof

Some of the trades, such as the carpenters, plasterers and painters, have seen fit to hold aloof from the arbitration. Therefore in applying a wage scale to the new conditions of the trades that are here, I do so with the distinct understanding that those trades that have refused to come in and revise their agreements along just and reasonable lines, as most of you have done, will not receive your support of their wasteful and subversive practices, for this would be to permit them to capitalize your good work to their advantage and to your detriment. The highest dictates of both morality and interest require that you adopt and adhere to this policy.

To illustrate what I have in mind in this connection, I refer you to the window glass industry, said to be controlled in Chicago by six firms. The representative of the Pittsburgh Plate Glass Co. and the president of the glazier's union appeared here in behalf of this trade and insisted upon a working agreement containing a provision that no glazing should be permitted to be done in the shop; that it should all be done on the building or job. This attitude of these two interests was plainly hostile to the public welfare, particularly the owners of small homes. Certainly that trade has no call on you to support it in that unconscionable practice.

You have made what is called the "uniform agreement" applicable to all trades. Each separate trade agreement expressly adopts this uniform agreement and provides that it shall control as against any conflicting working rule.

Agree Not to Stop Work

In carrying out the declared purpose of preventing strikes and lockouts and other waste and avoidable expense, annoyances and delays, and for the purpose of making building costs as low, stable and certain as possible, consistent with fair wages, this uniform agreement provides for the peaceful adjustment of the disputes by arbitration, subject to appeal to the National Board for Jurisdictional Awards, with whose decisions all parties agree to comply; that you will not stop work individually or collectively under penalties prescribed, except only when an owner attempts to construct a building with non-union men while putting up another building on which you are employed, and when the employer fails to pay employees for work done; that in case of scarcity of help non-union men may work with union men until such time as union men may be obtained; that any journeyman may use in his work the tools of any other trade; that small tasks of not over thirty minutes' duration in any one day belonging to any trade may be performed by any other trade at the discretion of the employer; that overtime work during two and one-half hours beyond the regular working day shall be compensated at one and one-half times the regular wage; that overtime work beyond this, and work performed Saturday afternoon, Sundays and holidays shall be paid at double the regular rate; that shift work will be paid at the regular day rate; that contractors not affiliated with these associations may avail themselves of all benefits of these agreements by either joining the association or paying the regular dues and fees that members pay; that the union will provide men to any contractor, whether a party to any agreement or not, under the rules and at the wage provided in these agreements.

No Restriction of Output

It is further expressly agreed and stipulated that there shall be no restriction as to the amount of work a man may do, nor against the use of machinery, methods or appliances, nor against any raw or manufactured material except prison made. Employers may employ or discharge whomsoever of the union they please, and employees may work for whomsoever they see fit, and the foreman, if any, is to be exclusively the agent of the employer.

Each of that group of trades that have entered into agreements with the Associated Builders and sixteen of those that have signed up with members of the Building Construction Employers' Association agree that nothing shall prohibit an employer or one member of a firm of contractors from working on his or their own jobs. Employers and employees of some trades acting in co-operation have refused to the public the benefit of the economy that would result from the operation of this provision, and three trades require work to be done by skilled men that laborers or helpers might do. Therefore, in fixing the wage in these trades I have been obliged to consider the waste thus occasioned. If at any time before Nov. 1, next, any of those unions notify me of their willingness to change their attitude in this respect I will advance their wages accordingly as the rule is applied in the present award to other trades.

Eliminates Jurisdictional Disputes

It is a matter of very deep gratification that all trades have eliminated jurisdictional matters by providing that "all work undertaken by the parties of the first part (the employer) shall be done by the parties of the second part (the employees) subject to the decisions of the National Board for Jurisdictional Awards," thus making the employer responsible for the kind of work he may contract to do and placing on him the initiative for settling disputes between unions as to the kind of labor they shall perform according to the provisions of the uniform agreement and reference to the National Board for Jurisdictional Awards.

Skilled Trades Cut About 12½ Per Cent

The wages in force at the time work was stopped in May were $1.25 per hour for skilled men and $1 per hour for common labor. These rates had obtained in Chicago during 1920 and apparently had been originally fixed in total disregard of skill, hazard, length of apprenticeship and necessary loss of time due to weather and seasonable demand. Theretofore in Chicago and elsewhere these considerations had influenced and controlled the matter, as they have since, and do now in other localities. Manifestly this theory was fundamentally erroneous and in violation of the principles heretofore announced in this proceeding. Having in mind these principles, the rates of the highest skilled trades, such as the bricklayers, have been reduced approximately 12½ per cent below the rate of 1920 and the wages for all other trades have been scaled accordingly. While it may be true that since the existing scale was fixed living costs have been reduced approximately 20 per cent, and that the rates here announced may impress persons unfamiliar with those trades as high when compared with wages paid in other industries, it must be remembered that in the building trades workers are limited by weather conditions and other causes to from 150 to 200 days' work per year.

Fixes Wages for Trades

Trade	Per hour
Plumbers	$0.95
Bricklayers	1.10
Boilermakers	1.00
Steamfitters	.95
Hoisting engineers (for operation of high pressure boilers and engines, cable ways, derricks, pile drivers, cranes and cable hoists)	1.10
Hoisting engineers (all others)	.85
Tile layers (fire proofers)	1.12½
Cement finishers	.85
Composition floor finishers	.97½
Cement workers (laborers—Local No. 76)	.72½
Stone derrickmen	.90
Drain layers	.82½
Electricians	1.10
Gas fitters	.95
Ornamental iron workers	.95
Structural iron workers	1.05
Common laborers	.72½
Caisson men (windlass and niggerhead men)	.85
Caisson men (diggers and laggers)	.97½
Laborers (plasterers)	.78¾
Excavating labor (Local No. 225)	.47½
Excavating labor (wall men—Local No. 225)	.55
The two rates immediately preceding are fixed in accordance with express agreement between employer and employees.	
Composition floor laborers	.72½
Lathers	1.00
Machinery movers and riggers	.85
Marble setters	.87½
Marble setters' helpers	.70
Marble rubbers and polishers	.75
Scagliola rubbers and polishers	.75
Mosaic and tile workers	1.02½
Mosaic and tile helpers	.70
Pipe and boiler coverers	.95
Composition roofers	.92½
Slate and tile roofers	1.00
Stone cutters	1.02½
Stone carvers	1.25
Stone planermen	.82½
Terrazzo mechanics	.95
Terrazzo mechanics' assistants	.80
Terrazzo helpers	.70
Tuck pointers	1.00
Sprinkler fitters	.92½
Sprinkler fitters' helpers	.70
	Per week
Composition roofer teamsters	$30.00

Seven Trades Not in the Agreement

The following trades are not in this arbitration: Carpenters, elevator constructors, plasterers, sheet metal, painters, glaziers, fixture hangers.

Carpenters

Early in the arbitration a tentative carpenters' agreement was submitted. That document is at variance with the new uniform agreement in several particulars. It provides double time for all overtime; it requires eight hours' pay for seven hours' pay work shift time; the work covered by the agreement harbors perilous jurisdictional disputes with other trades; it provides that should any other trade under control of the party of the first part do any work claimed by the carpenters that work shall cease until the matter is taken up by the joint arbitration board.

Should this agreement be rewritten according to the uniform agreement, uniform suggestions and principles, the wage would be fixed on the same scale as others, at $1 per hour.

If an agreement had been submitted by the elevator constructors in harmony with the uniform agreement, uniform suggestions and principles, an award would have been made of 95 cents per hour.

Plasterers

The plasterers are not in the arbitration. Early in the proceeding a document expressing the agreement of the parties was presented for the *advice* of the umpire respecting legal questions. That document has few of the safeguards of the uniform agreement. In it are many provisions designed to produce waste, increase cost and monopolize the business. The foreman is made subject to union rules; rules are laid down to be obeyed by property owners contracting with plastering contractors; it assumes to extend the plasterers' jurisdiction beyond the fair limits of the trade; it requires an employing plasterer to register with the union semiannually, and union men may work for no contractor not thus registered. The effect of the foregoing is to subject the public to union rules apparently in exchange for the power of the unions in forcing "all plastering regardless of the nature of the structure" into the employers' hands.

The foreman is required to ascertain whether employees are in good standing in the union and to collect fines and dues for the union by withholding money from wages due for work. Overtime is fixed at double the regular rate, or $2.50 per hour, and the agreement provides that continuous overtime (apparently shift time) shall be given to those not regularly employed. The agreement limits to union men the right to use tools, thus prohibiting any employer from even doing patch work on his own job. It is required that all cast work, except in limited amount, must be done at the building by members of a sister union. It also required that ornamental plastering shall be contracted for by the employing plain plasterer under penalty; that a plasterer will not work on the building where the ornamental plastering is let to another contractor; that the original contractor must finish the job or any part thereof for which he may have a contract; that no plasterer will work on such a job for anyone except the original contractor, etc.

Should these parties eliminate these vicious provisions and make a clean agreement in line with the uniform suggestions and principles announced, a fair wage would be $1.10 per hour.

Sheet Metal Workers

The sheet metal trade is not in the arbitration. An agreement appears to have been tendered the union by the contractors based on the uniform agreement and refused by the union, which in turn appears to have tendered an agreement to the contractors. This latter document does not adopt the uniform agreement and it is in conflict with it. The "work covered" is written as a definition of jurisdiction and therefore is pregnant with controversy. Double pay is required for overtime; shop rules and regulations are included. These have no place in agreements covering building trades. Should this agreement be rewritten in harmony with the uniform agreement, uniform suggestions and principles, a fair wage rate would be 95 cents per hour.

Painters

The painters are not in this arbitration. This trade is now operating under an agreement running until April 1, 1922, providing for wages throughout the remaining period at $1.25 an hour. One section provides expressly for a sympathetic strike; another expressly authorizes the union to call a strike on any shop for any reason that may appear just to the union. It is further provided "that all sash, frames and screens must be primed, painted and glazed on the job." The contractor is expressly forbidden to handle tools, scaffolding or material, with the exception that this restriction does not apply to contractors who are members of the union. The union is authorized to cancel the agreement at any time for any alleged violation. Overtime is paid for at double the regular rate, or $2.50 per hour.

Should these vices be eliminated and an agreement covering this trade be prepared in accordance with the uniform agreement, uniform suggestions and principles a fair wage rate would be 95 cents per hour.

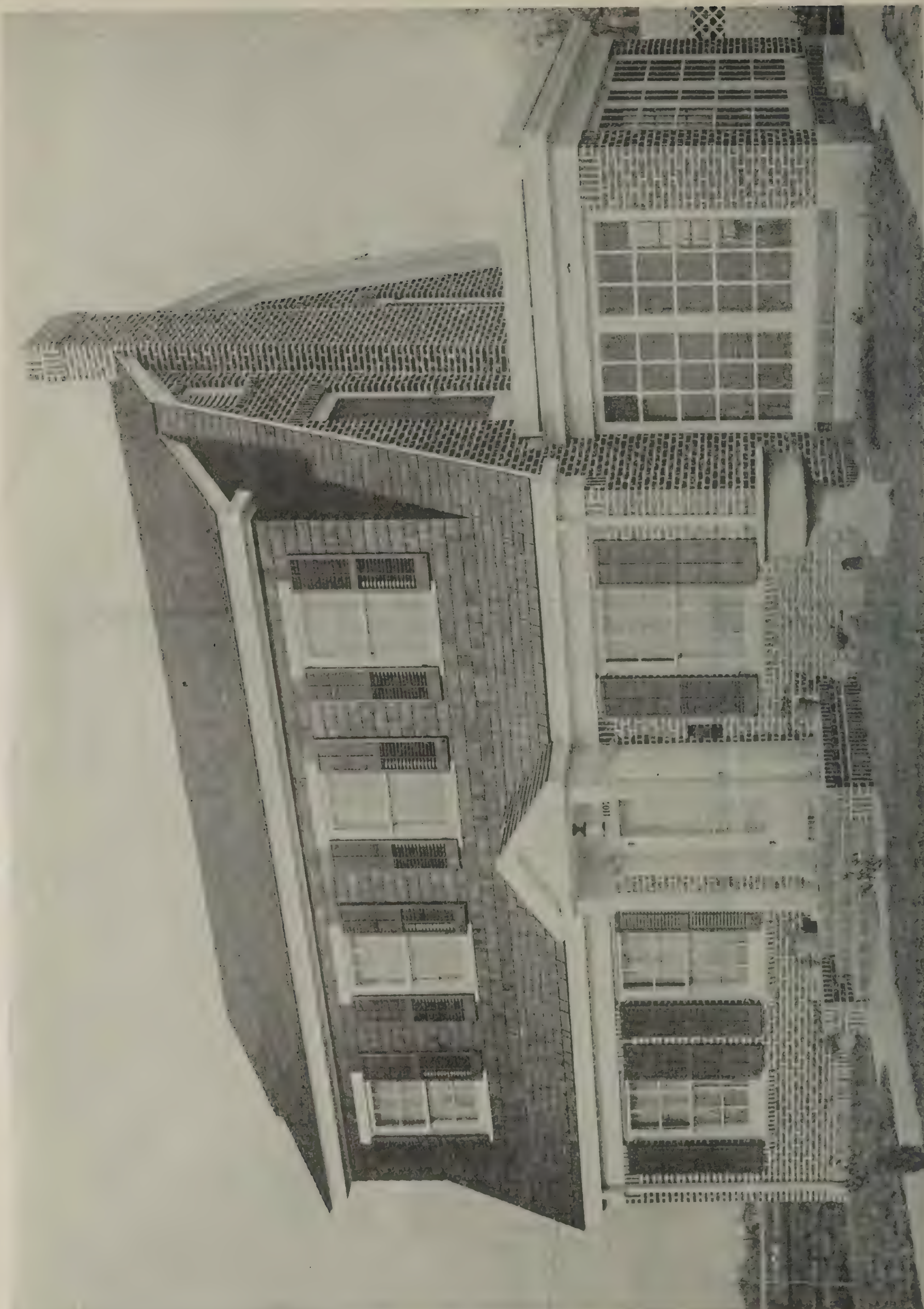
Glaziers and Fixture Hangers

The glaziers and fixture hangers were in the arbitration, but because of certain impossible conditions insisted upon by both employers and employees obviously with the sole purpose of effecting a monopoly and necessarily occasioning waste the umpire refused to fix a wage.

Should these agreements be rewritten in accordance with the uniform agreement, uniform suggestions and principles and not in violation of public law, a fair award would be to the glaziers 95 cents per hour and to the fixture hangers $1 per hour.

Building Material Situation

In conclusion a word about the building material situation. This is intimately and directly involved in the question with which we have been struggling. The testimony before the Dailey committee disclosed that a very large proportion of all building material is subject to artificial control. In utter contempt of state and federal penal codes, firms and corporations controlling the various lines have associated themselves together to fix and maintain prices. Business is divided up among the members of these associations, and adherence to the allotments is enforced by penalties, reimbursements and other devices denounced by the criminal law. The atrocious situation is beyond the reach of the umpire, but the activities of grand juries and prosecuting officers give me faith that real war is being waged against this species of criminality.



A Small House of Dutch Colonial Type—J. W. Northrop, Jr., Architect

See Working Drawings in Detachable Blueprint Insert in this issue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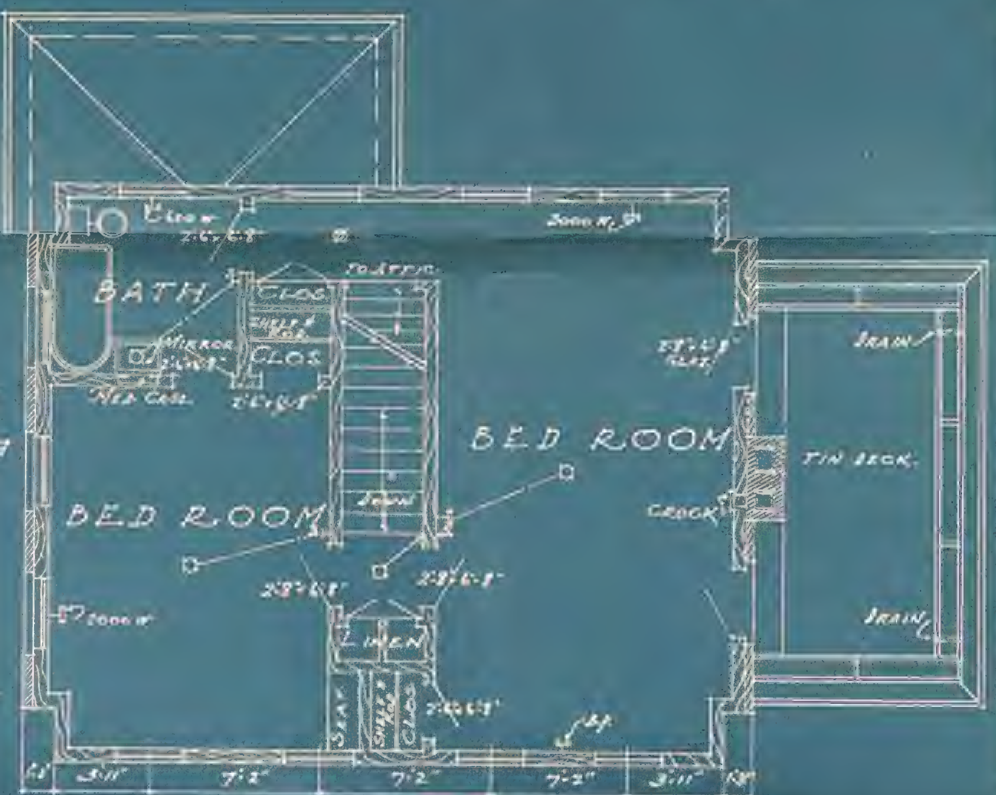

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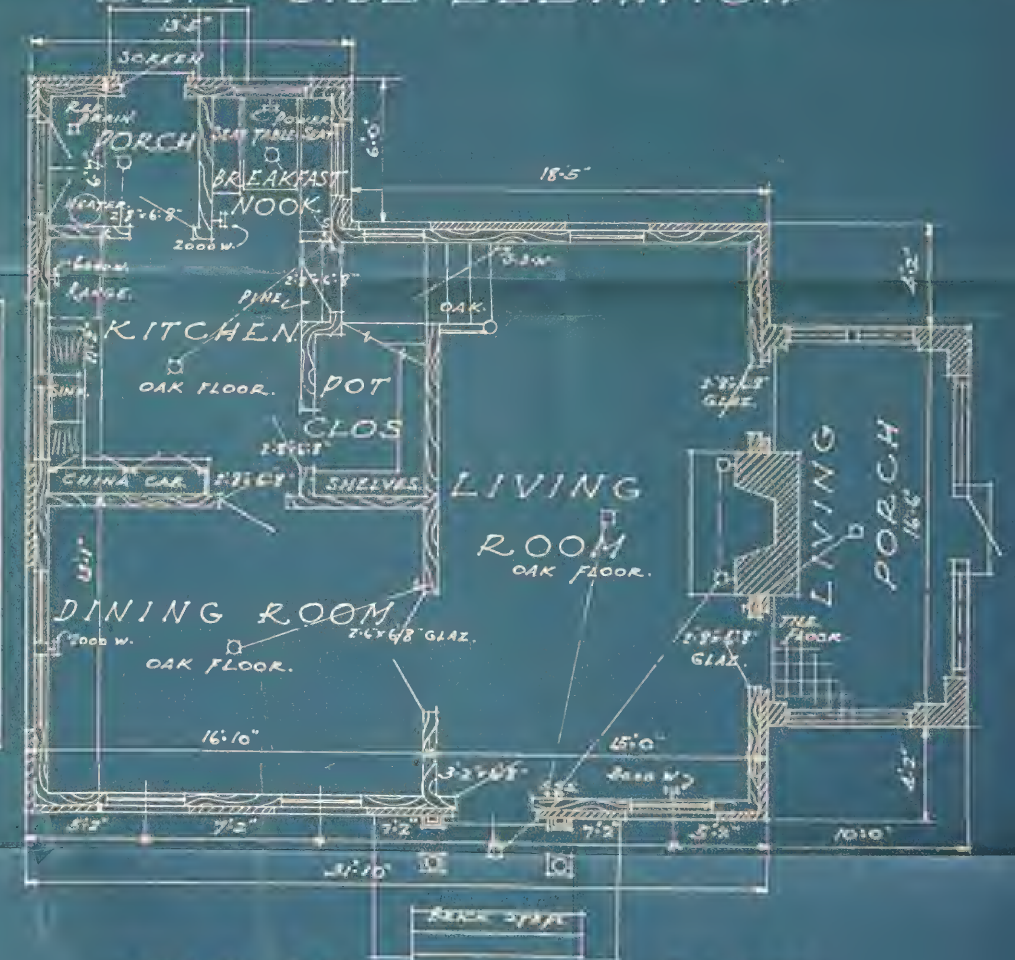

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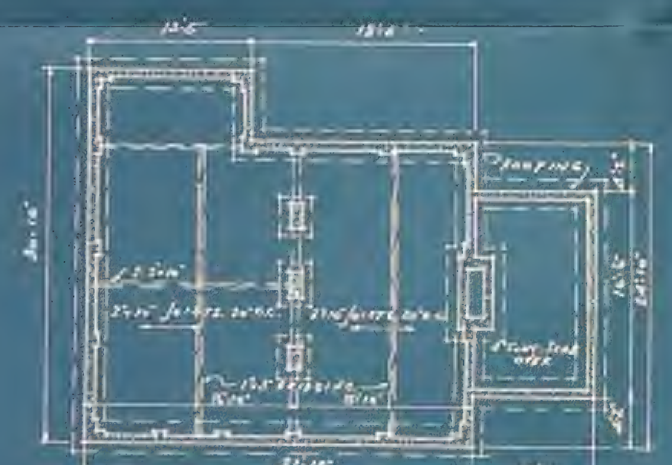


·FOUNDATION·PLAN·

NATIONAL BUILDER

October, 1921

A Small House of Dutch Colonial Type

J. W. Northrop, Jr., Architect
Houston, Texas

Scale: Basement, ⅛ inch equals 1 foot. Elevations and floor plans, ¼ inch equals 1 foot

See photograph and description in reading pages

A Small House of Dutch Colonial Type--J. W. Northrop Jr., Architect

Working Drawings of this House are Shown in the Detachable Blueprint Insert in this Issue

AS will be noted by the plans, this well proportioned and attractive dwelling is arranged with discriminating judgment in the disposition of space and the inclusion of conveniences of the most modern type. The house is faced with rough faced Colonial red brick, with white mortar joints struck flush. The roof is of the thickest obtainable red cedar shingles, stained a rich dark green with Cabot's creosote stain. The floors are clear quarter-sawed white oak on the first floor, and 1 by 3 in B. & B. long leaf yellow pine on the second. Inside finish is all long leaf yellow pine, given two coats of flat Keystone wall paint and one coat Vitralite enamel. The floors are finished by filling with Johnson's natural paste filler, giving two coats of white shellac, one coat Johnson's floor wax, and polishing with weighted brush. On pine floors the first coat of filler is omitted. Standard plumbing fixtures are used throughout. The house is heated by Simplex electric radiators, 3000 watt in living and large bedroom; 200 watt in dining room, kitchen and small bedroom, and 600 watt in bath. A 6000 watt range and a 700 watt Aqua water heater completes the mechanical equipment.

White hexagonal tile floor is used in the bath, and red quarry tile floor for the living porch, both laid in white Atlas cement mortar.

All inside walls are shiplap, covered with heavy canvas on which wall paper is applied.

The cost of the house, garage, walk and drive totaled $8,300.

Say It With Public Jobs

IN his Labor Day address Secretary Davis of the Department of Labor urged an immediate increase of public works expenditures. Pointing out that fully six million workers are jobless, he said: "This year Labor Day must be dedicated first of all to meeting this imperative human need of the idle."

Many newspapers have been using the headline, "Say It With Jobs," in urging employeers to give work to ex-army men. But the advice can not be followed by many employers, without danger of bankruptcy, until there is assurance that there will be a demand for the products of the men they hire. However, there is one class of employer that can and should act upon the "Say It With Jobs" slogan. We refer to cities, counties, states and the Federal Government. The governments are employers who need fear no bankruptcy, for it is not necessary that their products be sold. Roads, streets, waterworks, sewers, school buildings, and all that class of construction known as public works, are the products of the employing public. The economic demand for these products is never filled, for the public is never as alert to meet economic demands as are the private corporations. There have been six years of subnormal construction of public works in America, following centuries of inadequate appropriations for public works.

If this last clause is questioned, consider the significance of the fact that scarcely 15 per cent of the total mileage of country roads have a surface that is graveled, macadamized or paved! More than half the streets and alleys of our cities remain unpaved, and, of those that are paved, fully half should be repaved in order to reduce the wear and tear on automobiles and motor trucks. Only a small fraction of our city water supply is filtered. We have next to no sewage disposal plants. Our waterworks pumping plants are largely obsolete and inadequate in capacity. Our schools are crowded to a disgraceful limit. Our city children lack adequate playgrounds, and our city adults have almost no playgrounds at all! These are but a few of the outstanding facts that indicate the woeful inadequacy of our public works.

We mention such inadequacy because there are many local complaints whenever increased taxation for public works is proposed. It is, in fact, this never ceasing opposition by taxpayers that has always resulted in less than adequate expenditures for public works. We believe the time has come to brush aside all such selfish opposition to public improvements, not merely because the improvements are needed but because there are millions of idle men who need the work that can be given them by the public. It is cheaper, in fact, to support men by giving them work than to support them by giving them charity. In any event they must be supported.

Let it not be overlooked that every man thus given a job automatically creates a job for at least two more men. Work begets work. The wages that are paid to the construction worker quickly are passed along to the textile worker, the food producer, the moving picture actor, etc. Yes, we include the "movie man," the producer of pleasure—and why not? Why do we work but to add to our luxuries? There are many men of such myopic vision as to things economic that they see no useful work save that that adds "necessities." Heaven help their shortness of sight! It is more than 120 years since Americans ceased working merely for necessities. In Engineering and Contracting of August 3 it was shown that the buying power of the average worker is five times as great today as in the year 1800. But in the year 1800 our forbears were not without "necessities." They had their log houses, their homespun clothes, their "three squares," and—precious little else.

One day's work in a week would now buy all that a Daniel Boone earned in five days, and with 8 hours' work instead of 12, at that. So, four-fifths of all that we buy is purely luxury.

It is true that all the men and women now out of jobs form only 15 per cent of the total number of income earners, and this is about the maximum percentage of idle that every "hard times" since 1893 have produced; but, like Mercutio's wound, "It is enough"—enough to kill happiness for three times six million people. Happiness for these idle people and their families is fortunately to be had at no distant day and at no ultimate cost, if the public will rouse itself to its duty. Bonds for all needed public works can be sold in every American city, provided the newspapers and magazines will support such a project as wholeheartedly as they supported the Liberty Bond issues. Let us call these new loans Prosperity Bonds, and let us throw all our enthusiasm into the campaign to sell enough of them this fall and winter to insure a general revival of business.—Editorial from Engineering and Contracting.

Unemployment

General R. C. Marshall, general manager of the Associated General Contractors of America, appointed to represent the building construction interests at the Conference on Unemployment, held in Washington, D. C., on September 26, previous to the conference sought far and wide for suggestions from every department of activity in building. The foregoing editorial urging that we "Say It With Public Jobs" has the merit of proposing measures that are not only fundamental but of a character to offer quick relief to a dangerous situation.

How to Reach the Top in the Building Profession

By Charles H. Bishop

Some of the Secrets of the Success of William Aitken, Hubbards Woods, Ill., Who, in 16 Years, Has Developed a Remarkable Business as a Builder of Modern Homes

IF the average building contractor would build himself a fine, up-to-date residence that he can be proud of, and show prospective builders this example of his work, at the same time living and acting the part of a successful business man, he will accomplish a great deal toward arriving at the top of his profession. "You can't make a big success riding around in an old flivver." This is part of the philosophy of William Aitken, Hubbards Woods, Ill., a prosperous suburb along the north shore of Chicago, who, in 16 years, by perseverance, has built up a splendid business in the erection of modern homes. Ever since he went into business for himself, Mr. Aitken has religiously practiced the advice offered in the first paragraph. At the present time he owns a beautiful 15-room house in Hubbards Woods. Some people would call it a mansion. It stands on two acres of ground, surrounded by a wonderful collection of flowers and shrubbery, for besides being a builder, Mr. Aitken is also a landscape architect. Gardening is one of his hobbies and he knows every flower, and shrub by its first and last name. His home and grounds are worth easily $75,000, but only a few years ago this tract of land was a swamp.

William Aitken, "Builder of Homes," in his garden at Hubbards Woods, Ill. Sixteen years ago he was a working carpenter

The story of Mr. Aitken's success is actually a romance that pays tribute to America as a land of opportunity and to himself as a man of ability, sticktoitiveness and resource.

Mr. Aitken was born just outside of Glasgow, Scotland, 42 years ago, and came to North America 16 years ago.

He spent a year in Canada as a journeyman carpenter, and then came to Chicago and determined to go in business for himself, choosing the suburbs north of Chicago, where he resides today. Starting in right at the bottom, working 18 hours a day, anxious to build a sound reputation as a good builder, he progressed steadily year after year, until today he is recognized as the leader of his profession in the North Shore district. Now people come to him, and most of his clients are friends of satisfied customers.

"The reason most men do not succeed is because, when they start in, they get easily discouraged," said Mr. Aitken. "Getting established is always mighty hard work regardless of what profession you are in. Difficulties come up that, at the time, seem insurmountable. They must be overcome! Stick to the ship and steer it out of the storm. Never recognize defeat if you expect to reach the top.

"During my first year's work I managed to save two or three hundred dollars. I bought a lot and built a temporary cottage, where I lived for a year, through one winter. It was a single board structure, with building paper over the studs and a tar paper roof—really nothing more than a shed. Later on the place had a valuation of $1,600, and it cost $600 and the labor I put into it.

"Borrowing $2,000, I remodeled the cottage into a beautiful bungalow. When it was finished, I tried to sell it, but that was a hard job, as the place was six blocks from the railroad station. Finally a woman came around and wanted a three years' lease, and I said she could have it by paying me a year in advance. I got $480, and with that money bought another lot in a different section of town. Making another loan, on March 5th, I started to build a bungalow and completed it on April 24th. Being gifted as a landscape artist, with a great love for flowers, I made the place a beauty spot, so that by August it was ablaze with blooms.

"Along came a man who asked if I would sell the place. I told him that I would sell anything but my wife and family. A price was agreed upon, and I made a profit of $1,700, which seemed a lot of money back in 1910.

"In order to get the benefit of all improvements, I bought 90 ft. next door to the bungalow I had just sold, borrowed $3,000 and started to build again on December 1st. I moved in Christmas day, and in the following February disposed of the house for $6,000.

"In the meantime, the woman who took the three-year lease on my first place had decided to go abroad, so I moved back there —my third removal in a year—and when I balanced my books I found I had made a profit of $4,000 on my original investment of $480.

Bear in mind it had been hard work. I had done practically all of the work myself, and that often meant 18 hours a day. I did the work to the very best of my ability—always using good materials, and that is something I do to this day and will continue. Every house I put up I guarantee against defective workmanship for two years. I started that policy ten years ago and find that it pays. Always make good and your customers will speak well of you. Make sacrifices in order to get a sound reputation as an honest, reliable, first class builder. It works out profitably in the long run, and the confidence of a community is one of the greatest assets any builder can have.

"I started to buy real estate, a venture which entailed some hard knocks, but I kept plugging along, always striving to give satisfaction. I got a good reputation and—best of all, the confidence of our bankers. They suggested that I tackle larger projects instead of single houses, which I did, with gratifying results. In one instance I improved a frontage of 2,000 ft., where the land backed up against a railroad track, and handled the deal successfully.

"I advertise myself as a builder of modern homes, and, since 1913, have erected 125 homes and am proud of every one of them. Where homes cost $6,000 to $10,000 before the war, they are now running as high as $15,000 to $45,000, and I am specializing on the better class of homes.

"If my career can be called a success, there is no reason why others cannot follow my example. There really are no secrets. I might say that a contractor's correspondence course was a great help to me and added much to the practical experience I had gained here and in Scotland.

"One thing is certain, that if a man will take a deep interest in his business, eventually it will grow to a point where he will be able to live off the interest of his income. The building business is as much of a profession as any other. It offers big opportunities for initiative. Men can succeed, but must prove themselves worthy of confidence. The proper foundation is the first thing to remember—and the money will come later, sure as fate. There is always room at the top.

"I hope my two boys will follow in my footsteps. Building and landscape work are closer to my heart than anything else (except my family, of course), and I would

Residence of William Aitken, Hubbards Woods, Ill. Mr. Aitken maintains his business offices in his home. A few years ago this section was a swamp

like nothing better than the firm name of William Aitken & Sons."

Mr. Aitken looks and acts the part of a successful business man. He maintains a cosy office in his beautiful home, and enjoys nothing better than taking folks through the house and grounds. His garden bears evidence of the work of a master of horticulture. He is a very busy man, but never too busy to give courteous attention to business or visitors. During the hour the writer spent with him, the conversation was interrupted seven times by telephone calls. At no time did he display impatience, giving each call a careful, attentive, tactful hearing. This even temperament is another desirable asset that helped him to succeed.

Types of houses designed and built by William Aitken. Mr. Aitken has a predilection for texture brick—a predilection sympathized in by his clientele seeking beautiful homes

"Virgin Growth" and "Second Growth"

Specifications often call for "virgin growth" or "second growth" timber, yet the terms are without fixed significance, and the material when delivered can not be positively identified as belonging to one class or the other.

"Virgin growth," also called "first growth" or "old growth," means timber which grew up in a standing forest under conditions of active competition for sunlight and moisture.

"Second growth," when applied to a forest stand, usually means timber whose main growing period occurred under conditions of lessened competition, after all or a portion of the original stand had been removed by cutting, fire, wind or other means. In connection with individual trees, the term is used to mean any whose growing conditions approximated those which would produce a "second growth" stand. To the wood user, "second growth" means material cut from either of these sources. In general, the term is associated with the idea of a second crop of timber, though specific applications may vary.

Virgin growth is generally thought of as slow growing timber, while second growth, due to more favorable conditions, is relatively rapid. A faster rate of growth is evidenced by wider annual rings. These are popularly supposed to indicate stronger and tougher wood in the hardwoods, such as ash, hickory, elm and oak; and weaker and brashy wood in the conifers, such as pine and fir. Hence, for uses in which strength and toughness are essential, second growth is sought among the hardwoods, whereas in conifers virgin growth is desired.

As a second growth forest attains maturity, the rate of growth slows up, and the annual rings may be no wider than in virgin growth timber of the same size. On the other hand, when a slow-growing suppressed forest tree is freed by removing the neighboring trees, it may grow rapidly for a long period. Therefore it is possible to have some wood with the characteristics of virgin growth and some with those of second growth in the same tree. Furthermore, individual trees in a virgin growth forest may have the characteristics of second growth throughout and vice versa.

Instead of broadly specifying "second growth" or "virgin growth" or depending upon requirements on the width of annual rings to secure good material, the Forest Products Laboratory considers it advisable to disregard rate of growth and rely upon density as a guide to quality.

National Builder aims to give its readers what they need in the way of information in the building field. We are guided by what our readers say they want. Write to the editor and say what interests you especially.

Sanitation, Heating and Lighting for a Suburban or Country House

No. 1--By Edward E. Ashley, C. E.

[*Editor's Note.*—With this issue of National Builder is begun a series of articles by Mr. Ashley which will describe in detail the mechanical equipment of the ordinary dwelling house.

Mechanical equipment includes the furnishing of a modern house with water-supply, sewerage, light and heat—with particular reference to the country house where not only interior details, but the sources of these conveniences fall within the house builder's supervision.

While it is the custom in many localities for the owner to give separate contracts for these details to the plumbing, the lighting and the heating contractor, the better practice is to let one general construction contract to a reputable building contractor, to profit by that contractor's experience in the supervision of such work, rather than dividing the responsibility for the completed structure between various contractors more or less independent.

So the general contractor should know what is good practice in the selection and installation of this equipment and be competent to assume the responsibility for the completed dwelling from A to Z.

Mr. Ashley is particularly well qualified to post our readers on these details of their work. He is the engineer in charge of this branch of building construction with one of the most prominent firms of architects in the United States, and during the recent war, was in charge of this very work for the United States Housing Corp.—*Editor.*]

In starting this series of articles relative to the sanitation, heating and lighting of a moderate-priced dwelling, it is not the intent to solve any particular problem but to bring forward certain features often overlooked by the average building contractor. It is realized that the whole subject is complex and contains too many varied conditions to permit of definite conclusions being reached. Each locality has its own individual problems which must be considered if the contemplated dwelling is going to be satisfying to its accupants.

Probably the best advice that can be offered the average builder is to employ at the outset a competent architect or engineer to design and superintend the erection of those features with which the builder is not thoroughly familiar. Many wonderful plans have been absolutely ruined by lack of experience in handling the construction details, in spite of having complete plans and specifications developed by experienced men.

There will always be a considerable number of persons who will shun the experience of others and attempt to entrust the work to persons of little experience, whose endeavors, although often well meant, through their inability to properly visualize the completed dwelling, will, by a poorly arranged bathroom or kitchen, insufficient heating, or inadequate lighting spoil what would otherwise be a successful piece of work.

Special effort should be made in the selection of the artisans for the mechanical trades, for sorry to say there are plying these trades as many quacks as there are in patent medicines and who practice very much in the same way. Also avoid equipment which is advertised to give astoundingly economical results, "better than any of the products of well-established and reliable firms." The reputable manufacturers producing dependable goods maintain service and stand back of their product and if a difficulty should occur, are to be found and have not either moved away or discontinued the particular model or type of apparatus you may have, and in the long run the cost of their product is little more than that of the quack.

An erroneous impression has unfortunately gained considerable weight among the inexperienced—that professional services add materially to the cost of the operation. This is entirely wrong as is very often the case, the architect's entire fee is saved many times in the selection of materials, arrangement, or upkeep.

However, it is hoped in these articles to give such information as will assist those who cannot employ services of architects and who must rely on local talent.

Avoid overhanging trees

Advantages of One General Contract

It is the practice of many persons contemplating building to call in contractors and invite them to submit estimates on furnishing the various portions of the work, they furnishing their own specifications, the owner merely giving them the outline of what he expects. When estimates are received under these conditions, the variations as to what is offered will be considerable and the lowest price may not be adapted for the conditions. For instance, in an electric wiring estimate one man might provide lighting with a few ceiling outlets without any local switches for hall, and require that the person living in the house go up or downstairs in order to switch on the light, while another electrician would provide the three-way switches and his price would be higher and he would, therefore, lose the work.

In another instance, the plumber would figure on locating the washtubs behind a door in a dark corner of the kitchen in order to minimize the run of piping and have the low bid, whereas the man who placed the tubs in a light portion of the room, thereby saving steps for those keeping house, would have a higher price and lose the work; or the heating contractor who figures on a boiler just large enough to heat the house and which requires continual watching has a much lower bid than the man who figures his boiler size correctly—and so it goes. The expert is able to detect these defects and reject the deficient bids, while the inexperienced builder will accept the bid simply because it is low and assumes the equipment will be satisfactory.

A protected site

There are other methods of procedure: One is to select one reputable contractor for each of the several trades and engage him to design the work for you. Such a contractor should not, however, be placed in competition with others, for if this is done it is to his interest to design the work so that he can bid cheaper on same than can his competitor.

Another way is to have some reputable manufacturer lay the work out and have various contractors figure on same; or have each contractor submit with his bid a complete plan, and then compare same and award work on one which seems best suited for the dwelling. However, the best method seems to have some specification and have all bid on the same type and character of work.

Selection of Site

In considering the prospective dwelling, one of the first questions to be decided is the location:

A. First of all, it should be located on high land.

B. It should be dry.

C. It should not be located too near a river, brook, or flatland which is subject to periodical flooding; nor should it be located near a sluggish flowing stream.

D. Avoid proximity of polluted streams, lakes, or brooks.

E. A house should not be located on the top of a hill leaving it exposed to the winter winds.

F. It is best to avoid close proximity to a steep hill for a building so located is apt to be damp.

G. Where possible, it should be located on sloping ground facing south or southwest.

H. House should be placed on plot so as to give maximum sun in the various rooms.

I. Location of trees should be so as to afford shade but not close enough to produce dampness and prevent sun entering house.

This location affords no protection against winds

J. Locate house so as to protect it against winter winds and to afford full benefit of the cooling breezes in the summer. If necessary plant a wind break of evergreens to afford shelter in winter.

K. The selection of site for house in suburban locations is less difficult than that in rural districts where careful consideration must be given to the matter of good, pure, and abundant water supply.

It is desirable to locate where electric current and gas are available.

If the plot appears wet, examine carefully into the possibility of draining it. If for any reason it would seem impossible to obtain a proper outlet of sub-soil drainage, by all means avoid the plot.

Examine carefully just how the sewage can be disposed of—especially if there are no sewers to which you can connect.

Avoid a site near which there are any leaching cesspools, privies, or stables, unless the topography of the ground is such as will permit draining these without in any way contaminating—through percolation or seepage—your building site.

Too much emphasis cannot be placed on the fact that defective cesspools, drains, soil pipes, privies, etc., will through contamination ultimately breed disease.

When land is inexpensive it is desirable to build a house on a large plot so as to isolate it from many of the annoyances mentioned above.

Sanitation

To the prospective home owner it is doubtful whether there is a more important subject than this of sanitation; for after all what is a home that is not healthful—what adds more to the charm and attractiveness of a place than health and happiness which go hand in hand?

Wm. Paul Gerhard, in his book on Sanitation of Country Houses, states in the opening chapter:

"Whoever has the opportunity of planning and building for himself a home in the country should bear in mind the importance of having not only an attractive and comfortably-arranged house—be it cottage or mansion—but above all a healthful house. Upon the healthfulness of the home will

A mere shelter

chiefly depend the comfort, well-being, and happiness of its inmates. A country home is beautiful not only in summer but at all seasons, and life in the country implies as a rule, the existence of health-favoring natural conditions. Hence, it is all the more important that the building itself, its surroundings, its water supply, drainage, sewage disposal (heating, lighting)—in a word, all its vital household arrangements—should be quite sanitary."

Colonel George E. Waring, Jr., considered one of the best authorities on matters of sanitation, wrote in an issue of the American Architect, January, 1876:

"In the interest of sound building it is of utmost importance that those who are charged with the construction of houses, especially of residences, should concern themselves not only in matters of taste and of economical and substantial construction, but with the fulfillment of the chief (because the first) purpose of all building—that of providing protection against influences injurious to health. The first use of the house was doubtless to furnish shelter against exposure, whose influence would be permanently or temporarily injurious to the physical condition of those for whom it was prepared."

Unfortunately conditions have not changed materially since Colonel Waring wrote the above, for the writer is often confronted with the problem of keeping the essentials of sanitation, heating or lighting from being cut out in order that something affecting exterior finish or design may be retained.

"The mere provision of shelter has so long been accomplished that this consideration no longer enters into the conscious idea of those who build.

"But there has arisen within a comparatively short time as an incident to the adoption of modern household conveniences the knowledge of other influences to which the human frame is subject, which equally demand the wisest and most careful attention.

"Every house of any pretension is provided, as a matter of course, with certain arrangements for the removal of liquid wastes, which it has been often the custom of the architects to treat simply as matters of specification, and over which they exercised less personal supervision than was given to more conspicuous parts of their work."

Fortunately the smaller cities and rural communities are realizing the importance of health and are passing laws and ordinances governing the installation of drainage, water supply and electric systems.

(To be continued)

Houses located too close to the road

Progressive and Compartment Dry Kilns Compared

All dry kilns now on the market are either progressive or compartment kilns. In the progressive type the drying conditions increase in severity from one end of the kiln to the other, the material being moved into severer conditions as it dries. In the compartment type the same temperature and humidity prevail throughout the kiln at any one time, beginning with mild conditions and increasing in severity as the material becomes dry.

The kiln-drying data and experience of the Forest Products Laboratory indicate that each type has particular advantages on certain points, as follows:

The progressive type of kiln requires less skill in the operator. It consumes less heat per pound of water evaporated from the wood, but the saving of steam possible should not be considered so important as the question of ability to perform the work required with the best results. The progressive kiln reaches its greatest heat efficiency in drying from the green state and is most useful in circumstances which permit of its being supplied continuously with green lumber of one thickness and class. It is, however, impracticable with this type of kiln to give individual attention to special loads of lumber.

The compartment type of kiln is more flexible and affords greater control over the drying conditions, permitting less change in temperature, humidity and circulation in the kiln with variations in the wind and weather. It is better adapted to meet the varying requirements of different kinds of material and is most useful where exact and careful drying is required, as in the handling of refractory woods.

Wind Forces on Buildings

By Albert Smith

Professor of Structural Engineering, Purdue University

BUILDING specifications prescribe wind loads of 20 lbs., 30 lbs. and sometimes 40 lbs. per square foot of vertical exposed surface.

The pounds per square foot given in specifications is the total effect of the wind on a vertical thin plate one foot square with its surface normal to the direction of the greatest probable wind.

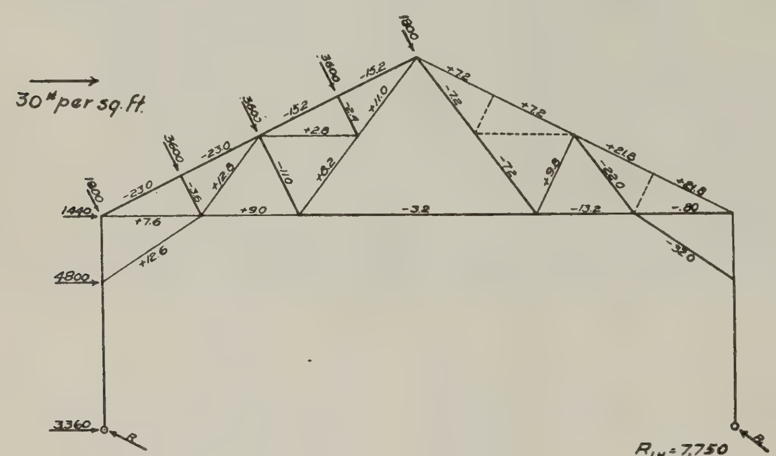


Fig. 1

There have been many tests to determine the relation between wind force and velocity. I prefer to use the formula $P = .003V^2$, based on the tests of Dines. Using this formula, 20 lbs. per square foot corresponds to 82 miles per hour, 30 lbs. to 100 miles per hour, and 40 lbs. to 116 miles per hour.

The method of applying to a building the loads resulting from these specified forces is not prescribed in specifications. Always, since man made his first houses, the builder has had to reckon with the force of the wind. If the builder underestimated its force, and the building was wrecked, the rebuilt structure was made stiffer, without any analysis of the manner in which the wind tore the first construction to pieces. The heavy walls and roofs of ancient and mediaeval buildings were less affected by the wind than the lighter construction which modern science has made possible today. A man buffeted by the wind feels only the horizontal force, and is conscious only of the push on the windward side. It is natural, therefore, that when we learned to analyze stresses in large structures the loads from the wind force should be assumed to be as shown in Fig. 1.

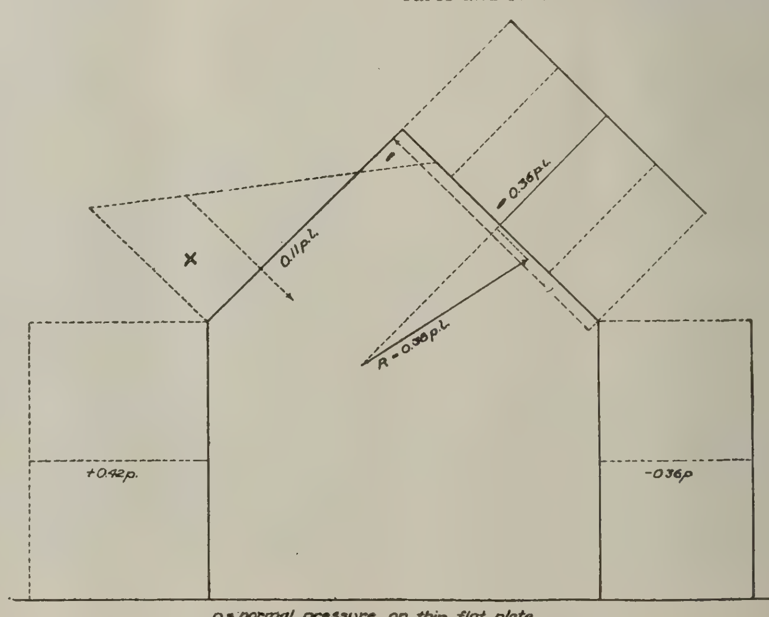
Wind loads have been applied as shown in Fig. 1 for many years, and even now all the handbooks give data for computing wind loads so applied. Some observed facts seem at variance with this assumption. It has been observed that in tropical countries the leeward half of a roof is frequently blown out. In many localities where high winds occur frequently, it has been found necessary to weight the roof slopes with rocks.

In 1894, Mr. J. O. U. Irminger, of Copenhagen, observed that in a warehouse wrecked by the wind, the steel channel purlins were bent outward. He tested small models in an artificial current of air, and obtained results shown in Fig. 2. He also tested semi-circular roofs and obtained results very much like those shown in Fig. 3, except that the curve of forces shown by Irminger is regular in shape. (Engineering, Dec. 27, 1895.)

Irminger's results were checked and amplified by Stanton. (Proc. Inst. Civil. Engineers, December, 1907.)

Three tests were made upon small models, and engineers and architects have been unwilling to revise their practice on the basis of such tests. In the hope of determining whether the size of the models affected the distribution of load, and of showing the effect of the proportions of the structure upon the distribution, tests were performed at Purdue University in 1911 and in 1913. (Jour. Western Soc. Engrs., Vol. XVII, No. 10, and Vol. XIX, No. 4.) Some of the results of these tests are shown in Fig. 3.

In (a), (b) and (c) ordinates giving pressure in pounds per square foot are laid off normal to the surface and outside the building, while suction ordinates are laid off inside the building. In (d) both pressures and suctions are laid off normal to the surface outside the building, and the distinction indicated by signs. In (a), (b)



p = normal pressure on thin flat plate.
l = length of bay.
Velocity of Wind – 20 to 34 miles per hour.

IRMIGER'S EXPERIMENTS ON SOLID MODEL.

Fig. 2

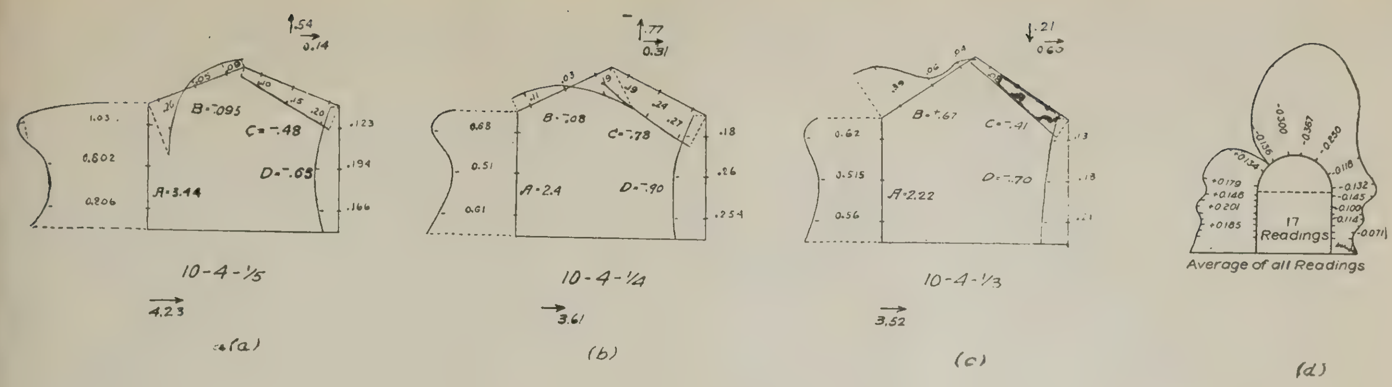


Fig. 3

and (c) the pressures and suctions are for winds of 18 and 16 miles per hour, while in (d) seventeen sets of forces have been reduced to those for a wind of 10 miles per hour and averaged. In (a), (b) and (c) the figures with small arrows above the diagram indicate total force components on the roof, and the figures and arrow below indicate the total horizontal force on the whole model.

All these models were 10 ft. long and of 6-ft. span. (a) had a roof of one-fifth pitch, (b) of one-quarter pitch and (c) of one-third pitch. Each had 4-ft. walls. In (d) the wall heights were variable, the maximum being 5-ft.

These tests proved that there is a resultant upward force from wind on roofs of any shape. This should not have needed proving. I have seen a tile roof and its timber trusses lifted as a unit and carried 50 ft. by a second-rate tornado.

Even heavy roofs should be firmly anchored to the walls or to the floor below.

These tests also suggest the nature of the forces which act upon details of a building. At Camp Taylor, Ky., in 1918, during a high wind, a large verandah roof, on the leeward side of the Hostess House, was picked up and thrown against the house in a direction contrary to that of the wind.

The Flow of Air Around an Obstacle

In analyzing the wind effect upon a building we must regard the building as an obstacle in the bed of a flowing stream of elastic liquid. In this rough analysis let us consider this current of air as composed of long filaments. If there were no obstacle these filaments would be straight, and the surface of the bed of the liquid would be subjected to a uniform tension. This may be expressed thus: In still air, the atmospheric pressure would be about 14.7 lbs. per square inch. In a moving current of air the atmospheric pressure would be less than 14.7 lbs. per square inch by the amount of the *velocity head.* (This is conveniently illustrated by blowing between two suspended sheets of paper. They will swing together, showing that the pressure of the still air outside the sheets is greater than that of the moving current between them.)

When the current passes over an obstacle the filaments of air follow a curved path illustrated in Fig. 4.

We may regard spaces (a) and (b) as filled with bodies of relatively still air. On the body of air in space (a) the impinging filaments of air exert a uniform pressure, the reaction to which causes their paths to curve uniformly. The lowest moving filament will touch the surface of the building at some point in its path. In Fig. 4 this point, x, is shown as near the top of the windward roof slope. (The location of this point depends upon the relation between height and span and upon the pitch of the roof.) At this point the path of the filament is parallel to the slope of the roof. If, now, the space (a) were filled by a solid body the upper surface of that body would receive a uniform pressure over most of its area. This pressure would be the unit pressure required to produce uniform angular change in unit distance *less the velocity head* of the moving current.

On the right of the point x the angular change from x to y is caused by tension, and if the space (b) were filled by a solid body its upper surface would be subjected to a tension equal to the tension required to produce the given angular change in unit distance *plus the velocity head.* From y to n the force producing curvature is pressure and the resultant force on the upper surface of the solid filling would be a tension equal to the velocity head less the pressure producing curvature. If the curvature of the filling solid were uniform from m to x, from x to y, and from y to o, we should have resultant forces on the exterior of the solid as shown in Fig. 5.

On such a solid the forces could be computed at least roughly. Where, however, we have instead of solid filling bodies, a mobile elastic body of relatively still air, there can be no sudden changes of force, such as are shown in Fig. 5 at m, x, y and n. The greater tension, or rarefaction, between x and y will constantly draw air from between y and n into the space between

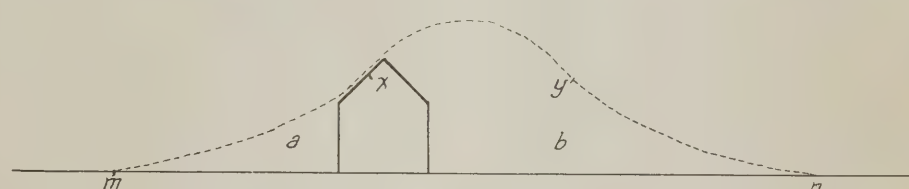


Fig. 4

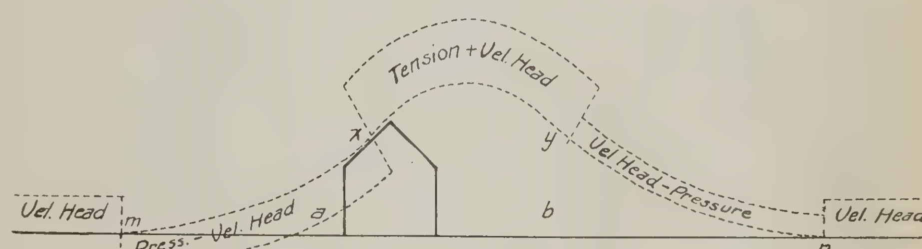


Fig. 5

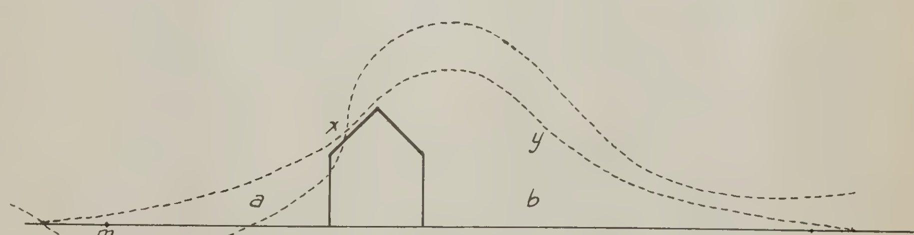


Fig. 6

x and y. Similar action takes place at m, x and n. There will be, on the leeward side of any obstacle a backward current or eddy. This eddy tends to diminish the amount of the tension between x and y, and to diminish its rate of curvature, and the eddy tends also to increase the tension between y and n, and to diminish also its rate of curvature.

It is clear also that at the point x, at which we have supposed the continuous filaments of moving air to be parallel to and to touch the roof surface, there can not be an abrupt change from pressure to tension. Some filaments of air will be broken up at x and diffused into the space (b) making a small forward eddy, and the point of zero pressure will occur, not at x but to the left of that point. In the same way a small backward eddy will be formed at m. We shall then have external forces on the bodies of relatively still air, approximately as shown in Fig. 6.

The action around the ends of the building is similar, and in short buildings the points m and n will be moved nearer to the building walls by the action of the currents around the end walls.

The assumptions of continuous filaments of air, and contained still bodies of air acted upon by the filaments is a very rough assumption, but it serves to illustrate the nature of the forces generated. These assumptions, and the reasoning based on them make the forces measured in the tests here illustrated, and in others not shown, seem much more reasonable than they would otherwise appear.

It is clear that even if a rational analysis could be made of the wind forces on buildings of any size and shape, it would be so intricate that even its approximate formulae would be troublesome to apply.

A complete series of tests upon buildings of all shapes and proportions would be a very large project. Such tests would have to be made in a plain of large extent exposed to winds of uniform velocity.

Based upon such tests and observations as are available I have therefore drawn up a series of diagrams illustrating the distribution of wind force on buildings of various shapes, with ordinates showing intensities of force in pounds per square foot. These diagrams consider:

(a) Wind Force on Parts—Monitors, sheds and porches.

(b) Wind Force on Trusses—Usually neglected.

(b) Wind Force on Details—Roof covering, walls, columns, purlins and girts.

A future article will present these approximate wind force standards, with a brief discussion.

Paint

Paint is first of all a preservative; secondly it is a cleanser; thirdly it is means of making things more sightly and keeping them so. There is a paint for every purpose. Select the paint for the purpose.

Eliminating Waste in Estimating

Quantity Survey and Payment for Estimating Procedure Recommended to Owners and Investors, Architects, Engineers and Contractors—Approved and Adopted by the American Institute of Architects, the American Engineering Council of the Federated American Engineering Societies, and the Associated General Contractors of America

THE purpose of this report is to acquaint prospective owners and others financially interested in building and other construction projects with the wasteful duplication and consequent expense involved in the preparation of estimates of quantities under the systems now generally in vogue.

To ascertain the cost of a construction project it is necessary to determine and compile lists or estimates of the quantities of materials and work to be done, to which are applied a price for each item. Under existing methods this work is done separately by as many contractors as are permitted to bid, and there may be as many varying interpretations of a set of plans and specifications as there are bidders.

The recommended procedure of quantity surveying described herein is intended to eliminate the present wasteful and uneconomical methods by concentrating the function of determining and compiling the quantities and list of work involved in one agency for each project. This quantity survey to be submitted to all bidders with the plans and specifications.

To Owners and Investors

It should be realized that all expenses in connection with the planning of buildings and construction are paid by the owner. Those who contemplate building know that none can afford to work without fair compensation for services rendered, but they probably do not realize that, due to practices in vogue, *they pay* for the cost of preparation of *all* bids, including that of the successful bidder. Generally speaking, it has been the practice to have the figures submitted by the successful bidder include an amount sufficient to cover the work entailed in making proposals on other work which he was not successful in securing; in short his "overhead" account is much larger than it necessarily should be—but for all this the owner pays. To eliminate the duplication of effort in estimating, thereby reducing the contractor's overhead, with attendant reduction in the cost of building, requires that all bids be submitted on the same basis in such manner that they may be readily analyzed.

The owner should not be required to pay a contractor an overhead charge which includes any other costs than belong to his own project. It is believed that this can be accomplished by having made an itemized list of all quantities entering into the proposed work. The owner should pay for the preparation of this itemized list whether he proceeds with the building or not. It is obvious that such payment will be much less when such itemized list is furnished than otherwise, as each bidder is furnished with the list of quantities called Quantity Survey and each bidder is thereby released from the work of separately taking off the quantities from the drawings and specifications.

A quantity survey because it fixes definite quantities on which the bids are to be received eliminates speculation on the part of the bidders as to the quantities involved in the project and thus makes possible lower bids due to the elimination of this "contingency." Where the owner does not avail himself of the quantity survey procedure recommended herein he should pay for estimating work direct to selected bidders on a prearranged basis rather than have all his bids increased by an unknown amount for estimating quantities, which frequently in current practice the successful bidder distributes amongst the unsuccessful bidders in accordance with a prearrangement of the bidders.

To Architects and Engineers

With the idea in view of having all contractors submit proposals on a uniform basis, with some means provided whereby the amount of the proposed work will not be left to individual interpretation of the plans and specifications, it seems most desirable that all owners through their architects or engineers should have submitted to bidders with the plans and specifications a so-called Quantity Survey. To insure the result aimed at, no proposals should be considered other than those based on the quantity survey accompanying the plans and specifications. It is therefore recommended to architects and engineers that, unless eliminated for some particular reason, all plans and specifications submitted to contractors for proposals be accompanied by a quantity survey. It is further recommended that the selected bidder shall submit, before the contract is awarded, a copy of the quantity survey with each item priced and separate items added for costs of administration, etc., the total to make up the bid price.

To Contractors

It is evident that before an intelligent proposal can be made upon any project, the contractor must have a quantity survey or some other statement of quantities involved. It has been customary in the past to add a stipulated overhead charge to provide for the cost of estimating and as this has been applied to every individual proposal made by the contractor, the successful bid, out of a possible fifteen or twenty, contains an item not strictly chargeable to such bid and thereby penalizes the owner. A quantity survey furnished to each bidder will reduce the cost of preparing proposals on prospective work and not only should but obviously will reduce each bid price and thereby directly lower the cost to the owner.

A quantity survey places all contractors on the same basis which is a definite one, from which they may price or determine the proper cost of the work. Each individual item or cost as set out in such quantity survey should be a basis of determining the proper cost of extra work desired by the owner as well as a basis for credits on account of omissions; it also has the added advantage of enabling contractors to audit and prepare monthly statements, progress reports, etc.

Recommendations—Quantity Surveying and Payment for Estimating

1. Quantity Surveying—Architects, engineers and contractors should jointly use their efforts to have established facilities for making quantity surveys.

2. Payment for Quantity Surveying—The owner should pay for the quantity survey from ¼ of 1% to 1% of the cost of the project for commercial and public work and not more than twice as much for residence work, whether the project is constructed or not.

3. Cost of the Project—The cost of the project may be defined as the accepted bid, or in cases where no bid is accepted, the bid of the lowest responsible bidder as determined by the architect or engineer. However, in cases where alternate bids are required, the additional payments for the quantity survey shall be based upon the additional quantities survey, as approved by the architect or engineer.

4. Altered Plans—Altered plans which involve a change in quantities after the quantity survey has been made justify an addition to the original fee for quantity surveying.

5. Basis of Contract—Owners should have the option of—(A) Making the quantity survey a part of the contract, or

(B) Permitting the successful bidder, at his own expense, an opportunity to verify the accuracy and completeness of the quantity survey before the contract is signed. If he proves errors to exist in the quantity survey, the bidder shall be permitted to adjust his bid accordingly.

6. Unit Quantities and Standards—The schedule of unit quantities should conform to local customs or methods of measurement and should be so stated on the quantity survey. The eventual adoption of national standards is recommended.

7. Guarantee—The guaranteeing of quantities by a quantity surveyor is not recommended, for it might influence the surveyor to protect himself by increasing the quantities. The extra cost of a guarantee would not be warranted.

8. Existing Methods—The cost to owners of preparing bids by existing methods, which make necessary wasteful duplication in estimating quantities by several bidders, is known to be much greater than the cost of preparing bids based on a quantity survey furnished by the owner, and therefore such existing methods are condemned and should be discontinued.

Collapse of a Masonic Temple Building While Under Construction at Salina, Kansas

In Response to a Telegram from the Agent of the Masonic Aid Temple Association to National Builder on July 16, the Services of the Condron Company were Secured to Determine the Cause of the Collapse as Hereafter Described

ONE of the most unfortunate and serious construction failures that has happened in recent years was the collapse of the Masonic Temple Building at Salina, Kansas, while under construction, on July 11, 1921.

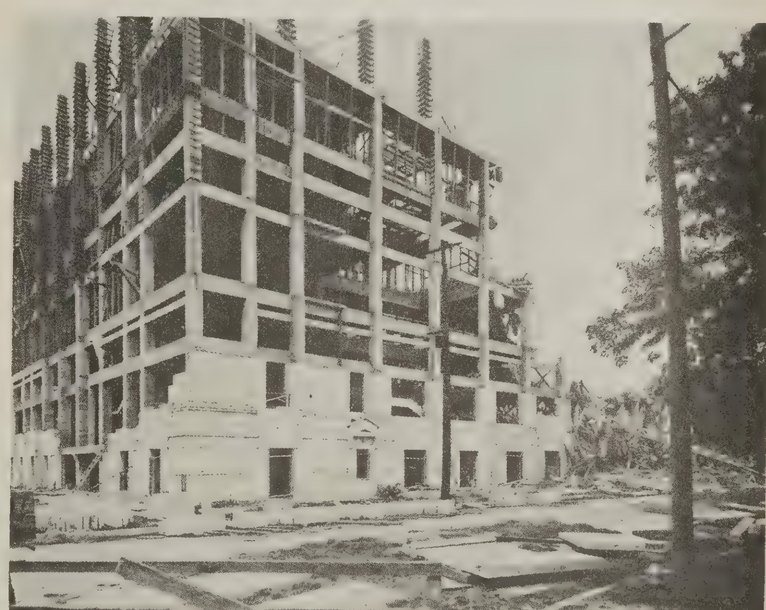


Fig. 1—Southwest corner of Masonic Temple, after the collapse of a portion of the building, July 11, 1921

This failure is of unusual interest to contractors and builders, because the structure was carried entirely on falsework or shoring up to the time of the collapse, and therefore the failure is one of falsework.

Figure 1 is reproduced from a photograph taken directly after the collapse, and shows the west end and a portion of the south side of the building, which remains standing, while a larger portion of the building to the east and north was carried down in the collapse.

Figures 2 and 3 are from photographs taken several weeks after the collapse, when a good deal of the rubbish had been cleared away. Figure 2 is a view looking across what was to have been the auditorium and large banquet hall toward the southwest corner, and Figure 3 is a view from the southeast corner looking northwest. The building had been carried up to the lodge floor, which was the sixth floor above the ground, and formwork was being built for the roof. The extent of the construction prior to the collapse is quite clearly shown in Figures 4 and 5, which are longitudinal and cross sections of the building. In these two drawings, those portions which were carried down in the collapse are indicated by solid sections and cross-hatched members. The lodge floor formed the ceiling of the auditorium and was to be supported by two large reinforced concrete trusses. These trusses had not been built at the time of the collapse, and therefore this ceiling or floor, not being self-supporting, was carried on long length shoring which rested on the auditorium floor. The auditorium floor formed the ceiling of the banquet hall, and this floor or ceiling was likewise supported on shoring which rested on the banquet-room floor.

Fig. 2—Taken several weeks after the collapse, when rubbish had been cleared away. The view is across what was to have been the auditorium and large banquet hall toward the southwest corner

Under the banquet-room floor were large girders and under these girders were also shorings which in general rested on the ground, except that the center shore rested on the concrete floor of a trench. This trench was 4 ft. deep and 4 ft. wide with clay tile walls.

About one hour before the collapse, some of the long shoring in the east half of the auditorium space began to bend or buckle and carpenters were put at work to brace or otherwise strengthen this part of the shoring. They observed that while some of the shoring was bending under excessive load some of the other shores were loose and wedges were called for to tighten up the loose shores. These loose shores were near the extreme east end of the auditorium.

According to the investigation made by Condron Company, consulting engineers, Chicago, who were retained by the owners to make an examination and report upon this disaster, the conclusion reached was that owing to excessive loads on the foundations of the shoring which rested on the ground and trench slab, these shores settled into the ground and probably ruptured the trench floor slab, with corresponding deflections in the large girders under the banquet-room floor, which girders were not strong enough, without the aid of the shoring under them, to sustain the great loads they were called on to carry. With the excessive deflection of these large girders, the auditorium floor construction would necessarily deflect under its load and allow the great weight of the auditorium ceiling or lodge floor to follow down. However, the shoring under the last portion of this ceiling was supported by the very rigid short span construction, and therefore, as the central portion of the lodge floor deflected, the load on the rigidly supported shoring was greatly increased, while some of the shores nearest the east end of the auditorium would be relieved of part of their load. The shoring thus overloaded began to buckle, and as all the shoring was tied together by horizontal ties, this buckling or bending would necessarily become general. This is what was observed by the general superintendent, foremen and carpenters about one hour before the collapse.

Shortly after the carpenters began work on bracing and strengthening the shores in the auditorium space, the breaking of one of these shores caused the carpenter foreman to order his men out of the building, and fortunately this warning came in sufficient time to enable all but two of seventy-five men working on the job to make their escape. Two men working on the lodge floor were caught and carried down in the

Fig. 3—View from the southeast corner looking northwest

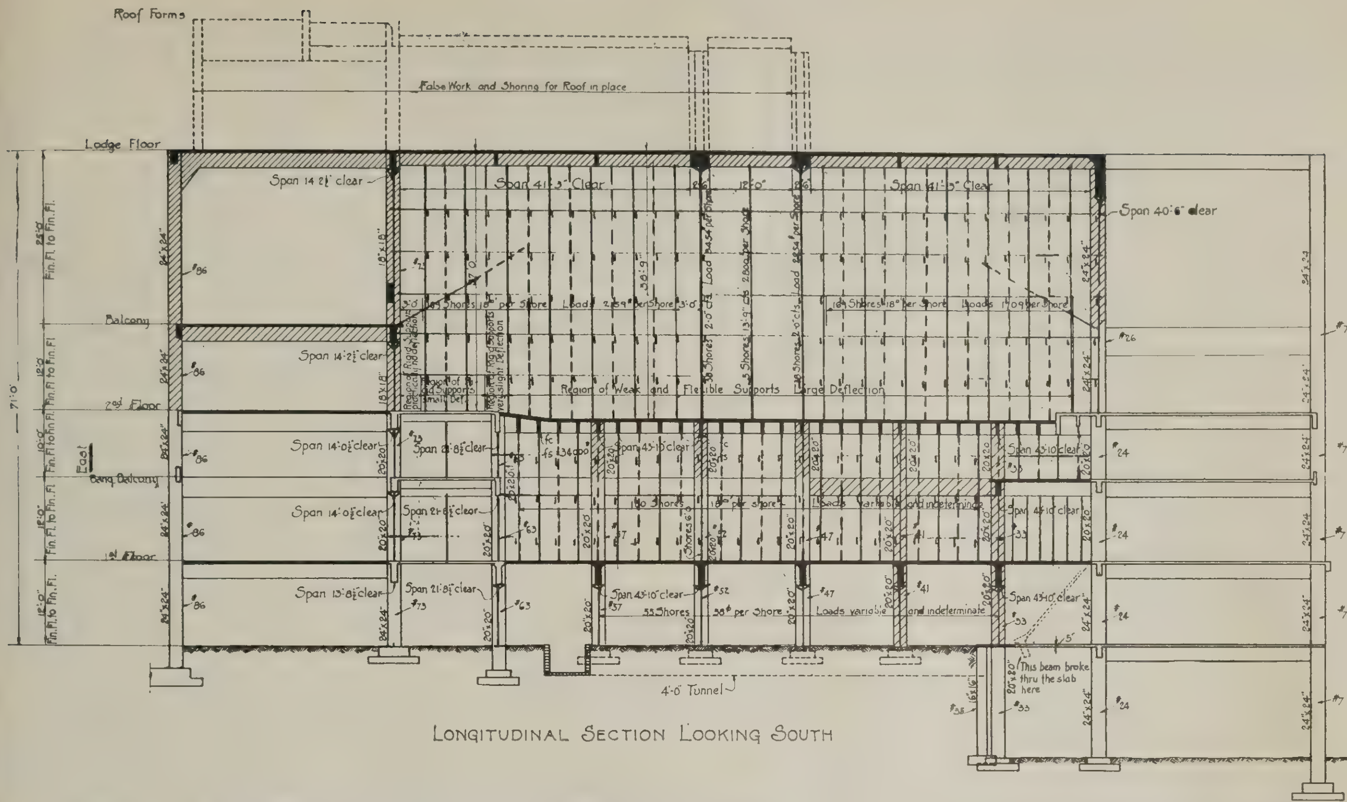


Fig. 4—The portions carried down in the collapse are indicated by solid sections and cross-hatched members in this drawing and in Fig. 5

wreck, but, fortunately, were not killed, although each one suffered a broken leg and a few minor bruises.

This serious accident should point a lesson to all builders as to the very great importance of carefully determining the loads that are to be supported by shoring or falsework, and the necessity of actually designing such falsework so as to have not only adequate strength for the loads but to be so thoroughly braced that in case of slight settlement all loads will be so distributed that none of the falsework will be overloaded. It also points a further lesson as to the importance of so spreading the bearing of false work or shoring onto the ground that the pressure on the ground will not be too great. In this case the loads on the 6x6 in. posts at the bottom were simply spread on the ground through a single 2x8 in. plank on which several 6x6 in. posts 4 ft. apart rested. The ground was none too solid, and the tile walls of the trench, even though occasionally braced, offered very little lateral resistance to the earth supporting the shoring placed near the trench.

The unusual feature of this particular failure was the fact that it occurred forty days after the last concrete was poured. Such failures have taken place during the pouring or placing of fresh concrete. In this instance, the falsework had withstood the loads from the fresh concrete of the lodge floor and although some of the formwork under that floor had been removed, together with some of the shoring, none of the shoring in the east half of the auditorium, where the failure began, had been disturbed for fully two weeks, and fully half of the original number of shoring posts in this section was still in place at the time of the collapse. It is evident that this failure was due to a condition of overstress on the ground, in the structure and in the shoring, which resulted in gradual or progressive failure, a condition commonly called fatigue.

There had been expended on the building up to the time of the collapse more than $175,000. The total cost of the building completed was to be about $800,000. Fortunately, much of the facing marble that had been erected was uninjured and therefore saved from loss, but practically all of the frame of the structure will have to be rebuilt, so that the financial loss due to this collapse is very great.

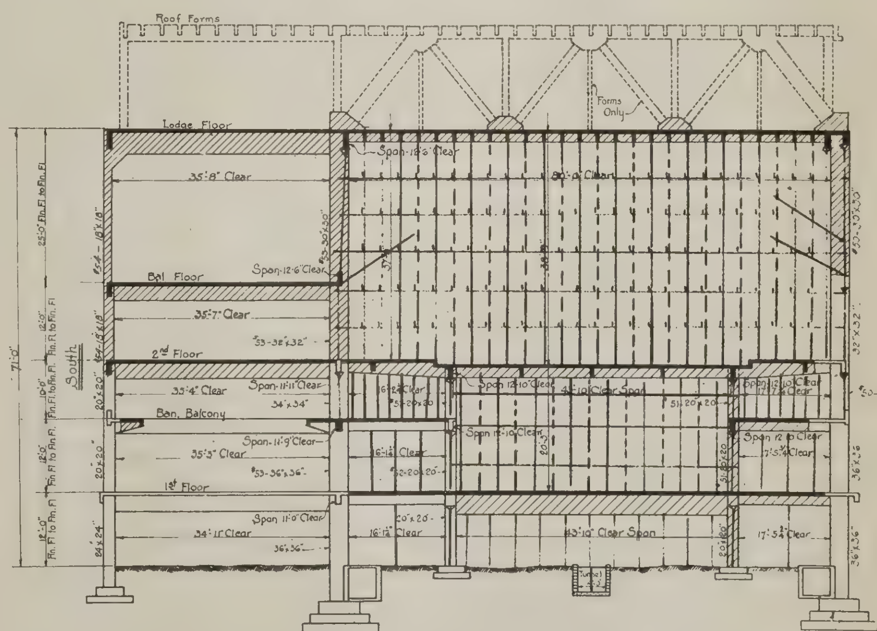


Fig. 5

The Foreman Talks About Old Men and Efficiency

By Edward H. Crussell

OUR old friend the foreman, who was forever and continually preaching to Davis concerning the benefits to be obtained from reading technical literature and trade magazines, was taking some of his own advice. Seated on an upturned nail keg on the shady side of the house he was devoting the latter half of the noon hour to the pages of a magazine published in the interests of one of the woodworking trades. That he was not entirely satisfied with what he found there was, however, soon evident, for presently with a display of much unnecessary violence he twisted the periodical into a roll, pitched it to the far corner of the lot and ejaculated, "Bah! What insufferable rot!"

Davis, who had been an interested spectator of the incident, retrieved the offending magazine. "What's the matter?" he inquired with mock solicitude, "did you bet on the wrong horse or something?"

The foreman at first ignored him, but being pressed for a reply took the magazine into his hands again and as he turned the pages, explained: "For some reason or other I get foolishly excited about every time I see that much over-worked word, EFFICIENCY. Within the last few years it has undoubtedly become one of the most abused and misrepresented words in the English language. It has been made a synonym for every despicable trick in the small-calibered executive's equipment, from cutting wages and lengthening hours to slave-driving, overbearing, bullying tyranny. Every space-writing expert manages, in some manner or other, to give us a new definition of the word and now comes a fellow who evidently wishes to make it stand for the scrapping, or retiring to subordinate or charitable positions, of all help that has passed the age of forty years, irrespective of its former loyalty or present ability.

"Here is the article. It is headed, 'EFFICIENCY AND THE AGE OF EMPLOYES.' It is decorated with one of those important looking charts, so dear to the eye of the college-boy engineer, and, so far as I am able to make out, is an effort to prove that no one should hire a man who is over forty years old, and that all present employes who have reached that age should be relegated to subordinate and unimportant positions, where their incompetence will not tend to slow up the rest of the plant. How any editor can be found who is willing to print such rubbish, is something beyond my comprehension."

He scanned the article for a moment and then: "Listen to this," said he: "'*It is a well-known fact that men of advanced years, no matter how skilled their experience has made them, are unable to produce a normal amount of work—are unable to complete on quantity production with men of less years.*' Is there anyone gifted with the ordinary amount of every-day common sense who would be willing for one moment to maintain and defend such a statement? He is not talking about ball players or prize fighters, remember, but about skilled artisans in the woodworking industry; and don't forget that in this case, 'advanced years' means from forty years upward."

He read again: '*A plant which permits its older workers to be mixed in with the younger men is very materially slowing down production.*' "Now I wonder about that." And he gazed meditatively over his specs at the other members of the gang, who had in the meantime gathered around him. "I wonder if the general run of foremen segregate their 40-year-olds and herd them by themselves where they will not slow down production, or if they mix them in with the young and irresponsible, so that a little of the leaven of skill, loyalty, understanding and conscientious workmanship may leaven the whole bunch? Speaking as one who knows from personal experience what some of the trials and tribulations of a foreman are, I'm willing to make a small bet that the fellow who follows the first method will not last as long as a celluloid collar on the devil's chief cook.

There are things more important than quantity production. I can easily remember the time when, with the boundless energy of youth, I did two day's work in one, and how, just before the whistle blew, the boss discovered that everything I had done was wrong, and in consequence there was twice as much lumber spoiled as there would have been if I had not been so young and full of energy. I remember the boss said he'd have been money in pocket if he had paid me my wages to stay at home. I also remember that when he wound up by firing me I didn't give a cuss, because I was not yet 40 years old and could easily get another job.

"It is fairly safe for me to say that if I remember these things, some of you remember something similar; so does pretty nearly everyone who has done anything at all in the world. There is an old proverb which runs: 'A wise man knows an ignorant one because he has been ignorant himself, but the ignorant cannot recognize the wise because he has never been wise.' In like manner, and without meaning anything personal or applicable to present company, I may still say, that the competent workman of 40 and upward has it all over the fellow who has not yet attained to those years of discretion and experience.

"This writer uses as an illustration a factory where a number of the workmen were over 40 years old when they were hired, and says, 'Therein lies the fault, not in the fact that they are now employed.' That is indeed some fault. Two or three years ago this country was passing through a period of great labor shortage, without doubt the worst in history, and the executive who could get serviceable help of any kind, 40 or 50 years old, deserves praise instead of blame and should not have this ability classes amongst his faults.

"In what is perhaps an effort to smooth down some of the rougher spots, the article intimates that the reward for employes of long service should be based upon the annual saving of labor turnover expense. This, of course, is nothing but bosh. The argument defeats itself; the very reason why there is such a thing as labor turnover expense is because the newcomer lacks something the old workman has. The average mechanic is a better workman between the ages of 40 and 60 than he is between the ages of 20 and 40, and he can earn more money, both for himself and for the firm during the latter period. If he cannot, then such words as knowledge, skill, experience can have no meaning. As long as I have good health I'm a better workman this year than I was last; so are you, if you are not, then there was something wrong with you in the first place, I don't care what your age is."

At this point Davis interrupted the monolog with: "Then according to your view, boss, such words as youth, strength, energy, speed, activity, don't mean anything either, and a fellow has to get to be forty years old before he is good for anything?"

The foreman shook his head. "I didn't even intimate any such nonsense. I have always been a believer in and admirer of the untiring energy of youth, and if I could have the energy and pep of twenty-one, coupled with the knowledge and experience of forty-five, I'd expect to be a world beater; but seeing that I can't have both, I'll take the knowledge and experience and trust to them to conserve my energy by avoiding the false motions and wasteful efforts of the immature years.

"I'm taking the workman's side in this matter, the young as well as the old. Once let the wild-eyed executive (who considers an aimless waving of arms and legs and a disorderly rushing hither and yonder as evidence of efficiency) get the idea that the proper judging of a workman's ability can be reduced to note book formulae and plotted on a chart, and we'll return to a semblance of the days when each workman had to show his debentures and apprenticeship papers before he would be considered for a job: only in our case the papers will be birth certificates and affidavits concerning the same, and men will be more interested in concealing the facts concerning the date of their birth, than they will be in improving their ability.

"I think we can sum up the entire matter about as follows; the young fellow has the virtues of strength, activity, and endurance. He also often has the following faults; he is irresponsible, insubordinate, and careless. He may have plenty of energy but knows no reason why he should expend it all for the benefit of the boss: as a matter of fact he is more likely to spend the greater part of it at dances or other activities of the young. He generally has only himself to think of and knows that because of his youth and strength, he can easily get another job if he loses this one. This tends to make him irresponsible and insubordinate. He is careless, merely because carelessness is a trait of the young and he has not yet learned to be careful.

"The middle-aged workman hasn't the activity of youth any more than the old cat has the activity of the kitten, nor does he need it any more than the cat does. He has the skill and efficiency which enable him to do the same amount of work with one-half the motions. Previous experience has taught him to foresee the emergency before it arises and he plans accordingly. About half of what the short-sighted executive takes for youthful industry is nothing but a mad scramble to cover up a careless mistake before it is discovered by those in authority. I could recite hundreds of instances in proof of this, so could anyone else who has made a practice of keeping his eyes open. The older workman has done with most of the follies of youth, he more often has a family to consider, he has acquired the common sense of mature years and fully realizes that insubordination, disloyalty, or opposition to the boss, will gain him nothing but trouble. Most important of all, he has a reputation to maintain and it is a matter of professional pride with him to avoid mistakes and turn out as much work as anyone else.

"Not all the young workmen come under the first classification, and not all the old workmen come under the second, but the general trend is as indicated and will certainly refute any such statement as: *'It is a well known fact that men of advanced years, no matter how skillful their experience has made them, are unable to produce a normal amount of work.'*"

"Thanks boss. Thanks." Said Shepard. "You express my sentiments exactly, in much better language than I could ever hope to. I'm mighty glad to have heard your views on the subject because having got pretty well along the way myself, I might have felt a little diffident about singing the praises of the man of mature years in the way you have. I might have been afraid that my hearers would think I was beginning to get nervous about my own chances and was looking for a soft spot to fall on. It'll be a tough day for many of us old has-beens when they start judging us by our age instead of our ability; I hope I'll be through working before that day comes."

"Don't worry," said the foreman, "one of the best things I've learned in the school of experience is, that as long as you have the goods, it's no trouble either to show them, or to deliver them. That goes for all of us, the young as well as the old, and we need not let the ravings of any of these efficiency sharks scare us away from the notion.

Principles of the Associated General Contractors of America

The following postulations introduce the program's main objectives:

A PRINCIPLE IS A STANDARD BY WHICH MEN LIVE.

A PROGRAM IS THE MEANS OF PUTTING A PRINCIPLE INTO EFFECT.

A PRINCIPLE WITHOUT A PROGRAM IS A PLATITUDE.

CO-OPERATION IS THE STANDARD THAT GIVES LIFE TO ASSOCIATIONS OF MEN.

IS IT A BLITHERING PLATITUDE, OR IS IT AN EFFECTIVE PRINCIPLE?

THERE IS JUST ONE TEST: HAS IT AN EFFECTIVE PROGRAM?

The Present Program of the Associated General Contractors of America includes the following main objectives:

Co-operate with Associations of Engineers, Architects, Manufacturers, Dealers, Bankers, Realtors, Sub-contractors, and Workmen in the solution of common problems.

Maintain the National Board for Jurisdictional Awards in the Building Industry.

Organize a National Conference Board for the Building Industry representing contractors, workmen, architects, engineers, and owners to consider working conditions, establish national standards, remove restrictions, and eliminate strikes.

Promote the organization of official and voluntary Boards of Arbitration of disputes.

Put in operation the procedure for Payment for Estimating and Quantity Survey, recommended by the joint report of A. G. C., American Engineering Council, and American Institute of Architects.

Formulate Standard Estimating Forms for builders and highway contractors.

Develop a System of Money Accounting for contractors.

Standardize Construction Cost Accounting Practices, such as equipment rental schedules.

Secure necessary amendments to existing Standard Contract Forms and formulate others as needed, for use between Contractor and (a) Owner, on lump sum, unit price, cost plus work in building, highway, railroad, and public work construction; between Contractor and (b) Sub-contractor, (c) Material Manufacturer, and (d) Equipment Manufacturer.

Revise, systematize and standardize Compensation Insurance Classification and Rates.

Develop the Contractors' Service Corporation as a service bureau representing contractors on insurance rates, coverage, and service; establish local branches.

Secure passage of National Legislation, as follows:

Navy, War, Treasury Contractors' Relief Bills,

Department of Public Works Bill,

A Scientific Selective Immigration Law,

Adequate, Federal Aid for Highways,

An effective Water-power Development Act,

Proper Railroad Regulation including: (a) Maintenance of private ownership, (b) curtailment of Interstate Commerce Commission's arbitrary power to grant priorities, (c) modification of wartime freight rates on construction materials, (d) adequate support of railroad expansion.

Standardization of Government Contracts, Jt. Res.

Secure an Open Wholesale Market in materials.

Urge Fall Lettings of highway and public works contracts.

Seek the Standardization of Building Codes.

Encourage Associations of General Contractors in the solution of problems of mutual interest.

Maintain a Research Division for the study of contractors' problems.

Give accurate Information and Statistics on construction through regular publications, bulletins, and pamphlets.

Restore public confidence in construction by maintaining a Code of Ethics for contractors based on the highest standards of Skill, Integrity and Responsibility.

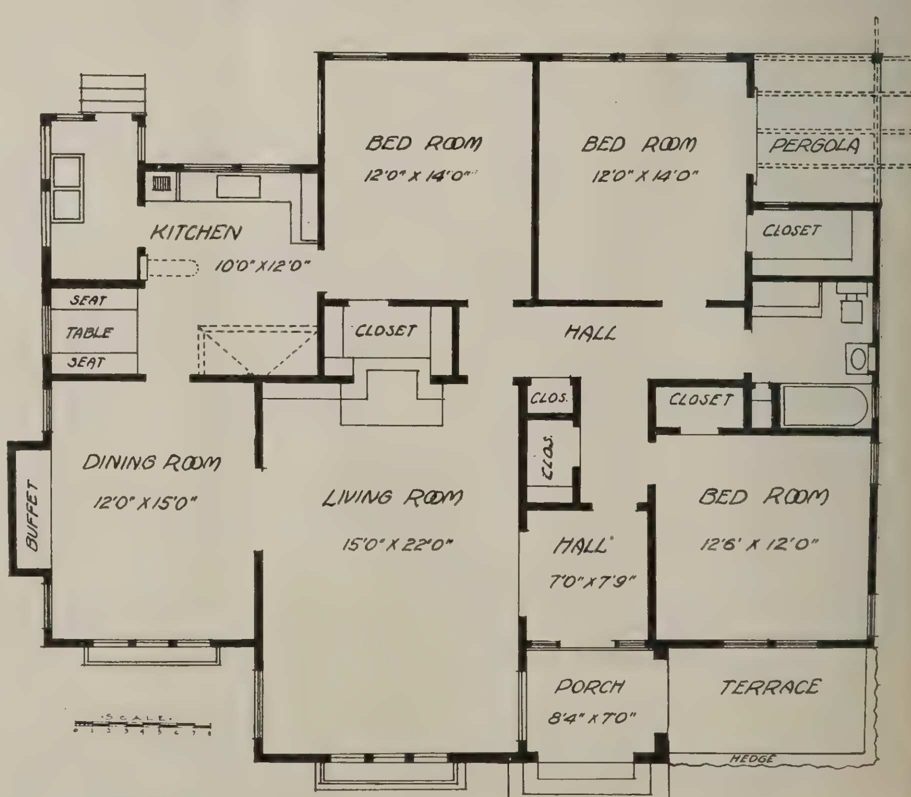
An English Manor House Type

THIS six-room cottage in English manor style was designed by Architect Frank M. Tyler, Los Angeles, for Edwards & Wildey, and was erected on the opposite corner from a French chateau in Los Angeles, Calif. Though done in plaster and cement, with shingled roof of olive green and all exterior painting and landscape work to harmonize, yet it stands as true to type as if done in ancestral stone and slate.

Mr. Tyler has made the big living room the key to the home, this room corresponding to the English drawing room and being the center of things in a hospitable family taking active part in the social life of the city. The 14-foot domed ceiling and the walls of this room are canvassed and hand decorated in oils in the soft Tiffany blends, and the wood work done in old ivory. Both the direct and indirect systems of lighting are used in this room, as well as in the dining room adjoining. In the latter room a striped wall paper in Colonial design is used effectively, and the trim is of Tabascan mahogany. The buffet is a movable piece set in the recess conveniently provided for it.

The little reception hall is not always found in California dwellings, and is especially prized in this case. The inside hall entirely separates the sleeping apartments from the living rooms. Off the hallway is a closet for guests' coats and wraps, and the closets off the bedrooms are sufficiently large to accommodate trunks or to serve as dressing rooms. Accommodation for twin bedroom suites is especially planned for in two

1—Type of English manor house



2—Looking from living room to dining room

3—Looking from living room to front entry

4—Showing detail of porch roof

5—Back of house, showing cellar balkhead, and detail of screen porch

of the rooms, and there are sidelights on the walls and indirect lighting above, and duplex plugs near the baseboard for attaching vacuum cleaner, sewing machine, etc. The dining alcove is off the kitchen, and everything carefully planned for the convenience of the woman who in getting a centralized one-story home plans to leave herself as little as possible at the mercy of outside help.

The general construction and class of materials is the same as that used in other Edwards & Wildey houses. In the present case there is a basement, reached by an outdoor balkhead, and the gas furnace is a baby brother to that used in their two-story houses, being only about 3 x 4-feet in size, and set up on a cement stand or base, having a pilot light and controlled upstairs. This house before it was finished was sold for a price of $12,500 and the owners occupying it are eminently well satisfied with it in every way.

6—Showing side and back of house. Note that provision is made for a vine-covered pergola at corner

Questions, Answers, Kinks and Discussions--V. L. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

Two Methods of Bracing

A. L. S., a contractor located in Comer, Georgia, sends us the accompanying sketches (Fig. 1 and 2) illustrating two methods of bracing. Of them he says: "The upper sketch, or 'right way,' shows how the braces hold the house together. The lower, or 'wrong way,' shows how the house would be torn apart by the brace tending to ride off the upper corner. The first is the style of bracing I have used for years and have secured lots of jobs on the strength of it."

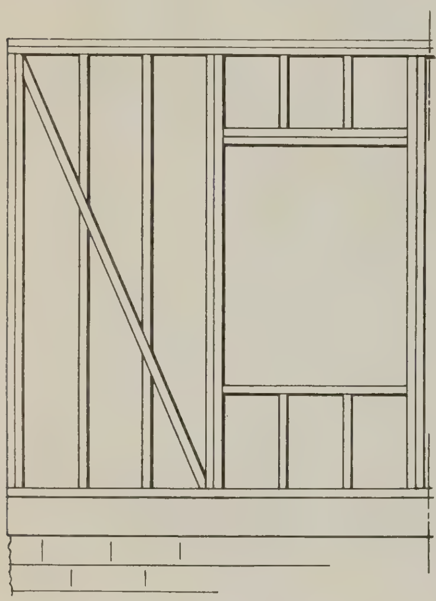


Fig. 1—The wrong way

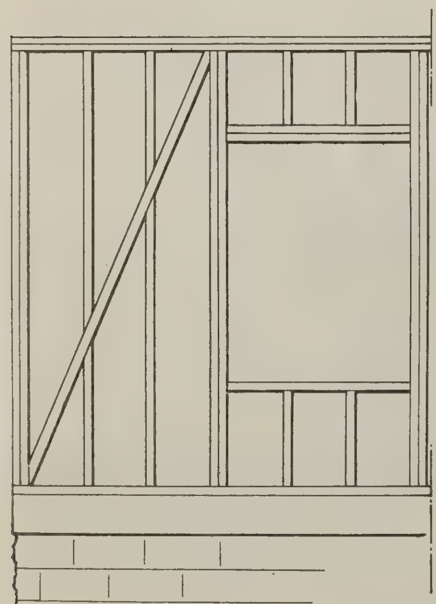


Fig. 2—The right way

This letter is interesting in more ways than one, and is presented for general discussion. For just what purposes is a house braced? There probably are as many and as varied reasons for bracing houses as for bracing ships' hulls. Neither a house nor a ship may be rigid. Both must withstand varying loads from all directions (except in the case of a Texas cyclone when the house might explode at the storm center).

This discussion will take you back to that on diagonal sheeting at the lower corners and diagonal flooring.

Putting Up Long Rafters

H. S. M., of Sherman Mills, Maine, writes us: "Having some long rafters to put up and only one man to help me, I nailed a piece of board on the side of the rafter far enough from the plate to slide down by and hold the foot of the rafter from sliding off the plate."

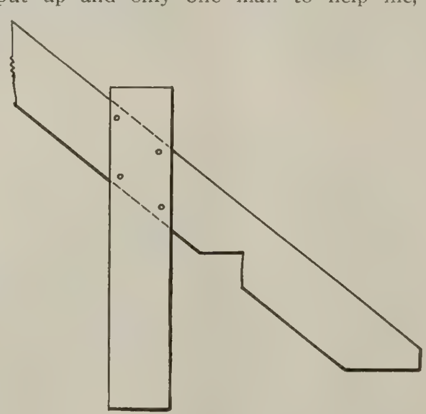


Fig. 3

Rafter Framing

A. G. Young of Ogunquit, Maine, writes: "I am sending my way of obtaining side cut for hips and jacks rafters. (See Fig. 4.) I lay out my foot or bottom cut and saw out my crow-foot notch. That is where the rafter sets on the plate. When I have my length I take the piece that came out of where the plate goes and lay it on the back of the rafter just as it sets in the foot. Then I take my mitre square and mark a square mitre. The crow-foot pieces give me the rise, and as a square mitre would be the cut if the stick was level, it would still be a square mitre only the raising of the rafter would make it look longer. But still it is square mitre to the plumb cut. This would not work on an irregular hip but is O. K. on a square hip."

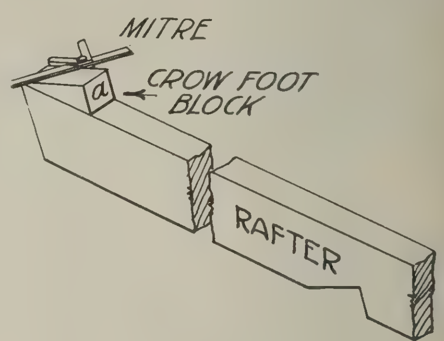


Fig. 4

Trigonometry in Carpentry

In glancing through some recent books on carpentry this statement by Griffith's attracted my attention. The statement is made in a preface and concerns the use of trigonometry in carpentry.

"No apology is made for making use of trigonometric solutions of plane right triangles as a basis for developing generalized roof framing principles. There is absolutely nothing in the use of natural trigonometric functions to prevent their introduction in mathematical experience—*except academic tradition.* The ease with which roof framing problems lend themselves to solution by the use of natural trigonometric functions and the readiness with which problems may be generalized thereby has emboldened the author to make use of it in a text as elementary as this. No previous knowledge of trigonometry is presupposed, . . ."

This topic is interesting because of the large number of roof framing problems submitted, all of them no doubt correct but some rather laborious.

An instructor of machine design in a

technical night school held classes composed of machinists, pattern makers and other types of men thoroughly experienced in their trades, but with small mathematical experience. They progressed to work on bevel gears and worm gears long before the routine of the mathematics had carried them to trigonometry; but as that study,

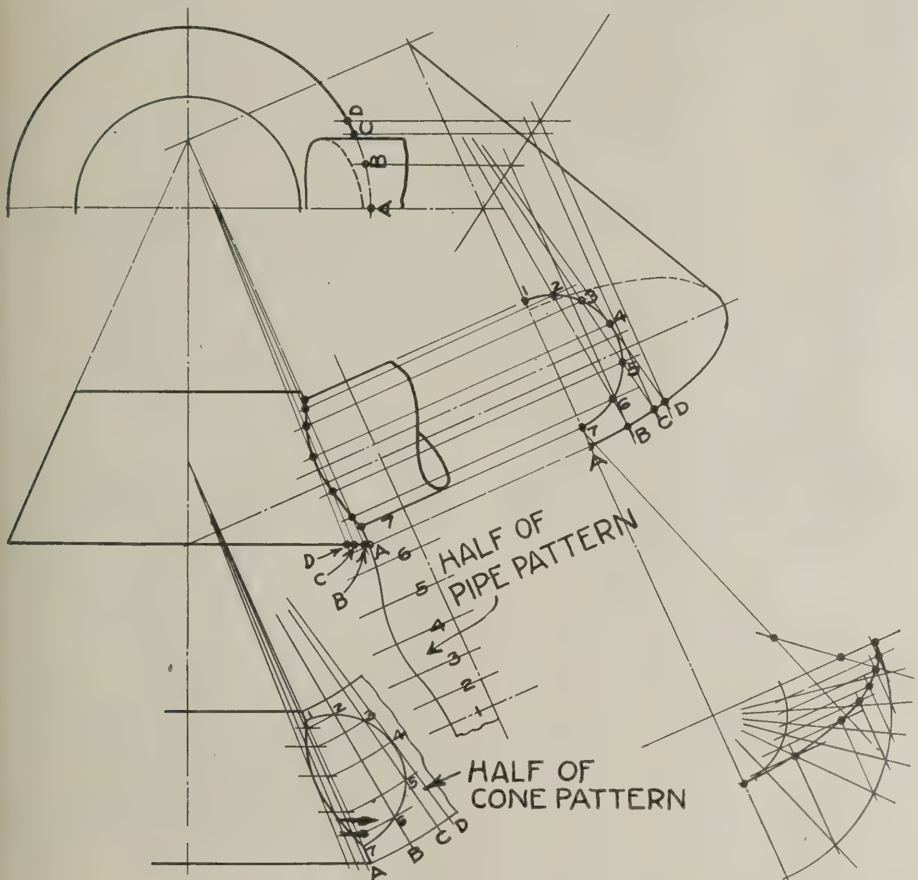


Fig. 5

or at least a part of that study, was essential to the work in hand he provided each man with a small pamphlet containing the functions and logarithms. The right triangle ratios with their respective names were explained on the blackboard, and the work progressed.

With few exceptions the students found themselves familiar with a lot of obscure signs because they were already familiar with triangles in every day work. No carpenter except the "hammer and saw" type should have the least fear of trigonometry.

Intersections

The development of surfaces is about the most interesting of all projection drawing problems. The cone and cylinder are extremely common and easily developed.

Fig. 5 shows the upper section of a furnace shell as the frustum of a cone which is drawn complete. When the cone is drawn, front and plan views, the pipe center is located and brought out to the right for an auxiliary view. In this view the pipe is drawn as it is, a full circle, and the cone is drawn as it appears when you look straight into the pipe. The lines from the vertex to the base of the cone are then drawn in the auxiliary view (Fig. 6), the tangent element "D" first, touching the pipe at the point "4." Other elements are placed as desired and projected into the front view and plan view as shown "C," "B" and "A," and the points of intersection with the pipe circle "1," "2," "3," "5," "6," and "7." The curve in the plan view is really unnecessary but that in the front view with the points must be drawn.

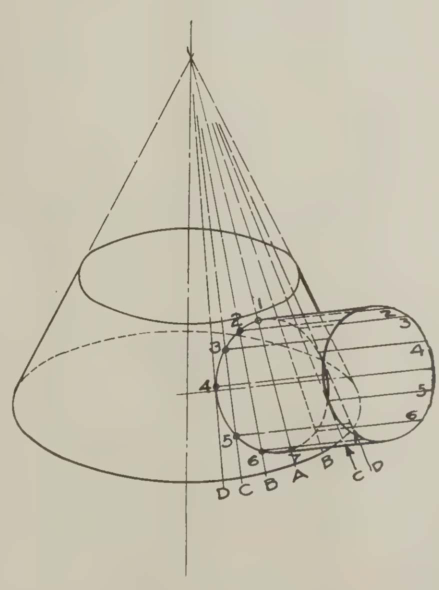


Fig. 6

To get the opening in the cone draw a circle with the vertex as a center and the radius equal to the side, or slant height, of the cone. Step off on this circle the points "B," "C" and "D" as your dividers, take them from the circumference of the cone in the plan view, and draw elements. You are rolling out the cone. With the points projected straight across to the edge of the cone you can swing them onto their respective elements. In this you are in reality swinging the points around the cone's axis to the element from which they can be transferred. This gives you half of the cone pattern.

To get the pipe end pattern the cylinder is sliced with a plane at right angles to its center line and the elements of the pipe stepped off as they come from the pipe circle in the auxiliary view. For convenience the pipe is unrolled directly below the front view so that the points of intersection may be projected to the proper elements.

Notice in each case that the developments being symmetrical with the center lines only half a pattern is necessary.

Cements for Emergency Repair

Freshly prepared curd from soured skim milk is mixed intimately with one-fourth its bulk of lime, which has been slaked by adding just enough water to cause it to fall to a powder. This cement, which is good for wood, marble, metals, and glass, should be used immediately as it soon sets to a hard mass. When used on marble or wood, it is advisable first to paint the surface with a solution of casein (curd) in borax solution or ammonia, to fill the pores.

Powdered and sifted quicklime mixed to a paste with white of egg quickly sets to a hard cement that can be used on ivory, marble, glass, porcelain, etc.

A waterproof cement for cisterns, casks, etc., is made from glue, mixed with one-fourth its weight each of boiled linseed oil and red ochre. The glue is soaked and melted in as little water as possible and the other ingredients are then thoroughly mixed in. The cement should set in two or three days.

Powdered whiting or air-slaked lime mixed with hot glue will adhere to wood and metals. Liquid glue containing acid should not be used.

Litharge and glycerine mixed to a paste form a cement that adhere strongly to metals, glass, etc. It is not softened by heat and resists the action of water. Beeswax and rosin melted together in the proper proportion for the desired consistency form a cement that will adhere strongly if aplied to warm metal or glass surfaces. It may be mixed with whiting, etc., to give it more body.

Shoemakers' wax and shellac melted together at not too high a temperature give a more tenacious cement than the preceding.

The metal or glass to be cemented must be hot enough just to melt the cement. By changing the amount of shellac from one-half to two and one-half or three times the weight of the wax resulting cement will vary from moderately ductile to quite hard and brittle form.

An excellent aquarium cement is made by mixing ten parts each by volume of litharge, fine sand, and plaster of Paris and one part of powdered rosin with enough boiled linseed oil to make the mixture somewhat stiffer than ordinary putty. The aquarium can be filled with water in three or four days, even though the cement may not have set hard.

Rubber cement is made by dissolving crude rubber in gasoline or benzine (benzol). Other ingredients, such as dry mineral fillers, gums, or resins, are sometimes added to adapt the cement for particular purposes.

In cementing two rubber surfaces together they should first be thoroughly cleaned with gasoline. This is absolutely essential to secure satisfactory adhesion. If the surfaces of the rubber are very smooth, they should be roughened slightly with sand-paper and again cleaned. A small quantity of cement is now spread over each surface, and after allowing a few minutes for the major part of the solvent to evaporate the two surfaces are stuck together and kept under pressure for several hours to give the solvent time to evaporate completely.—*The Modern Hospital.*

Handy Time Card and Cost Record

41225

EMPLOYEE'S NAME ____________

CARPENTER'S TIME CARD WHERE WORKING ____________

ADOPTED BY MASTER CARPENTERS' ASSN., MILWAUKEE, WIS

Mark Hours Under Date Opposite Kind of Work Done	1 / 16	2 / 17	3 / 18	4 / 19	5 / 20	6 / 21	7 / 22	8 / 23		9 / 24	10 / 25	11 / 26	12 / 27	13 / 28	14 / 29	15 / 30	31	TOTAL	Draw Line Through Item on Side Not Needed
Posts ( )																			Hang Door or Window
Girders ( )																			Jambs ( )
Joist ( )																			Casing ( )
Lining ( )																			Stairs ( )
Outside Studs																			Wainscoating ( )
Partitions ( )																			Base
Sheathing ( )																			Bookcases
Rafters																			Mantels
Shingling																			Cabinet ( )
Siding																			Pantry Finish
Floor ( )																			Chair Rail
Concrete Shoring																			Coal Bins
Frames																			Store Front
Cornice ( )																			Porch Work
Fence																			Screen or Storm Sash
Scaffolding																			Garage Doors
Steps																			Shelving
Furring																			Skylights
Sleepers																			Picture Mldg.
Repairing ( )																			Hardware Trim
See that Foreman Punches Total Time Here Before Leaving Job																			Total Hours

½	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8		9	10	11	12	13	14	15		Jan	Feb	Mar	Apr	May	June
10	20	30	40	50	60	70	80	90	100	16	17	18	19	20	21	22	23		24	25	26	27	28	29	30	31	July	Aug	Sep	Oct	Nov	Dec

EMPLOYEE'S NAME ____________

WHERE WORKING ____________

MEMORANDUM ____________

41225 CARPENTER'S TIME CARD

Considerable trouble has been experienced by contractors to obtain from their men correct reports of the number of hours worked by them on different kinds of work and at different jobs or places, says the *Builders' Bulletin,* and therefore the Master Carpenters' Association of Milwaukee, Wis., made this matter a special issue at a number of its regular meetings. Members who had adopted for their own use some system of time reporting were requested to submit specimens of their cards or sheets and from these the committee in charge selected the principal or most suitable features which were combined and laid before the members for discussion.

After several meetings the form shown herewith was adopted and 50,000 sheets were ordered printed. The total expense was advanced by the association and each member given the privilege of purchasing at net cost from the association's Service Bureau as many copies as he may desire. By printing the sheets in large lots the cost to the individual member is lessened considerably.

In addition to providing an absolutely correct cost and material account from which the contractor can make his charges and keep tab of extras, these sheets, if filed, will also serve as the original entry and first-hand evidence in case of dispute or lawsuit with an owner, should he question the correctness of a bill for work done.

Another great advantage in having uniform time sheets is that the men when changing from one boss to another are already familiar with the system and need not be shown how to use the forms before beginning their work. The sheets are conveniently blocked in lots of 200 and the cost is comparatively trifling.

Casein Glues Exceptionally Durable in Damp Places

Casein glues are as a class more water-resistant than animal and vegetable glues, but they are not, strictly speaking, waterproof. There is no glue that is waterproof in the sense that it is absolutely unaffected by water after a long immersion. Nevertheless, there are casein glues that are so water-resistant that plywood glued with them will withstand soaking for many weeks in water or exposure for many months to a warm, damp atmosphere. Under similar conditions, animal and vegetable glues would lose their strength in a comparatively short time.

When casein glue joints are kept fairly dry, they can be expected to retain their strength and remain unchanged for an indefinite period, as is the case with animal and vegetable glues. Water-resistant casein glue in a joint, kept constantly wet, will after a long time weaken, but it will ordinarily regain a great deal of its strength if the joint is dried. In a study aimed to discover the reason why casein glues ultimately decompose when kept moist, the Forest Products Laboratory found that under certain conditions the decomposition seemed to be due to a hydrolysis of the casein, undoubtedly brought about by the sodium hydroxide that is always present in casein glues.

This explanation when published was misunderstood to some extent. It should not be taken to mean that casein glues are unreliable, and not durable enough for use in manufacturing plywood and other glued products. On the contrary casein glues are considered as permanent as any under dry conditions, and the water-resistant casein glues are more permanent than animal or vegetable glues under wet or damp conditions.

"Attaboy"

A builder in Covington, Ky., writes: "Please send one of your subscription blanks and one of your late issues to my friend ——— in New Jersey. I have been writing to him of the good stuff I get out of National Builder, and he wants to subscribe."

Chimney Stacks

By John Y. Dunlop

IN common practice the simplest form of chimney stack is one built with brick in stretcher bond and finished on the top course with a concrete cope.

These copes are most always cast in position with the wooden forms built on top of the chimney. In priming the course of the flue through the cement cope, a piece of tin bent to the inner circle of the chimney will give the formation in the cement.

Double flue brick chimney with the upper portion arranged diagonally

Stone chimney stacks showing one group placed diagonally while the rear one is of twisted pattern

Flues are usually square in section and if a round chimney pot is used the angles of the square flue at the connection are covered with a piece of slate sufficient to carry the cement until set.

I may say that I don't like to use round pots on a square chimney flue for the reason that the corner formed at the junction of flue and pot forms an obstruction to the smoke and in the course of time a great amount of soot collects at those corners. If such a chimney takes fire it will be found that the soot generally burns very long at the top, with the result the chimney pot often splits and when the next gale comes along the pot falls to the ground. I always advocate the use of round chimney pots when circle fireclay lining is in use. But where the flue is square, a chimney pot which is nearly square at the base is best.

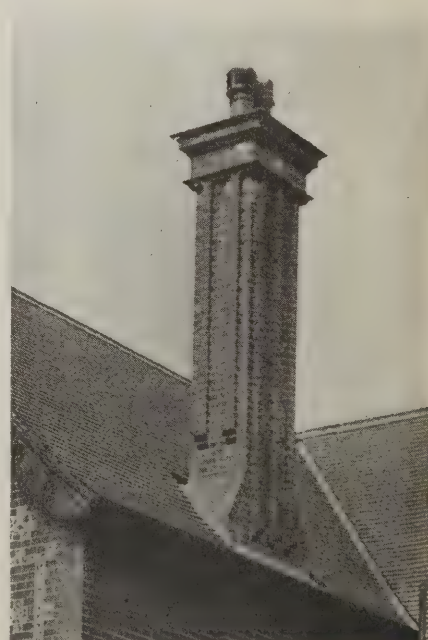
Of course this is just one of those small points in construction which cannot be seen alike by every one, but to me it seems to be very important in many cases. For instance on one job which I can well remember we had occasion to build a 16-inch square flue in a 28-inch stone wall and of course as the material was stone, the mason put a stone cope to finish the top part. A hole cut through the cope was 15 inches in diameter with the result that the chimney was finished with a 15-inch chimney pot and the job worked all right. In course of time the heating boiler was put in and it did not draw any too well, but as the flue was not a very long one the faulty draught was laid to the short flue.

In this, as in a great many other jobs, nobody was to blame. The boiler was as specified and the chimney was built according to the drawings, with the result that the poor janitor of the school was left to make what he could of the heating. It was not very long, however, until the soot began to collect at the under side of the chimney cope and in short the chimney took fire, with the result that the great amount of heat due to the acumulated soot split the cope stone. Of course it then became quite evident that the corners which were covering up a great part of the flue were the cause of all the trouble.

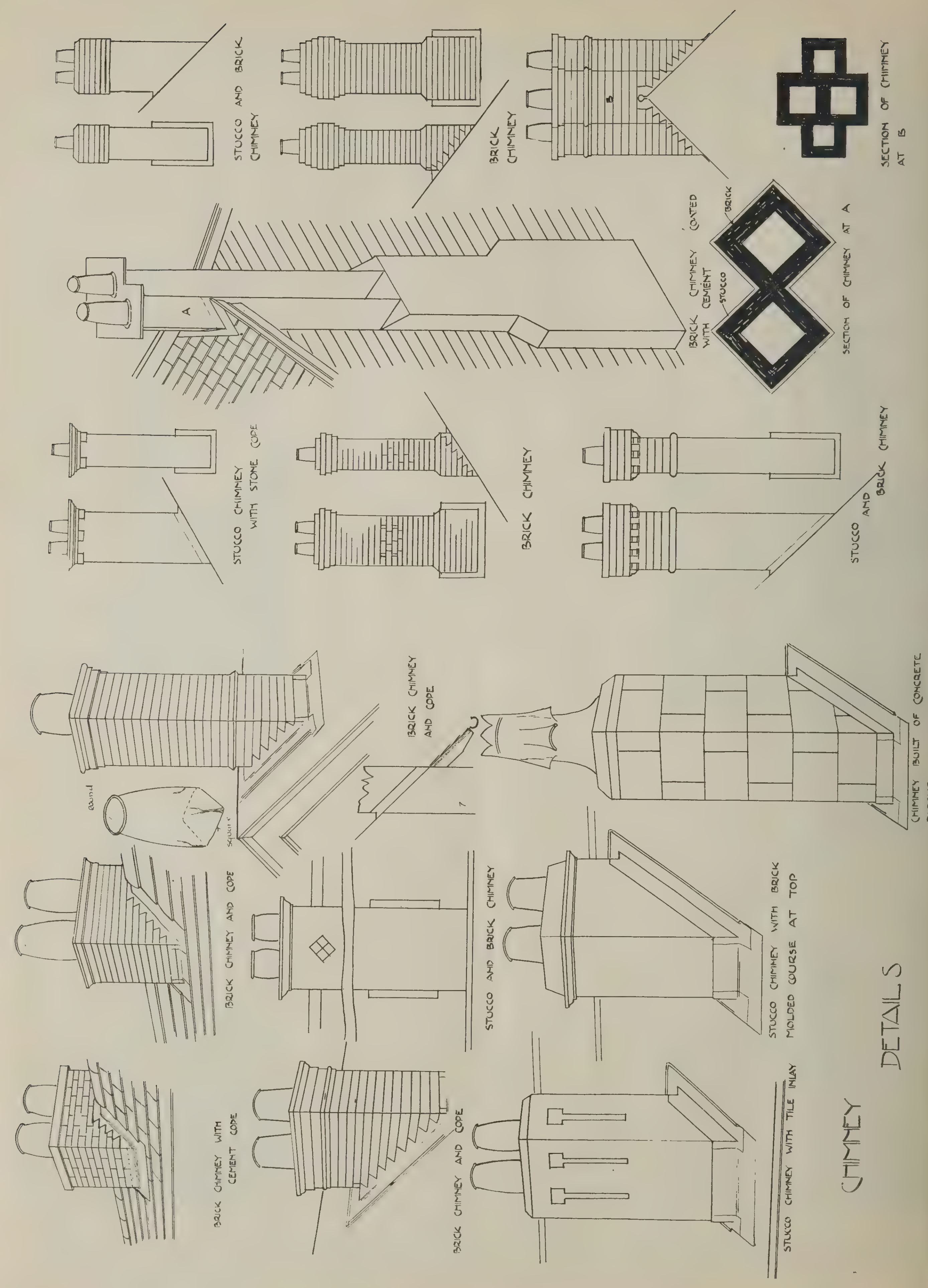
A chimney passing through a roof entails a certain amount of trimming for the carpenter, as in the first place it is desirable that a rafter should be put on both sides of the chimney. In thick chimneys there might be a rafter between these rafters which would mean that a header would be required between the two rafters first mentioned.

Another important part of such construction is the rendering of the junction of the chimney and roof watertight. With

The cornice at the top is built with common brick, while the three top courses are drawn in to reduce the flat surface of the chimney stack at the top to a minimum



Two flue brick chimney stacks built with projecting pilasters and moulded top courses


STUCCO AND BRICK CHIMNEY
BRICK CHIMNEY
B
SECTION OF CHIMNEY AT B
A
BRICK CHIMNEY WITH CEMENT STUCCO COATED
STUCCO
BRICK
SECTION OF CHIMNEY AT A
STUCCO CHIMNEY WITH STONE COPE
BRICK CHIMNEY
STUCCO AND BRICK CHIMNEY
BRICK CHIMNEY AND COPE
round
square
CHIMNEY BUILT OF CONCRETE BLOCKS
BRICK CHIMNEY AND COPE
STUCCO AND BRICK CHIMNEY
STUCCO CHIMNEY WITH BRICK MOLDED COURSE AT TOP
BRICK CHIMNEY WITH CEMENT COPE
BRICK CHIMNEY AND COPE
STUCCO CHIMNEY WITH TILE INLAY
CHIMNEY DETAILS

an ordinary roof the junction of the chimney and roof is made with sheet metal flashing of which there are two types, viz: ordinary or single flashing, and double or counter flashing. The former type will be considered because it is cheaper, but it should be used only on minor work.

The front piece of flashing is called the apron and extends down the roof 6 inches and has a minimum depth on the chimney of three inches, the top edge being turned into a raggle formed in one of the horizontal joints of the chimney.

When the flashing is being dressed into shape on the roof, a piece of wood equal to the thickness of two courses of slates or other roof covering is laid under the sloping portion of the apron. When the apron has been fixed in the raggle this piece of wood is taken out to allow for the courses of slates which are to be laid close up to the chimney under the apron piece.

The side flashings which form the skew piece are made about 3 inches wide on the roof and have a vertical upstand of 3 inches at their lowest point. The top part of the side flashing is also turned into raggles cut step fashion in the horizontal joints at the chimney. Where the flashing is cut obliquely from one joint to another, the edge is neatly trimmed and dressed tight against the face of the brick work.

On the roof, the edge of the flashing is dressed over a wood tilting fillet about one-half inch high and the ends of each course of slate rest on this metal covered fillet. Thus forming a tiny gutter along the sides of the chimney.

At a chimney passing through a ridge, the side flashing would be lapped the one over the other at the ridge, but in the case of a chimney which penetrates through the side of a roof, a gutter piece is laid behind the chimney. This flashing extends up the back of the chimney for 3 or 4 inches then across and up the roof slope and is finally dressed over a tilting fillet similar to the one which has been referred to already in connection with the side flashing. The side flashing overlaps the apron in front and the gutter piece overlaps the side flashings. In the drawings, all examples of flashings for brick chimneys are made on these lines.

With a stone chimney or a cement block chimney as shown in the drawings, the only difference is that the flashings at the side are raking in place of stepped. That is the raggle which is to receive the top edge of the flashing is cut parallel to the slope of the roof.

With the stucco chimneys shown we again have raking flashing but in this case the flashing is seldom applied directly to the brickwork for the reason that the stucco coat does not make a good finish on the lower edge when its surface projects past the face of the flashing. Usually when the carpenter is finishing the boarding of the roof he puts a strip of wood 4 inches deep and equal to the thickness of the stucco around the chimney at the roof line. The flashing is then placed on this wood base with the top edge of the flashing turned over the edge and also one-half inch up the vertical sides of the brick work. The stucco work is then laid flush with the lead.

The first four examples of brick chimneys shown in the drawing are of the commonest types. In the designs shown with brick moulded courses at the top, the work is done with special bricks which are increased in length and arranged in bond to meet the need of what might be called standard sized chimneys.

The stucco chimneys are built with common bricks and given two coats of cement stucco.

In the design for a brick and stucco chimney, the cope is of sandstone cut in one piece, and the diagonally placed square on the front is formed by four 3-inch square tiles bedded on to the chimney and flush with the stucco work all round.

A great variety of ornamental areas can be added to the faces of stucco chimneys by adding tile patterns. The stucco chimney with inlaid tile shows one 6-inch tile and four 6-inch by 2-inch strips in each pattern. This chimney is wholly covered with stucco, as the top course of brickwork has had the outer corner cut off to form a splay so that the stucco may be carried over the top.

The next example is one made with the same material, but a brick moulded course has been introduced under the two top courses which are stuccoed.

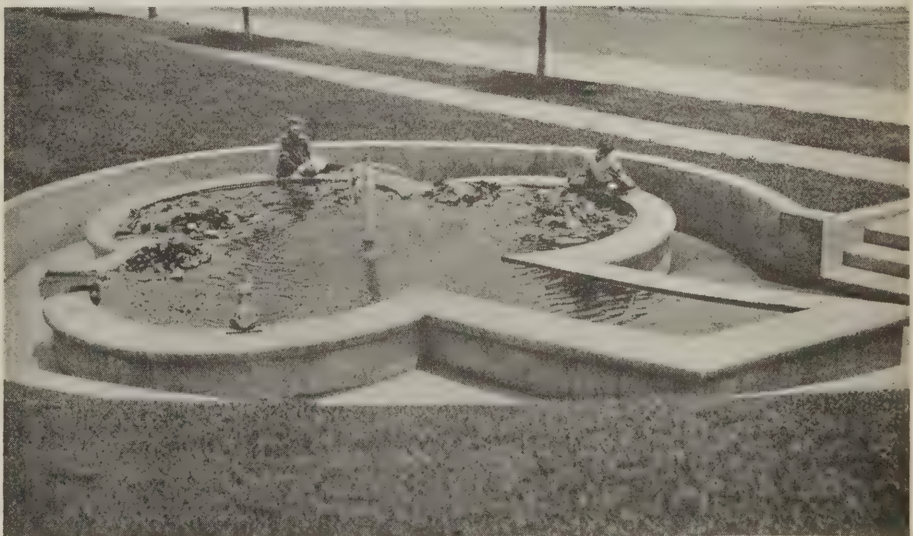
A very common method of finishing chimney heads of stucco houses is with concrete blocks. In many cases this saves the extra expense of raising a scaffold for stuccoing the chimney and in the case of a roof covered with red tiles the sober grey color of the chimney shaft with its regular joints, looks uncommonly well.

In the other drawing three additional examples of brick chimneys are shown. Two of them have twin flues and are built with an increased base at the point where they leave the sloping surface of the roof. The shaft is also increased in size at the top by projecting courses. The idea for the increase in size at the base is to prevent the chimney from appearing top heavy, but as a rule a chimney built in this way is really no more secure than one with straight shaft all the way up to the cope. At least this is true where the shaft is corbeled out just below the roof to provide for the increased size of the chimney at the base, giving the false impression that the construction is of greater strength than is really the case.

In the four flue shaft, the arrangement of the flue is good, but it can only be logical when the flues from various rooms can be grouped together and centralized.

The two examples of stucco and brick chimneys are arranged on much the same lines as the simpler designs and are shown to give an idea of the manner in which these two materials may be combined in chimney construction.

An Unconventional Garden Pool



In memory of the land of his birth, a wealthy California Irish-American has constructed a lawn pool in the form of a shamrock

The builder or architect desirous of finding something new and different in the way of a formal pool for a private lawn or garden will find a stimulating suggestion in the pool shown in the accompanying illustration. Pleasing as is this particular shape the shamrock or a clover leaf are only two of many designs which are adaptable to this treatment. It will be observed that the design has been made more striking and the pool more accessible by setting it in a circular depression which is cement lined. The owner of this particular pool is a native of the Emerald Isle.

Concrete Block and Tile Construction

This is the Fourth Article of a Progressive Series Begun in the February Issue—Questions in Regard to Concrete Block and Tile Construction Will Be Answered by Mail and Also in this Department

The Slump Test for Determining the Consistency of Concrete

RECENT researches by Prof. D. A. Abrams, of the Structural Materials Research Laboratory at Lewis Institute, have shown conclusively that the quantity of water present in a concrete mixture bears a very direct relationship to the strength of the resulting concrete. The "water curve" shown in Fig. 4 tells the story graphically. The hump in the curve represents the strength of concrete of "normal" consistency, containing the exact amount of water required for greatest strength. The fall of the curve to the left and to the right indicates how rapidly the strength drops off if less than or more than the correct amount of water is used.

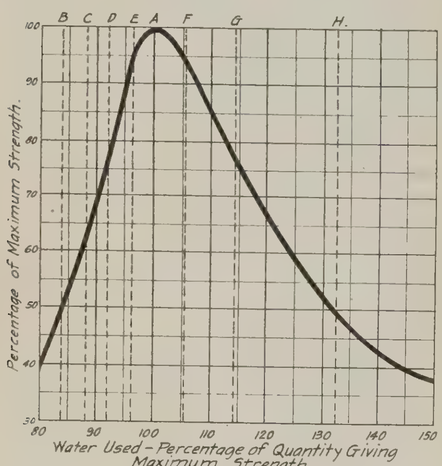


Fig. 4—The diagram indicates the important relation between consistency and strength in concrete. Vertical distances represent strength in per cent of the maximum, obtained with "normal" consistency. Horizontal distances indicate amount of water used, in terms of the quantity required for consistency of maximum strength

Fig. 6—The mold shown in this illustration is first carefully filled and packed, after which it is withdrawn with a steady upright pull

Fig. 5 shows several piles of concrete made with varying amounts of water. Notice the variation in the "slump." All were made in the same mold (Figs. 6 and 7) with various quantities of water, as shown by the figures beneath the pictures, giving the quantity by per cent of that required to produce the greatest strength. By means of the Slump Test it is possible for any cement products manufacturer to determine the quantity of water to be used for maximum strength in his products.

How to Make the Test

All that is required is a tapered form of sheet metal made up as shown in Fig. 7.

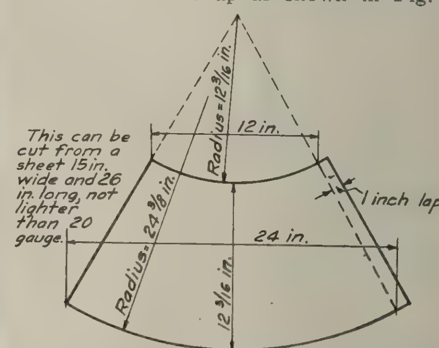


Fig. 7—Slump test molds are inexpensive and can be made by any tinsmith, using this plan

After the concrete has been thoroughly mixed, it is placed in the mold in three or four layers, until flush with the top, each layer being thoroughly settled by working with a pointed iron rod. The form is then carefully lifted with vertical pull, allowing the concrete to settle or slump. After the pile has settled, its height may be measured and the slump determined.

The amount of water to be added for any given consistency varies slightly, due principally to differences in amount of moisture in sand, which varies between two and six per cent. About 5¼ gallons of water are required to produce normal consis-

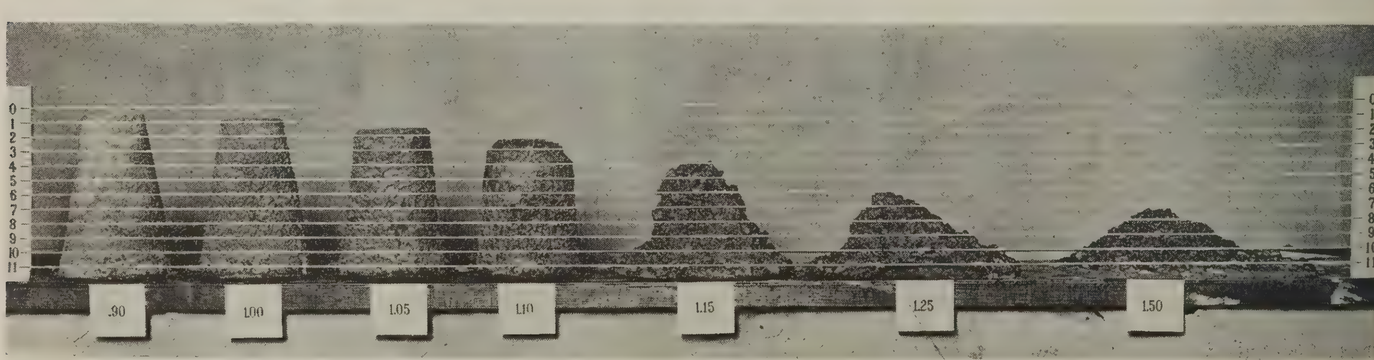


Fig. 5—The variation in "slump" with different quantities of water in the mixture, is conveniently measured by means of the horizontal cords. Each pile while contained in its mold was 12 inches high. The numerals beneath each pile indicate the proportion of water used compared with that necessary to obtain the mixture of greatest strength

tency in a one-sack batch of 1:2½:4 concrete. Referring to Fig. 4, it will be noted that the addition or omission of 10 per cent of water, probably about two quarts, from the correct amount, causes nearly 30 per cent less of strength.

The practical range of consistencies for the power tamp process block machines, is shown between the vertical lines C and D. Careless operators sometimes use mixtures approaching the line B, with a loss of strength of approximately 50 per cent. Stripper type machines may use advantageously a mixture somewhat wetter than other tamping machines, the limit being in the vicinity of the line E. Pressure type machines operate best at consistencies from D to F. The line F also represents about the driest mixture which can be successfully used with wet cast molds, while G indicates a good average for such molds. The consistency represented by line H represents careless practice as occasionally seen, the excess of moisture resulting in a loss of about 50 per cent in strength. Fig. 4 would indicate that so far as their range of consistency is concerned, block machines of any of the common types are capable of turning out block sufficiently strong to exceed ordinary structural requirements.

Concrete and Imitation Brick

By H. Owen

Fig. 1—Imitation brick wall made with concrete metal forms of special design

IMITATION, said to be the highest form of flattery, has reached the point where it deceives the experts. "Whose brick are you using?" was the query of an experienced brick man, as he passed the house under construction shown in the accompanying illustrations. "It is ours, made right here in Valparaiso," returned the builder to whom the question was put, who then went on to explain that it was a house built of solid concrete, special forms being used for the effective brick construction as it appears from the outside. This residence is being built by William Urschel of Valparaiso, Ind., who invented the forms and superintended the entire concrete work. It is a two-story building, 30x38 ft., having a sun porch which will be finished with cobblestones. Figs. 1 and 2 show the building under construction, the estimated cost of which, complete, is $8,000. Mr. Urschel states that the work costs a trifle more than frame, but is cheaper than brick. The estimated cost of the concrete work, including the foundation, is $1,900, labor and materials running about "fifty-fifty."

The special forms used in this connection are 12 inches high and 32 inches long, the outside forms being ribbed on the inside to represent brick. One of the forms is shown in Fig. 2, where it will be seen resting against a wall under construction. The forms are designed to build a wall 8¼ inches thick, and, when set in place, are bolted at the bottom and clamped at the top. Half forms are used when occasion requires, and one of these, also, is shown in Fig. 2. After the forms are set, concrete having one part cement, two parts sand and three parts stone, is put in in a quaky state and troweled and tamped in place. The outside coat used for the imitation brick is white Medusa with a buff coloring. Wooden blocks, 1x2x4 inches, slightly tapered, are embedded in the concrete 16 inches apart for holding strips.

The forms can be removed after being in place for five hours. The work records show that one mason and two laborers made one complete round of the building in 15 hours, a distance of 140 ft., including the bay window shown in Fig. 1.

On completion, the interior concrete work receives a coat of asphaltum to insure a dry surface. Afterwards, the work is lathed and plastered in the usual manner.

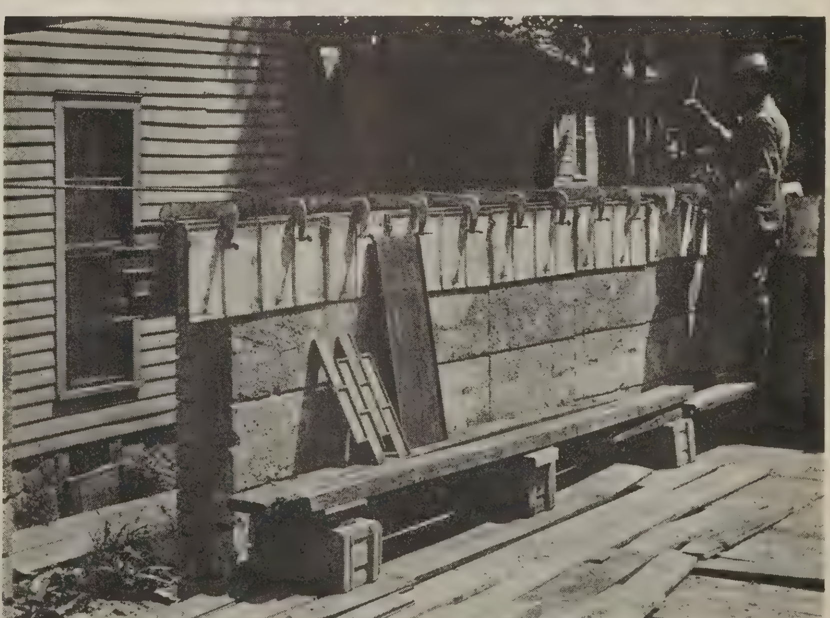


Fig. 2—Showing forms as placed. Note the ribbed form plate propped against the wall. These plates are used on the exterior walls

Successful Arcade on Forty-Six-Foot Frontage

--By John Anson Ford

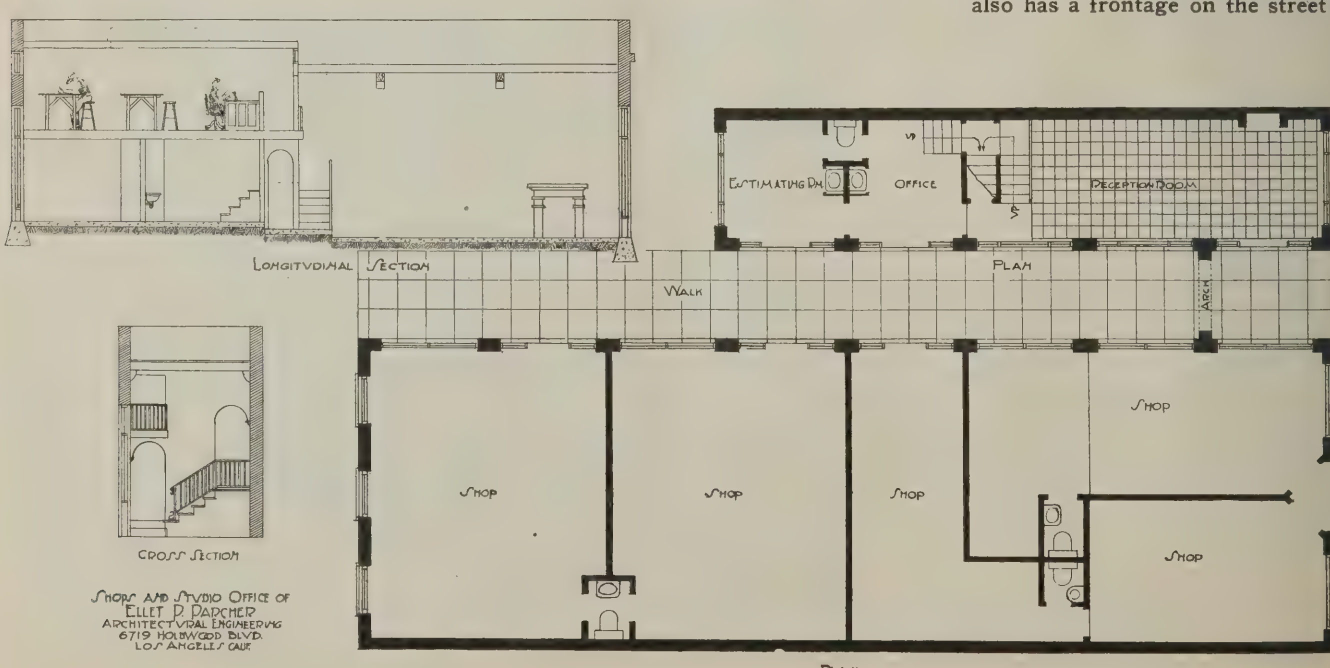
WHILE many would not suppose that an arcade could be successfully attempted on a business lot having so narrow a frontage as 46 ft., the achievement of a Los Angeles architect, Ellet P. Parcher, 6721 Hollywood Boulevard, as shown in the accompanying plan and illustrations, indicates how such an arrangement can be utilized with an artistic and financial result that is highly satisfactory.

By setting aside 8 ft. for the arcade passageway Mr. Parcher has been able to provide two small shops with a plate-glass frontage and to create a beautiful studio with light at the side as well as the front. The result from a financial standpoint is that the rental which he is able to secure for all of his first-floor space (both structures are only one story) is considerably in excess of the total that he could receive if he had devoted the entire 46 ft. to one store with the conventional frontage.

As the accompanying interior and sketches show, the studio on the right of the arcade (as one enters) gains quite as much from abutting on the 8-ft. passageway as does the shop space on the left. Mr. Parcher has reserved the studio for himself. But a positive index of the value of the arrangement which he has worked out is found in the fact that recently he was offered a rental for this 12x52-ft. building which is practically the rental paid for ordinary

Arcade on a lot 46 front by 140 deep, increasing available rental space

The arcade, showing the eight arched windows, affording front light for three shops and side light for a fourth shop, which also has a frontage on the street



stores in this neighborhood having 30-ft. frontage instead of 12 ft.

Both structures are of brick, stuccoed, and are Class C buildings. The structure containing the shops measures 26x82 and the studio 12x52. The arcade is 8 ft. wide and leads to a small structure at the rear of the lot which measures 46x140. The

Interior of studio taken by natural light showing illumination secured by windows opening on the arcade and enhancing the value of this 12-foot building

drafting room of the architect's studio is on the mezzanine floor and is reached by a stair with a wrought iron railing that starts from the rear of the reception room.

The rounded arch has been used with excellent effect in the front and arcade windows, in the arch connecting the two buildings and in the interior of the studio.

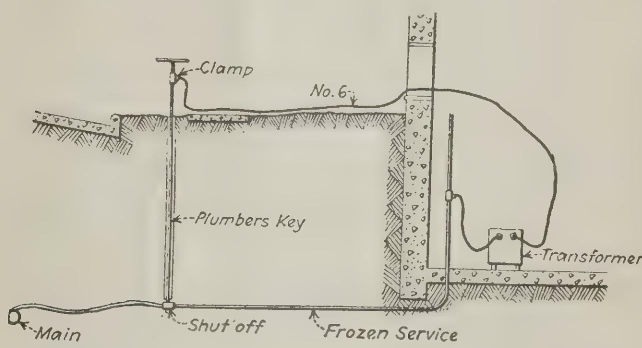
Pipe-Thawing Outfit Operated from House Electric Service

A pipe-thawing outfit which can be operated from a 110-volt or 220-volt house service has been developed that may be operated safely without requiring great skill. A description of this outfit is contained in an article by H. S. Rush, Associate Professor of Electrical Engineering, State School of Science, Wahpeton, N. D., in a recent issue of Electrical World as follows:

The equipment consists of a 1.5-kva. transformer having 110-volt and 220-volt primary windings and a 16-volt secondary, 100 ft. to 125 ft. of No. 6 weatherproof copper wire in pairs for the secondary connections and 50 ft. of No. 14 drop cord for the primary connections. The current supply is obtained from a connection at the entrance cabinet of the house-lighting service, using the 220-volt connection where the service is three-wire. One secondary connection is made to the water pipe in the building and the other by means of a plumber's key attached to the shut-off cock at the street end of the service pipe.

The transformer capacity of 1½ kva. has been found sufficient for ¾-in. and 1-in. iron and lead service pipes. The thawing time ordinarily ranges from 10 to 30 minutes, which compares favorably with the former method using a 10-kva. to 15-kva. transformer connected to the 2,200-volt primary circuit. Should the service be frozen between the shut-off and the main the connection may be made to a neighboring shut-off.

The transformer used is of the ordinary



core type having a core made of sheets of stovepipe iron. The laminations are 1¾ in.x 6¾ in. and 1¾ in.x9¾ in. The core is built up to a cross-section of 1¾ in.x1¾ in., with the laminations dovetailing at the corners in groups of five. The opening through the core is 5 in.x8 in. The primary winding consists of 520 turns of No. 12 magnet wire divided into two windings of 260 turns for paralleling when using 110 volts on the primary. The two halves of the primary winding are placed in series when using 220 volts. The secondary is made of 38 turns of No. 1 bare copper wire. The transformer is air-cooled and is mounted in a wooden case with a hole left through the box so that additional secondary turns may be threaded through to vary the secondary voltage if required The complete transformer is 8½ in.x14 in.x13½ in. high and weighs about 55 pounds.

The current depends upon the resistance of the service pipe, usually 80 amp. to 110 amp. on the secondary side and 11 amp. to 16 amp. on the primary.—*Engineering and Contracting.*

Removal of Glue Stains

Casein and vegetable glues containing caustic soda produce stains on certain kinds of wood, notably the oaks, maple, cherry, elm, ash, birch, and beech. Some glues stain the wood more than others, and those that contain the most alkali are likely to be most injurious. The staining is due to the action of the alkali in the glue on the tannins and other constituents of the wood, whereby a substance related to ink is formed. No means have yet been found of preventing this chemical action. Precautions can be taken, however, the Forest Products Laboratory believes, which will keep the discoloration from the finished surfaces.

The most trouble with glue stain in woodworking is caused by the penetration of the glue solution through thin face veneers. This seepage is very likely to occur if the veneer is less than one-twentieth inch thick and somewhat porous. The consistency of a glue in part determines whether it will be squeezed through the wood or not. It is quite obvious that under similar conditions a thin glue will penetrate farther than a thick glue. For this reason the quantity of water that is added to a glue might be diminished and "fillers" added when staining is feared. The amount of pressure exerted by the panels in the press is also a factor, but it would not be advisable to reduce the pressure in order to check the flow of the glue.

If a panel is dried promptly, the caustic-soda solution will have difficulty in coming to the surface. Rapid drying can be brought about by removing the panels from the press as soon as it is safe to do so, and placing them on stickers. The amount of staining can also be decreased somewhat by placing a caul or some other flat object between adjacent panels in the press.

Casein and vegetable glue stains can be almost entirely removed by sponging the stained surface with an oxalic-acid solution, prepared by dissolving one ounce of oxalic-acid crystals in about 12 ounces of water. Still better results may sometimes be obtained by moistening the wood first with a sodium-sulphite solution made up in the same concentration as the oxalic acid. In this way very stubborn stains can be almost obliterated.

Why Yellow Ochre Primer Peels

Ochre is of a very hard nature and when applied as a priming coat and it becomes quite dry the film of paint is so hard that the following lead and oil coat will not adhere to it. It is always best to prime woodwork with white lead primer.—*The Expert Paint Mixer.*

Bricklaying

By Wm. Carver, Architect, and A. Pentland, Mason Contractor

Mortar Strength and the Function of Mortar in the Wall. Kinds of Mortar and the Economies of Ready-Mixed Mortar Delivered on the Job

ANSWERS to the question, "What mortar produces the strongest brickwork?" would no doubt be many and varied. The obvious thing to say would be, "Why, of course, the strongest mortar produces the strongest brickwork." Masons with much experience know that this is not always the case, that a mortar which is far from being the strongest very often produces brickwork which will carry the heaviest loads.

Above grade in an ordinary house, lime mortar will often be found amply strong

To get at the root of the matter we must consider not only the properties of the mortar but also its exact function in the wall.

Rich Portland cement mortar, made into cubes, aged, and placed in a testing machine, requires a much greater load to crush it than any other kind. Following is a list of some test results on various mortars and piers laid up with them, made at Columbia University by Prof. James S. Macgregor. Mortar specimens were made in 2-inch by 4-inch cylinders and tested when 28 days old. Proportions by volume. All cement Portland cement. All lime hydrated lime:

No.	Mixture	Ultimate Strength in lbs.
1	1:3 cement and sand	1523
2 (1:3)	.75 cement .25 lime 3.0 sand	1172
3 (1:3)	.5 cement .5 lime 3.0 sand	576
4 (1:3)	.25 cement .75 lime 3.0 sand	188

After considering these tests one might be tempted to reason thus. "The load on the pier must be transmitted through the mortar in the joints. Therefore, I would certainly use mortar No. 1 to get the strongest brickwork." This reasoning is not necessarily correct, however, as the following shows.

Before the tests were made on the piers the individual bricks were tested, which showed that it required the enormous load of 10,550 pounds per square inch, or about 760 tons per square foot to crush them.

Slender face brick piers, 8-inch by 8-inch, 7 feet high were laid up, nine piers with each of the types of mortar. Of the nine piers laid with each mortar, three were tested when seven days old, three 28 days old, and three when 3 months old. It will be noted that the piers were of a relative size and height which some contractors and engineers would hesitate to use in supporting much load. This is what they actually carried at failure:

	Tons per Square Foot	
Mortar No. 1	28 days, 204	3 mos., 204
Mortar No. 2	28 days, 249	3 mos., 300
Mortar No. 3	28 days, 223	3 mos., 275
Mortar No. 4	28 days, 170	3 mos., 195

Thus it will be seen that the strongest mortar does not necessarily produce the strongest brickwork, and the following is the reason.

When placed in the wall a plastic mortar spreads more evenly, and fills up the joints and irregularities of the brick more completely than a mortar which works "short." Pure cement mortar is apt to be in the latter class, the addition of lime increasing its plasticity. Thus every part of each brick takes its full load with a more plastic mortar, while only the "high spots" of pure cement mortar really do the work.

The same results were noted in some tests made at Stockholm by Prof. H. Kreuger; 1 lime: 1 cement: 6 sand mortar having a compressive strength of 695 lbs. per sq. in., a pier built of it failing at 1,8[illegible]

In warehouses carrying heavy loads, cement-lime mortar is preferable

lbs. per sq. in.; while 1 lime: 2 cement: 9 sand mortar failed at 1,280 lbs. per sq. in.; and a pier built of it failed at 1,700 lbs. per sq. in.; the individual bricks in each case having a strength of 4,040 lbs. per sq. in.

Another and rather remarkable fact in all the tests results quoted is that the brick piers fail at a far higher load than do cubes of the mortar in which they are laid, and the reason for this is not far to seek. The average brick is far stronger than mortar of the richest mix, the mortar being thus the weakest unit in the wall. A column of any material decreases in strength in proportion to its height. Conversely, the shorter the column is made the stronger it becomes. Mortar placed in thin sheets will thus carry much more load than will mortar made into larger cubes.

To obtain the very strongest masonry, therefore, use well burned brick, a strong but very plastic mortar; and keep the joints thin.

These tests results also show that brickwork laid in any mortar will carry very many times the load usually placed upon it.

There is a great variety of mortar materials and mortars from which the contractor may select. The better known materials are Portland cement and lime, the latter either lump or hydrated. Natural cement and hydraulic lime are used to a lesser extent. Patent brick mortars have also a wide use in certain localities. Portland cement, natural cement and hydraulic limes possess the property of setting under water.

Portland cement is an "artificial" cement —the various ingredients being compounded in definite proportions to conform to definite standards.

Natural cement is used in certain localities. While being cheaper per unit of weight than Portland cement mortar, there are some serious objections to its use, the chief difficulty being its rapid set. Ten minutes is the minimum time allowed for initial set of this cement, as against a minimum of 45 minutes with Portland cement, according to the standard specifications of the American Society for Testing Materials. It is quite out of the question, of course, to place the mortar in the wall as quickly as this, which in practice means that natural cement is always retempered and its strength seriously reduced. Bricklayers prefer to work with it in this condition, in fact, because retempering makes it "fat" and very plastic. The addition of lime, however, delays its initial set—as it delays, in fact, the initial set of all cements. Another objection to natural cement is its variability, the quality of the product depending on the quality of the raw material found in the bank. It should never be used in freezing weather, for low temperature injures it seriously. It is not as strong as Portland cement, 1:1 natural cement mortar having about the same strength as 1:3 Portland cement mortar at the end of one year.

Hydraulic lime is not very widely used. It is manufactured from natural raw material as found in the pit, these materials containing, in fact, similar ingredients as those from which natural cement is manufactured, but in different proportions. It comes in lump form, and slakes with a little more difficulty than ordinary lime, emitting less heat. Mortar can be left overnight and retempered in the morning without injury. It is stronger than ordinary lime but not as strong as natural cement. It sets more quickly than ordinary lime It has the same disadvantage of variability as natural cement. It is useful in building foundations or masonry under moist conditions.

Lime is supplied in two forms—lump lime and hydrated lime. Sometimes lump lime comes in powdered form—pulverized lime—more easily slaked than lump lime.

There are four classes of lime—high calcium, calcium, magnesian and high magnesian. The two latter are termed also "dolomitic" limes. The most generally available of these classes are calcium and high calcium.

Dolomitic lime slakes more slowly, combines with less water, generates less heat, undergoes less increase in volume, sets more slowly, and shrinks less than high calcium lime.

There is little difference between the strength of calcium and magnesian lime mortars.

Contractors also divide lime into two classes—"fat" or rich lime and "lean" or poor lime. This division is not based on the chemical properties of the lime, for both "fat" and "lean" limes are found in each of the classes previously mentioned. "Fat" lime, so called because the paste is very smooth to the touch, carries most sand and is thus the most economical lime. It works with the greatest ease under the trowel, thus helping the production of the bricklayers.

"Lean" lime increases to less than twice its volume when slaked and will carry much less sand than "fat" lime. It is not as plastic as "fat" lime.

There are two grades of each class of lime: selected, which is picked free from ashes, clinker, etc., and run-of-kiln, which is not selected. Selected is the best grade for brickwork.

Lump lime should be delivered freshly burned. Lumps of old and partly air slaked lime are soft and crumbly and much of it may be in powder. It should not be accepted in this condition. Completely air slaked lime is practically identical with finely ground limestone and has no value for mortar making.

Lime should slake into a fine smooth paste without leaving any residue. It is advisable to slake lump lime as soon as delivered. If it must be stored keep it in a thoroughly air-tight box. Lime in process of air slaking generates considerable heat, and quite apart from the loss of strength, the hot lime might set fire to the building in which it is being stored.

Hydrated lime is mechanically slaked at the place of manufacture and comes in the form of a fine white powder. It does not of course require to be slaked. When mixed dry into mortar, however, it does not trowel as freely as lump lime. The lime or the water should preferably be soaked overnight. This greatly increases its plasticity and increases the efficiency of the bricklayers.

Hydrated lime is particularly useful on a job where a week's supply of sanded lump lime paste cannot conveniently be kept, or where, owing to scarcity of experienced labor, lump lime might be spoiled in slaking.

Patent brick mortars are available in great variety. Some consist of natural cement mixed with hydrated lime or Portland cement. Others consist of Portland cement, lime and sand mixed dry in their proper proportions and sold in bags.

One type sold largely throughout the Middle West is a natural but non-hydraulic cement, slow setting (can be retempered next day), and is very strong when fully set.

Sand should be selected with great care. Coarse sand makes the strongest mortar, according to recent tests, very fine sand making the weakest mortar and having the greatest number of voids. The particles should be sharp—not rounded—and river sand should be examined closely before being used. Loamy sand very seriously decreases the strength of mortar, and sand containing over 5% of loam should not be used.

A simple test for cleanliness is to squeeze some wet sand in the hand. If it contains loam the lump will retain its shape. If not it will have a gritty sound and when rubbed on the palm of the hand will not leave a slimy deposit. Another test is to place some of the sand in a glass jar, covering it to the depth of two or three inches with water. In a day or two the sand will have settled to the bottom, and the loam, if any, will be observed at the top of the sand.

[Of particular interest in this discussion of lime and mortar and their properties are the developments in economies, standardizations and improvements in furnishing ready-mixed mortar on the job as described by W. C. Hay at the annual convention of the National Lime Association held June 15 to 17 in New York. The success of a new patented process of producing ready-mixed mortar at a less cost, of better and of standardized quality to the contractor than he could make for himself, has been proved in Oakland and Los Angeles and surrounding territory. In fact the product is said to "spread like warm butter." By this process all descriptions of mortar adapted to the job are readily supplied.]

Machine Mixed Mortars

KIDDER'S "Architects and Builders Hand Book" says, "Machine mixed mortar should be much better than the ordinary hand-mixed mortar for the reason that time can be given for the lime to slake, the lime and sand can be accurately measured and the hair and sand are not mixed with the lime until just before delivery. The mixing may also be more thoroughly and evenly done by machinery than is possible by hand." Appreciation of these facts by an increasing number of builders is bringing concrete mixers into more general requisition for mixing concrete, mortar, plaster, etc.

The time-honored way: Typical mortar box and hod support

The organ of the National Lime Association, the *Construction Lime News*, to which we are indebted for the accompanying illustrations, points out that hand-mixing of mortar is a slow and back-breaking process, and goes on to say that much depends upon the skill of the mortar man as to how thoroughly it is mixed and how well the hair is distributed through the batch when it is used. Many of the larger contractors are now making it their practice to use mechanical mixers for all their work.

Machine Mixed Mortar Satisfactory

Machine mixed mortar and plaster is entirely satisfactory. It is thoroughly mixed and uniform in texture. There are a number of machines specially designed for this class of work, and they have demonstrated their suitability. Some contractors have a mixer in their storage shed and mix their mortar and plaster there, shipping it by truck to the job. Others move the machine from job to job and do the work as it is needed. Both methods have their advocates and both are satisfactory.

Lime mortar mixed by machine

Many contractors do not feel justified in going to the expense of a special machine for mixing brick mortar. Nearly every contractor has a small concrete mixer on the job, however. Practically all of the small mixers are suitable for mixing straight lime mortar, or lime-cement mortar. A letter recently received from Portland, Ore., tells of two of the largest brick structures there and mentions the fact that all mortar used in them was mixed in a concrete mixer. Another letter from Baltimore, Md., states:

Using small concrete mixer for preparing mortar

Practical Tests Prove Value

"In the first place, permit us to say that we were skeptical about our machine doing this class of work and, therefore, sent the first machine out on trial. The job was that of mixing mortar to be put upon expanded metal for outside work. It was on the B. & O. R. R. coal pier at Curtis Bay. The mixture was cement, sand, hydrated lime and hair. Our first experience was successful. We placed a sufficient amount of hair for one bag of cement in the mixer with a small amount of water, following up with half of the quantity of sand, then more water, then the cement, followed by hydrated lime and the balance of the sand. The discharge was made into wheelbarrows and a number of parties took sticks, pushing them through the cement and drawing them out to get the result as to the distribution of the hair. We found it thoroughly distributed. This job was then finished with a half bag mixer with platform loader, since which time practically all the plasterers in this section have been using the ordinary mixer small size for mixing wall plaster, that is, the ordinary wall plaster mixed with fiber or hair.

"The machines are also being used very largely for mixing cement mortar for bricklaying and ordinary stucco work. An added advantage is that concrete, brick mortar and wall plaster can all be mixed in the same machine."

The Cement Gun in Building Construction—A. C. and A. G. Brehm

SOMETIMES, in the life of every man, new and knotty problems present themselves, and it is then up to the man to show his metal; he may try to solve them and succeed, or he may fail in the attempt, and be considered a successful man, for honorable defeat is not shameful. But if the problem is evaded, or passed by without an attempt being made to solve it, then no credit is due to him thus side-stepping.

This was the very thought we had in mind when the Superintendent of the coal mining company at St. Mary's, Penn., whose carpenter work we were doing last winter proposed to us the use of the cement gun in the construction of two buildings, a moving picture theatre and an amusement hall, which were ready for their outside plaster coat. The cement gun, it will be known, is used quite extensively in the larger mines for closing cracks in "bradishes," cementing air passages, etc., but so far it had not been applied to building construction in this part of the State, and it presented the hardest problem that ever confronted us in our many years of general building contracting.

The cement gun consists of what might be called three separate machines: the air compressor, the air and water tank, and the receiving machine. To get those individual parts to operate synchronously was our big problem, for in the small mining town in which our job was located there was no practical machinist whom we could call upon, and so it was up to us to "go and get it."

The gun was brought to our job by the company's team, and we at once got busy with assembling it. In about two hours' time we had the electric wires connected—electricity was to be used for power—the hose unrolled, the water connected from a nearby plug, and so with the minor details attended to, we were ready to give it the try-out.

As stated above, the cement gun consists of three individual machines—the air compressor, the air and water tank, and the receiving machine. With sufficient water pressure, however, the water tank is not used, but when there is no pressure, or if it is low, then the tank must be used to procure the proper results.

We placed our air compressor on the outside of the building, and the receiver inside. This arrangement was considered the best for the reason that the receiver is built on wheels, and thus could be wheeled to the various window and door openings, making it possible for our limited length of hose to reach any part of the outside walls. The mixer was placed in the sand shed near by. There the sand and cement was mixed and hauled in barrows into the building and dumped into a large mortar box, and from there into the machine.

The buildings were constructed of 2x6 studding, but not sheathed. Since no sheathing was used it was found necessary to brace all corners with "cut-betweens," and such other bracing as was necessary to make the work solid. Upon this frame we applied a one-ply roofing paper, followed with a large mesh expanded metal lath. This lath was diamond shaped, and nailed with 10d nails, not driven entirely into the wood, but left out a half inch from the paper and nailed alternately in the corner of the mesh. This kept the lath fairly rigid and as the mixture was applied it struck the paper and crowded the lath to the nail heads. making a re-enforcing for the concrete.

Building constructed with cement gun

As the cement gun is a late acquisition to the construction trades there may be some readers who have not seen it in actual operation. To those we might say that the appliance consists of an air compressor which keeps the air tank supplied. From the tank a hose leads to the receiving machine, where is fed the thoroughly mixed sand and cement, and carried from there to the nozzle. Here the mixture is met by the water, brought in a separate hose, the air pressure and that of the water uniting in both setting the mixture and blasting it on to the surface to be covered. A nozzleman is required to direct the stream against the place to be covered, and a good man must be at the mixing machine in order to feed the proper proportions into the hose. The number of men required to mix the sand and cement and to bring it to the mixing machine depends entirely upon conditions. We used one man to mix the sand and cement and two men to wheel it into the building.

While applying the lath and the paper we nailed on 2x6 outlooks for the scaffolding. This scaffold was 8 feet wide in order to give room for the nozzleman, who had to stand from 4 to 6 feet from the wall to get the best results.

We began "shooting" at the bottom of the building, working up, and concreted the outlooks in. After the building was entirely covered, and the concrete had hardened, we started at the top with a light splash coat, covering any defects, and filling in the holes left when the outlooks were removed.

As to the thickness of the gunnite, as concrete applied in this manner is called, we put on two inches, and never had a bit of trouble with sagging or dropping. The force of the "gun" is such that the mixture is very dry when it hits the mesh, for in striking with such great force the moisture is forced from it. In the old-fashioned method of applying the mortar with a trowel by hand this is not the case, and therefore so much trouble is experienced with sagging and dropping. As we said before, we applied two inches of concrete and never had a bit of trouble with such conditions.

The window and door frames for these buildings were made as for brick veneer buildings, with brick moulding. This moulding, and the casing where it was planted on, measured one and one-half inches, while the gunnite measured two inches. The openings were closed with the same paper that was used under the lath, laid flush with the moulding, and a ½x2-inch strip was nailed all around the opening. After the concrete was hard these strips could easily be removed, leaving a half inch margin at all openings.

Our experience with the cement gun taught us one great lesson, and that is to be very careful in mixing the proper proportions in order to get desirable results. It taught us further to have the sand and the cement well screened, for any small stone or lump of cement will plug the air line. It chanced one morning that we could not get the receiver to work. The air driven motor would not turn over and, after many futile attempts to get it started, we decided to take off the front and investigate. We found that a 10d nail had gotten in with the mixture—or perhaps it had dropped in some other way—and had lodged between the cogs that shove the mixture into the airline, thereby stopping the motor and causing considerable trouble and loss of time.

Our mixture was on a one-third basis, one part cement and three parts clean, sharp sand. The nozzleman regulates the flow of water, great care being necessary to keep the mixture of the proper consistency. If this is not watched closely the mixture may become too wet and run or sag, or it may become too dry and not anneal rightly. When kept to the proper consistency—a little practice and close observation is all that is necessary to keep it so—there will be no trouble from running or sagging.

We averaged, in applying the concrete, about 25 square yards, two inches thick, to the hour. At the high cost we were paying for labor, allowing six men and a foreman, it cost 25 cents per yard for applying the mixture. This, however, does not include the rental of the gun nor the power and water used in operating it. We ran as high as 84 yards to three hours' work, but 25 yards an hour was a good average. The cost per yard, including the paper, metal lath, cement, sand, labor and overhead was $1.72, and this at a time when prices of labor and material were at the pinnacle. Compared to trowel work it averages a bit high, but it must be considered that the coat is two inches thick, and that it is practically impossible to apply a coat of this thickness by hand.

Prophets are never a great deal in demand and neither are their prophesies given much credence, but we feel safe in predicting a much wider use for the cement gun than at present, and that, too, in the not distant future.

SOFTENING PUTTY OR LEAD

Pour hot water over lead or putty that is hard and leave on back part of stove a few hours. The putty or lead must be mixed while warm or they will get hard again when cold.

Palestinian Type of Roof on Modern Home

Modern Los Angeles home designed with a roof resembling those common in Bible times. Note narrow stairs leading from front porch

"Is the roof 'coming back'" ask persons who have viewed the erection of the dwelling shown in the accompanying illustration. With stairs leading from the front porch, past a bedroom window and to the flat roof of this Spanish style of structure this dwelling suggests the residences so common in Bible lands. Should the style become popular it might mean a revival of the days when tidings were "proclaimed from the housetops."

The purpose of the owner of this house was to supplement his porch with an outdoor retreat where he and his family would be shut off from the gaze of passersby and yet would have a fine panoramic view of the nearby city, since the house stands on a slight eminence. At this height from the ground this roof is cool at night. If desired a canopy or screened in area can be erected on the roof. The feature illustrated promises to be increasingly popular.

Arbor of Concrete and Wood

A concrete and wood arbor

The ornamental arbor shown herewith is one which is appropriate for a private residence, hotel grounds or an apartment house court. While relatively simple in design it is a decided addition to a property. The floor and foundation are of concrete and the super structure is of eucalyptus logs. At the far side are broad steps affording easy approach from the yard. If desired the roof can be completely closed.

Announcements and Publications

National Conference on Unemployment

Herewith is a complete list of the conferees appointed by President Harding to meet in Washington, D. C., Sept. 26, to consider the labor situation and make such recommendations as their findings may warrant:

Herbert C. Hoover, Secretary of Commerce.

James J. Davis, Secretary of Labor.

Winslow B. Ayer, Portland, Ore., president of the Eastern and Western Lumber Co.

Julius H. Barnes, Duluth, Minn., president of the United States Food Administration Grain Corporation, 1917-19.

William Black, Louisville, Ky.

Wm. M. Butler, Boston, manufacturer, president of the Butler Mills and the New Bedford Cotton Mills.

W. S. Carter, Cleveland, president of the Brotherhood of Locomotive Firemen and Enginemen.

Elizabeth Christman, Chicago, secretary of the International Glove Workers' Union and secretary-treasurer of the National Women's Trade Union League.

Bird S. Coler, New York, Commissioner of Public Welfare.

Mrs. Sarah Conboy, New York, secretary of the United Textile Workers of America.

Edgar E. Clark, ex-president of the Order of Railway Conductors, member of the Roosevelt Anthracite Commission in 1902, formerly chairman of the Interstate Commerce Commission.

John T. Connery, Chicago, president of the Miami Coal Company.

Mayor James Couzens, Detroit, president of the Board of Commerce, formerly with Ford Company, mayor since 1919.

James H. Defrees, Chicago, president of the Chamber of Commerce of the United States.

John Donlin, Washington, president of the Building Trade Department, American Federation of Labor.

T. E. Edgerton, Nashville, Tenn., president of the Lebanon Woolen Mills, Tennessee fuel administrator, president of the National Manufacturers' Association.

W. K. Field, Pittsburgh, president of the Pittsburgh Coal Company.

Mortimer Fleishacker, San Francisco, banker, regent of the University of California.

James E. Gibson, Seattle, president of the Waterfront Employers' Union.

Samuel Gompers, president of the American Federation of Labor.

Jackson Johnson, St. Louis, chairman of the International Shoe Co.

John H. Kirby, Houston, Texas, president of the Kirby Lumber Co.

William Kelly, Vulcan, Mich., president of the Cleveland Cliffs Iron Co.

W. M. Leiserson, Rochester, chairman of the men's and boys' clothing industry of Rochester.

John H. Lewis, president of the United Mine Workers of America.

Bascom Little, Cleveland, contractor, head of the Cleveland commission chest.

C. H. Markham, Chicago, president of the Illinois Central Railroad.

Gen. Richard C. Marshall, Jr., Washington, D. C., formerly chief of the construction division of the army, general manager of the Associated General Contractors of America.

James B. Neal, Minerville, president of the Buckwin Coal Co.

Chas. P. Neill, Washington, D. C., formerly United States Commissioner of Labor Statistics.

Thos. V. O'Connor, Buffalo, president of the Longshoremen's Union.

Raymond A. Pearson, Ames, Iowa, president of the Iowa State College of Agriculture.

Andrew J. Peters, mayor of Boston.

W. C. Procter, Cincinnati, president of Procter & Gamble.

E. M. Posten, Columbus, Ohio, president of the New York Coal Co.

M. F. Tighe, Pittsburgh, president of the Amalgamated Association of Iron, Steel, and Tin Workers.

H. H. Stackhouse, Springfield, Ohio, president of the National Implement and Vehicle Association.

Harry S. Robinson, Los Angeles.

John D. Ryan, New York, the United Metals Selling Co.

Chas. M. Schwab, New York, chairman of the Bethlehem Steel Corp.

Benjamin Strong, New York, governor of the Federal Reserve Bank of New York.

Ida M. Tarbell, New York.

Ernest T. Trigg, Philadelphia, president of the National Federation of Construction Industries.

Mary Van Kleeck, New York, director of women in industry of the United States Department of Labor.

Matthew Woll, Chicago, president of the International Photoengravers' Union of North America.

Evans Woolen, Indianapolis, member of the Economic Policy Committee of the American Bankers' Association.

Clarence Mott Woolley, Chicago, president of the American Radiator Co.

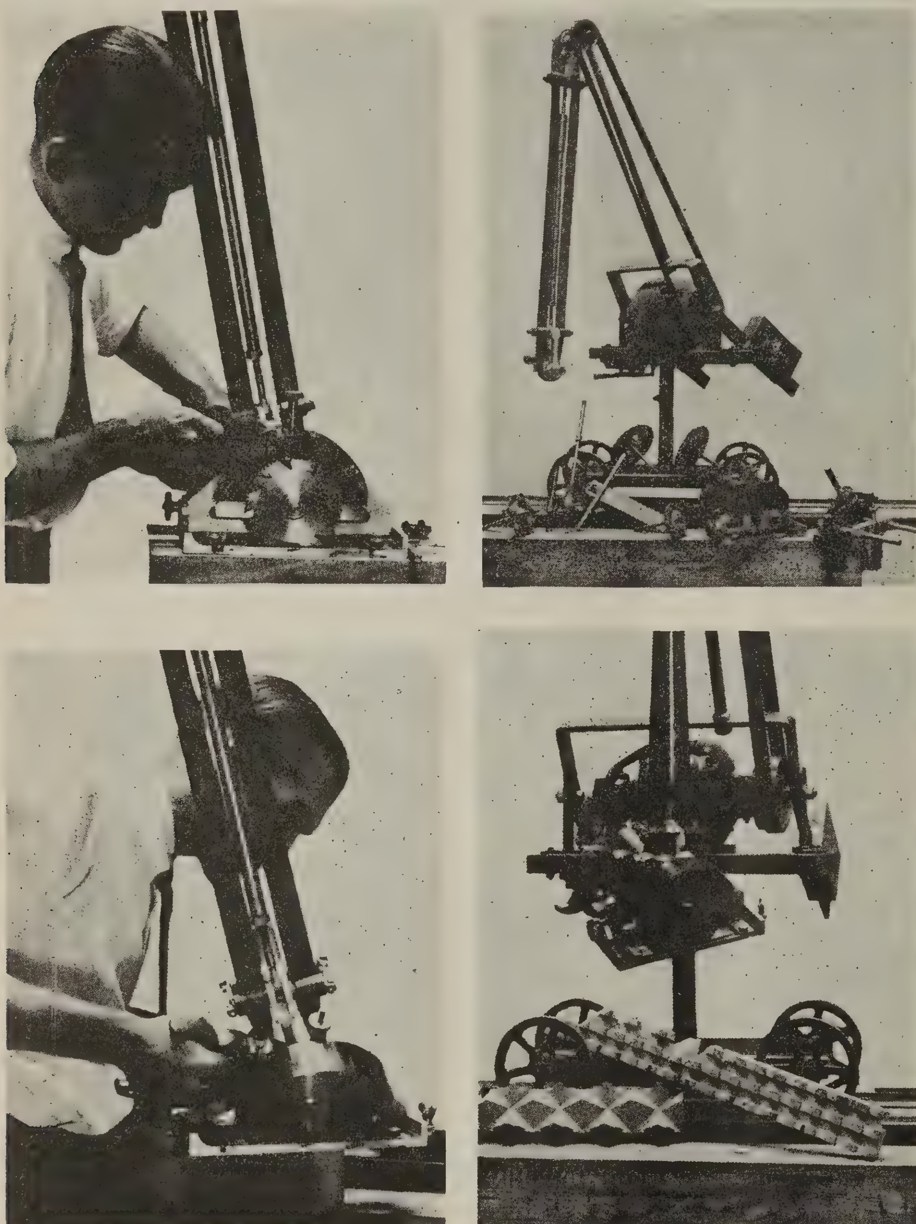
Arthur Woods, New York, former police commissioner of New York.

Modern Building Superintendence and the Writing of Specifications, by David B. Emerson; 247 pp., 6½ x 4¼. Published by Charles Scribner's Sons, 597 Fifth Ave., New York City; cloth, $1.75. The first part of this little book takes as its topic the erection of a large, up-to-date office building suitable for a thriving city of 250,000 population, and carries it through, step by step, from foundations to completion of the structure. Methods of construction, new materials, are discussed and explained. Part II has to do with the writing of specifications, and valuable hints and cautions to the young draftsman and student of architecture are set forth. The book is intended primarily for students and juniors, but can be read with profit by anyone interested in building superintendence.

The Lumber Inspection Rules for 1921 may be had now by writing to Lumber Inspection Rules, 280 Madison Avenue, New York City. This book contains rules governing the manufacture and inspection of the different kinds of lumber, weights of lumber, comparative strength of building timbers, and other information useful to the buyer and consumer of lumber. It is of a convenient pocket size, 4¾ x 5½, contains 341 pages, with excellent clear print and a number of photographic reproductions and detail drawings. The price is $3.00, postpaid.

"Concrete Work," Vol. II, by W. K. Hatt and W. C. Voss, is now available. Volume I of this work was reviewed in the April, 1921, issue of NATIONAL BUILDER, page 60. Volume II consists of a series of practical problems, or jobs, which the worker or student is expected to develop, using Vol. I as a reference book. As the authors express it, "This volume (Vol. II) is prepared to develop the *practical ability* of the concrete worker, the inspector, and the student of technical schools. This ability is best developed through the actual doing of jobs, learning the 'how' and the 'why' of these. . . . Most of the applications of concrete are founded on a few fundamental principles and operations, of computing, selection of materials, mixing, and placing concrete. The 'job sheets' in this volume are devised to uncover these fundamentals. . . . It is the intention to lead the worker and student through the work . . . that a *foreman* on a small job must be able to do, or the work of a *local cement contractor or inspector.*" The book contains 206 pages, 5¼ x 7⅝, 37 charts and 97 'job sheets'; and retails at $2.00. John Wiley & Sons, Inc., 432 Fourth Ave., New York City, publishers.

The "Flexway" Woodworker.—A new woodworking machine especially adapted to carpenters, cabinet makers and pattern makers has been placed on the market by the P. L. Billingsley Company, 427 Elm Street, Cincinnati, Ohio. All operations formerly done by hand can be done by this machine at a fraction of the time. High speed is one of the strong points and counter balances take all load off the operator. All changes of tools are made without the use of tools. A panel door can be ripped down to size, and the mortise made for the lock within ten minutes, including the time taken for changing from a sawing tool to a routing tool. Stair horses can be sawed out, the step cut square and the riser mitered; weight pockets, pulley mortises, header and sub-sill gains, parting strip groove and window sill can all be done with the machine without taking stock from the bench. Jointing, splining, grooving, tongueing, beading, molding, chambering, boring, etc., are all done rapidly. The machine weighs less than 200 pounds. It travels from end to end of work bench and has rubber tires for floor work while planing and sanding the floor.



The Flexway woodworker and some of its uses

Chicago's Second Annual Own Your Home Exposition will open in the Coliseum, March 25, and close the evening of April 1, 1922, according to an announcement issued by Fred C. Balthaser, assistant manager. The exposition management has permanent offices at 15 East Van Buren Street, Chicago, and the plans for the 1922 exposition now are far enough along to warrant the statement that the forthcoming show will in all respects surpass last year's successful event.

California Redwood Trade Extension Manual, 1921.—This handsomely prepared brochure issued by Evans & Barnhill, Inc., New York and San Francisco, gives an explanation of the policies and objectives of the California Redwood Association, and in the form of reproductions of advertisements used in selected general, specific, and technical publications illustrates and explains the various uses and applications of redwood on various kinds of construction work. Explanatory text and the obvious inference shows that the policies of the California Redwood Association make prospective builders and all those interested in building as a profession thoroughly familiar with redwood, its capabilities and possibilities as to make it as staple and merchandisable as any ordinary commodity.

The Superbo Automatic Thermo Storage Water Heater.—Circular illustrative and descriptive of a new type of water heater manufactured by the Superbo Manufacturing Co., 1666-74 Long Beach Avenue, Los Angeles, Calif., with reproductions of elevations of residences in which it is in successful use. The points of advantage claimed consist in appearance and finish, simplicity and economy, working equally well on low or high pressure of gas or water. It has full capacity tanks with reacting valves preventing lime deposits, copper coil heating elements, special Bunsen burners, and insulated on the thermos bottle principle. Made in several sizes.

Concrete Handling on the Small Job is the title of a circular issued by the Insley Manufacturing Company, industrial engineers and manufacturers, Indianapolis, Ind., illustrating and describing the types of equipments in the form of masts, swivel head chutes, elevators, buckets, sheaves and bail blocks, manufactured by the company for contracting work on small and medium sized concrete jobs, with illustrations of the various kinds of apparatus in use on different types of construction work.

The Metals Coating Company of America announce removal from Boston, Mass., and Woonsocket, R. I., to their new plant, 495-497 North Third Street, Philadelphia, Pa. The company manufactures and distributes the Schoop metal spraying process, which includes a small machine gun making its ammunition from reeled wire and coating objects by bombarding them with minute plastic particles of metal.

"Celotex" Wallboard from Sugar Cane Stalks or Bagasse.—A new wallboard made from bagasse or sugar cane stalks is announced and now on the market. It comes in thicknesses of one-quarter and one-half inch. The sheets are produced from the mills in boards 12 feet wide and of continuous length, or actually 900 feet long. These sheets are cut to sheets four feet wide and from eight to 12 feet long. An exceptionally long fiber gives the board exceptional strength, as it is homogeneous and not built up of layers. In process of manufacture the board is mixed with waterproofing material and is impervious to moisture or decay. The board weighs about six-tenths of a pound a square foot. The factory of the Louisiana Celotex Company, manufacturers of this insulating board, is at Marrero, on the Mississippi River, New Orleans, La.

BISHOPRIC

September Sales Break All Records

No. of Residences	3424
No. of Churches	5
No. of Garages	196
No. of Hotels	4
No. of Stores	68
No. of Apartments	26
No. of Schools	5
No. of Offices	29

Bishopric Stucco and Plaster Base Specified and Used As Above

Isn't this a wonderful story? Isn't this the most convincing evidence that Bishopric is the best and at the same time the most economical Building Material?

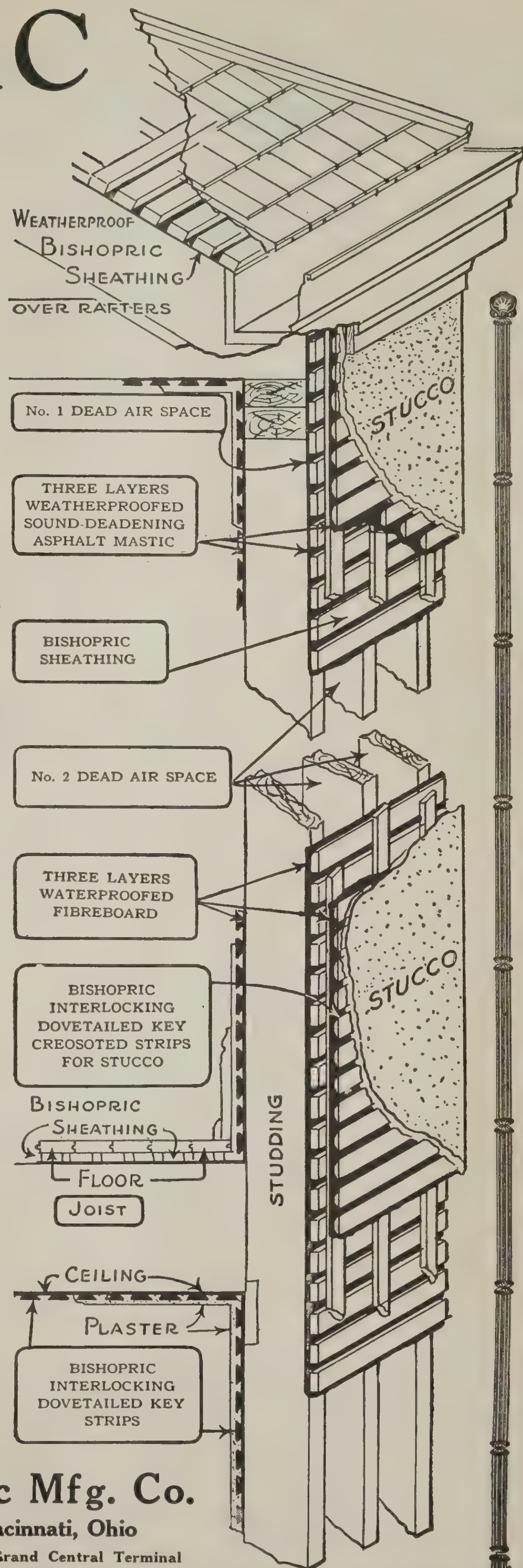
With a shortage of four million homes in this country, wise builders, having in mind the Economy, by reasons of the big saving in material and labor in its application, the Durability and Efficiency of Bishopric, can see in the growing demand for homes an opportunity for conservative and profitable investment. Seldom, if ever, in fact, have the builders of this country faced such a splendid opportunity for attractive and permanent returns for their outlay.

The BISHOPRIC BASE STUCCO HOME is equally in keeping and in place on the humble street or magnificent boulevard. Always adds and never detracts from any surroundings.

Strictly in Good Taste, yet cost represents great economy — **Bishopric Base** enables you to secure real permanency in Stucco Construction on account of its rigidity and the dovetailed interlocking wood strips which lock Stucco and Plaster in an inverted wedge clasp with a grip that holds for generations.

No upkeep cost, and as paint cannot add to either the permanence or natural beauty of Stucco this expense is avoided. A non-conductor of heat, cold and dampness. An ideal sound-deadener.

Let us send you *Bishopric For All Time and Clime Specifications.* It is yours for the asking.



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New York City Office: 2848 Grand Central Terminal
Factories: Cincinnati, Ohio, and Ottawa, Canada

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Vol. 64 November, 1921 No. 11

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NATIONAL BUILDER

Volume 64 Chicago, November, 1921 Number 11

The Situation

OF course the biggest factor in the construction field the past month has been the threatened railway strike. It is too early to tell at this writing whether or not the strike will materialize, but in any event probably this threat, together with continued troubles in handling building trades labor, will have a tendency to postpone construction work which would otherwise have started.

It is to be hoped that the efforts and results of the President's conference on unemployment will in some measure offset these handicaps. The Associated General Contractors have already acted on the findings of the conference and have scheduled meetings in various cities throughout the country, in which architects, engineers, builders and contractors, as well as labor representatives and public officials will be brought together in an effort to promote immediate resumption of construction work of all kinds.

It was the finding of the construction industries' committee of the unemployment conference that the problem of reviving construction work was almost wholly a local problem. No outside pressure can do what a little local enthusiasm can accomplish. Accordingly these local conferences fostered by the Associated General Contractors will endeavor to bring building material dealers and building trades workers into line, if they are out of line with the price and wage tendencies of the time; and to have house cleanings and mutual understandings.

The importance of reviving construction work as rapidly as possible may be appreciated when it is realized that of the 2½ to 3 million people out of employment, between 10 and 20 per cent are actually in want or in danger of starvation. Under such conditions it is not surprising that a high officer of the government has stated, confidentially, that there is a growing discontent with our social system which will soon embrace 75 per cent of the population.

In the material markets of the last month the most significant development has been an advance in the price of lumber of from \$1 to \$3 per M in several widely separated communities. Cement and brick prices continue to show recessions in scattered communities, which generally means that dealers here and there are being forced into line with the price cuts made by manufacturers some weeks back.

Wages of building trades mechanics also show reductions in many communities. After a long drawn out strike the building trades unions of Pittsburgh are one by one giving in to forced reductions. In Chicago the refusal of some of the building trades to accept the award of Judge Landis, after having originally agreed to abide by it, has so disgusted prospective builders that it is estimated 120,000 men have been thrown out of employment.

Reducing freight rates and railway wages as it looks to the construction industry

Home Building in Indianapolis Never Stopped

In a City of 85,000 Homes, Over 1,000 New Ones Were Under Construction on September 1 Last

WHAT one city has done and others should have done—and must soon do in any event—is exemplified in the case of Indianapolis, Ind. This city has been meeting the demand for more housing facilities, and better housing facilities, without cessation of work ever since the abnormal prosperity of the war period increased the pent-up normal demand for these things.

A birdseye view of the construction industry in this enterprising city is given in a recent survey by the local postmaster, whose figures are as follows:

	June 1, 1919	Sept. 1, 1921
Number of homes occupied including apartments	78,967	84,314
Number of homes vacant, including apartments	1,124	487
Number of business rooms occupied	9,309	10,254
Number of business rooms vacant	609	193
Totals	90,009	95,248

Business rooms in course of construction	182
Residences in course of construction	699
Suites of rooms in apartments in course of construction	646
Total	1,527

General industrial conditions in Indianapolis have not differed and do not now differ essentially from conditions in other large cities. It is growing rapidly and is fast becoming an industrial, distributing and railway center. The city now has over 1,200 industries and manufactures some 800 products. Indianapolis is located within 50 miles of the center of population of the United States, which assures its future as a distributing center. It is claimed to be *the* geographical center of manufacturing. The population is about 315,000. There are 70,000 families, of which 65 per cent own their homes.

It is a live city and it has some live building contractors and promoters, as the following pages will show. According to all accounts, it never suffered from even temporary stoppage of construction work. The Union Station was reconstructed during and since the war, and residences and apartments have been going up, being rented, bought and sold, notwithstanding high prices, high wages, receding prices, strikes, decreasing wages, high interest rates, and all the other handicaps that other communities have.

Indianapolis is the national headquarters of a number of building trades unions. Essentially it is a union town. Wages in the building trades were readjusted, with some strike troubles, early in the present year. The prevailing wages and the terms for which they run are shown in the accompanying table:

Trade	Rate per Hour	Agreem't Expires
Art Glass Workers,* per week	$30.00	....
Bricklayers	1.15	5/ 1/22
Carpenters	.92½	4/ 1/22
Cement Finishers	.90	4/ 1/22
Concrete Laborers*	.35	....
Composition Roofers	.50	....
Electricians	1.00	....
Electricians Helpers	....	....
Elevator Constructors	1.00	12/31/21
Elevator Constructors Helpers	.70	12/31/21
Engineers (hoisting)†	.92½ 1.02½ 1.15	4/ 1/22
Fixture Hangers	.85	4/ 1/22
Glaziers	....	....
Iron Workers (structural)‡	1.15	4/ 1/22
Iron Workers (finishers)‡	1.15	4/ 1/22
Iron Workers Helpers	1.15	....
Hod Carriers (brick)	.67½	5/ 1/22
Hod Carriers (plaster)	.70	5/ 1/22
Lathers (metal)	.90	4/ 1/22
Lathers (wood)	.90	4/ 1/22
Marble Cutters*	.65	....
Marble Setters	1.00	4/ 1/22
Mosaic Workers*	1.00	....
Painters§	.90	....
Pipe Coverers	.80	....
Plasterers	1.12½	....
Plumbers	1.15	4/ 1/22
Sheet Metal Workers	.92⅓	4/ 1/22
Shorers and Sheath Pilers*	.50	....
Slate Roofers	.60	....
Steam Fitters	1.15	4/ 1/22
Stone Cutters (granite)	1.00	5/ 1/22
Stone Cutters (lime)	....	....
Tile Setters	1.00	5/ 1/22

*Unorganized. †Three classifications. ‡All one union. §Open shop.

Monument Circle, Indianapolis, Ind.

General Observations

As the statistics already given show, home building in Indianapolis is about equally divided between houses and apartments. The apartment houses are very largely of the small apartment type—few of them with apartments of more than six rooms. The houses now going up and recently erected might be classified into three types—the small bungalow, or story-and-a-half house for wage earners, built to sell for $3500 to $5000, the $15,000 to $20,000 residence and the two-family house costing from $15,000 to $30,000.

The house that used to cost from $7500 to $10,000 seems to have disappeared entirely, and the class of people who would have owned such a home are now willing and able to pay the $15,000 or more necessary for the modern house. The demand still exists for the cheapest home compatible with decent construction; and undoubtedly the cost of a home of this type has increased in proportion less since 1914 than the cost of the higher class residence.

The new houses in Indianapolis are nearly all simple in design, painted in light colors and much more uniform and harmonious in general appearance than the houses of the last decade. The "central-hall" type of house, of which several illustrations are given in this issue of NATIONAL BUILDER, is tremendously popular. With this type and with an astonishing number of all new houses, Colonial doorways and other features of the Colonial style of architecture are extremely popular.

For exterior finish apparently the field of new housing is about evenly divided between wood, brick veneer, and stucco, with a possible leaning toward brick veneer as the most popular. Roofs in almost every instance are red or green tile (both clay and concrete), or red or green composition shin-

A house of common brick showing Colonial-type features at present very popular in Indianapolis

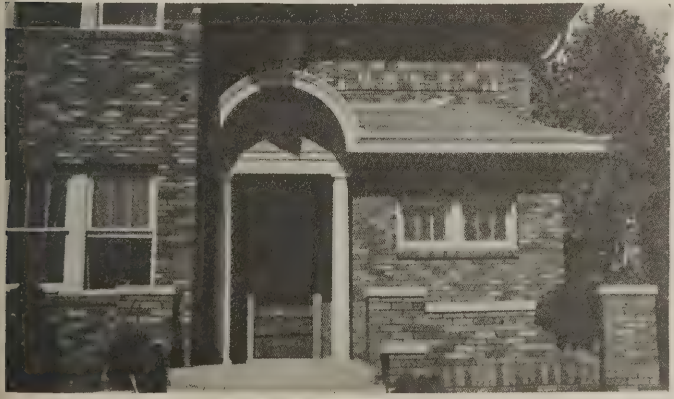
Typical high-class bungalow—built to sell for around $16,000

Typical double house on Fall Creek Boulevard

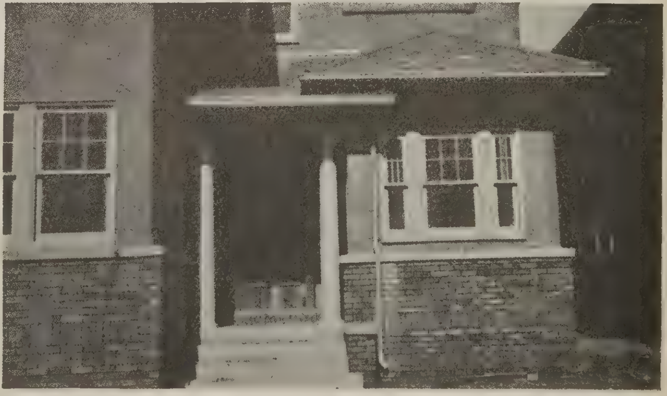
Double house with a single family residence look

Row of double houses on Fall Creek Boulevard—Jose-Balz Co.

Cheaper type of double house



Another typical entrance of double house—Jose-Balz Co., builders



Entrance treatment of double house to give one-family house appearance gles. In the few instances where wood shingles were observed they were also stained hues of red or green, or given some distinguishing color effect.

The tendency to have colorful roofs is very pronounced and certainly with white or light-colored exteriors these roofs give a pleasing effect. In a number of instances a combination of red and green surfaced composition shingles have been used. In some of the newest houses genuine slate shingles are achieving popularity.

Two-family houses of all types are quite popular. A typical row of these houses built by the Jose-Balz Co. is shown in this issue. These houses are built on Fall Creek Boulevard, one of the finest residence thoroughfares in the city, and are made to sell for about $30,000. One-half these houses rents for $140 a month and the investment feature is prominently used as a selling argument.

Houses of this character, both divided through the middle, and of the first and second floor tenement type, comprise some of the finest residences in the city. In general, the exterior treatment of such houses gives them the appearance of single-family houses, except in the case of the cheaper ones.

Some of the best examples of apartment-house buildings are shown elsewhere in this issue. The popularity of very small apartments—only one real room, with kitchenette and bath—is perhaps of considerable significance to builders in every large city. It is explained by E. G. Spink, one of the most prominent apartment-house builders, owners and operators in the city, by the constantly growing ambition of people with modest incomes to live in as fine and up-to-date quarters as any one, with all the conveniences that money can buy. The only answer to that problem is limiting the floor space to the minimum compatible with health and comfort.

How the Indianapolis Chamber of Commere Has Helped the Building Industry

FEW THINGS "just happen." The city of Indianapolis has not had continuous prosperity of its local building industry without some good reason. Having in mind the several suggestions NATIONAL BUILDER has made during the year that builders in various communities work with their local chambers of commerce, or commercial clubs, to get work started, one of the editors asked Col. John B. Reynolds, general secretary of the Indianapolis Chamber of Commerce, what his organization had done for the builders of that city. Colonel Reynolds said:

"The housing situation in Indianapolis has never been as critical as in many other cities. Some home and apartment building have gone on steadily and at present there is a sharp increase of construction of this nature. This construction ranges from cheap residences and apartments straight through to high grade apartment houses, fine residences and hotels. The National City Bank is just now completing a modern 16-story office building of the finest type.

"The Indianapolis Chamber of Commerce has been an important and powerful factor in helping to maintain manufacturin gand other trade at a high point of optimism. It has conducted trips into trade territory for the purpose of building new wholesale and jobbing business. It has cooperated, through its manufacturers' committee and Bureau of Industry, with established industries and those seeking locations. With its membership of nearly 4,000 and an aggressive ideal of service, it is a powerful influence in Indianapolis. Relations between the Chamber of Commerce and the real estate and building interests are very cordial. The Indianapolis Real Estate Board holds its meetings at the Chamber of Commerce and most of its members are likewise Chamber of Commerce members. The Building Contractors' Association maintains offices and headquarters in the Chamber of Commerce building, the two organizations co-operating in every possible and consistent way.

"The Industrial Exposition of Indianapolis-made products at the state fair grounds the week of October 10th gave striking evidence of the attitude of Indianapolis toward the future of American business. There almost 400—386 to be exact—manufacturers of Indianapolis presented their products to the world in a building of more than 51,000 square feet and at a great expenditure of time and money. When this industrial exposition was started, the most hopeful did not expect more than 250 exhibitors. On account of the manner in which the Chamber of Commerce has handled the exposition, the demand for space greatly exceeded the amount available. Most widespread publicity has been given to Indianapolis as a result of this exposition. The United States government and friendly foreign nations sent representatives, thereby giving it a national and international character. While this is somewhat apart from the purposes of this article, it will nevertheless have a great influence on industrial expansion, and therefore on future housing needs."

The National Builder Plan Insert

WITH THIS ISSUE *of National Builder the editors have replaced the time-honored blueprint insert with a black and white insert on special, thin paper. The object of this change is to better serve our readers.*

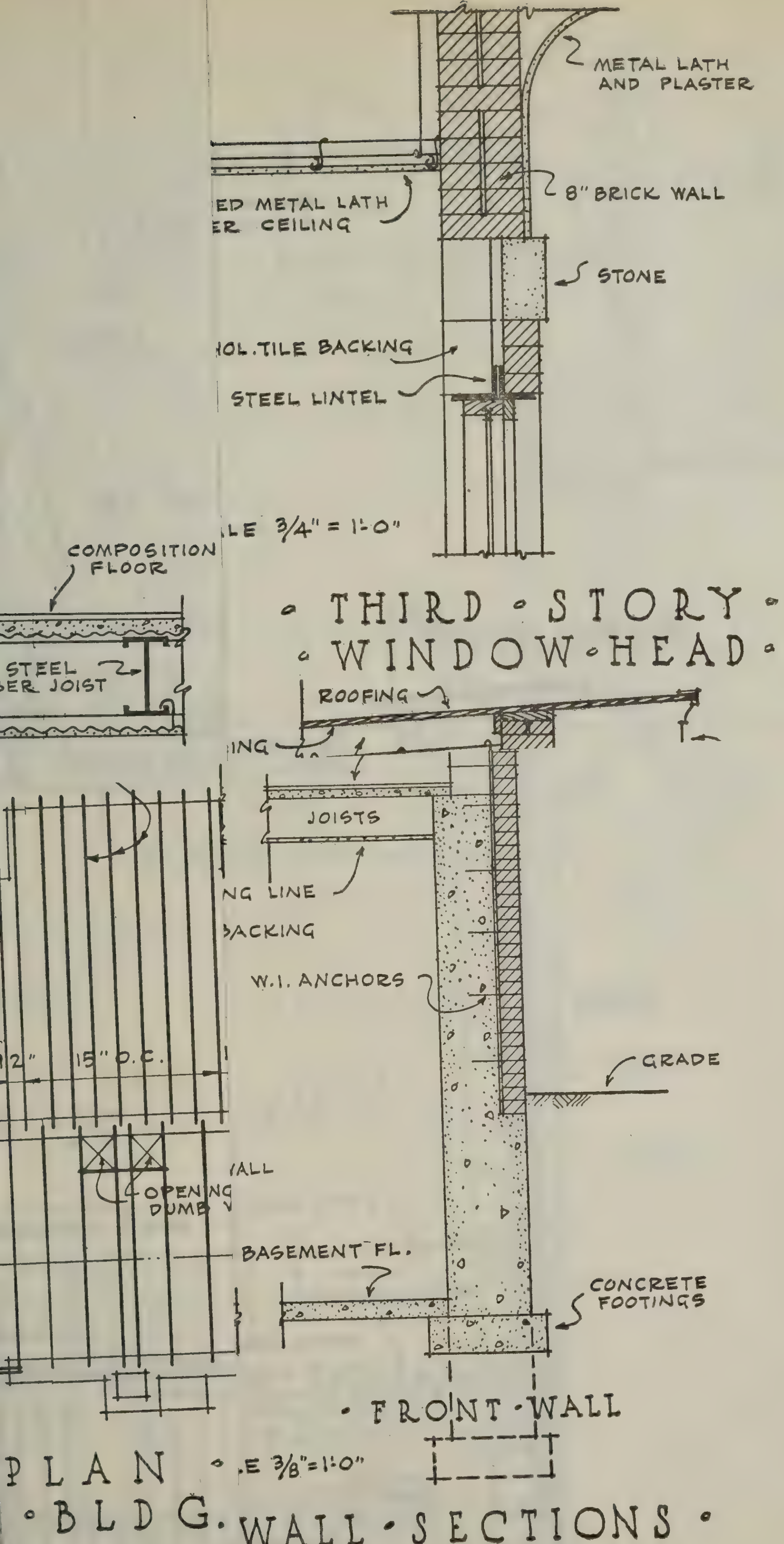
The thin paper insert is not only more easy to read and serves all the purposes of the pseudo-blueprint, but by simply painting it with melted paraffin, it becomes a tracing from which as many genuine blueprints as desired may be made.

The editors believe that this feature will add to the value of these plan inserts. Suggestions as to the utility of this change, and suggestions as to what kind of structures our readers would like most to see detail plans of, are earnestly solicited.

The Value of Standardization

A cut of six hundred dollars in the construction costs of the average small house and a reduction of 20 per cent in practically all bills for plumbing equipment are possibilities in connection with the work of the new Division of Building and Housing recently established in the Department of Commerce, declared F. M. Feiker, special assistant to Secretary of Commerce Herbert Hoover in a speech before the National Conference of Business Paper Editors in session at the Congress Hotel, Chicago, Oct. 24.

Mr. Feiker said that the six hundred dollar house construction saving depended largely upon the national adoption of standardization code regulations with regard to fire-walls. The reduction in plumbing costs is also a matter of standardization. Mr. Feiker said that according to a special committee which is working on the simplification of plumbing specifications, the existing rules for plumbing equipment in different cities and towns are now as varied and as unsystematized as the autumn winds. Standardization of these local regulations along sound lines will make the estimated reduction possible in the opinion of the committee.


METAL LATH
AND PLASTER
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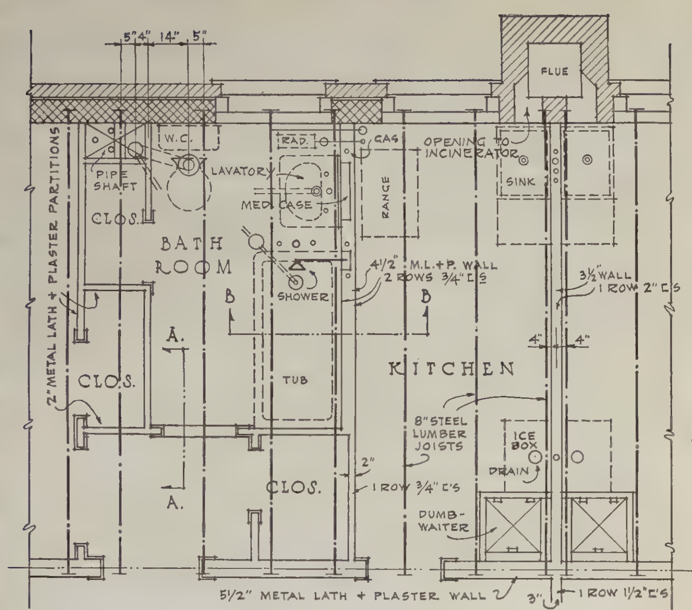
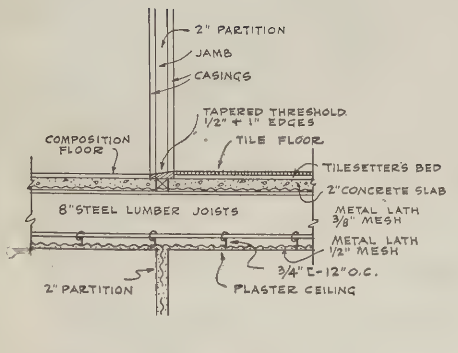


PLUMBING AND FRAMING PLAN OF KITCHEN AND BATH RM.

SCALE 3/8" = 1'-0"



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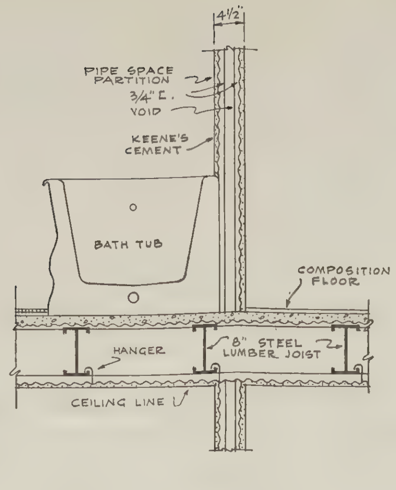
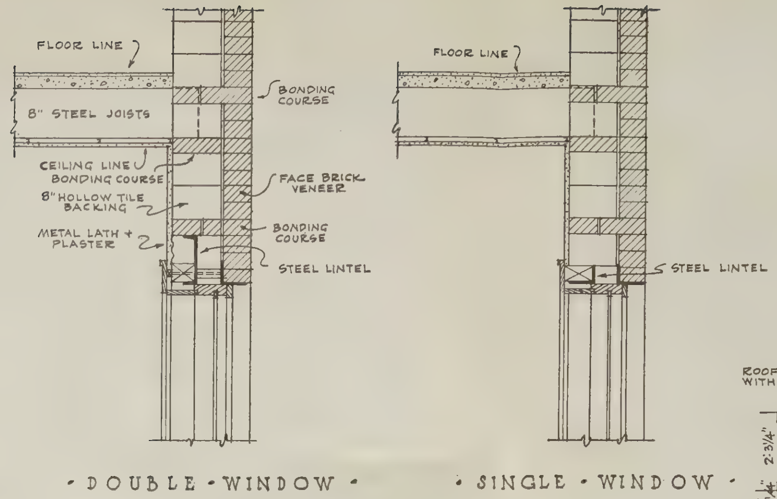


SECTION "B-B"

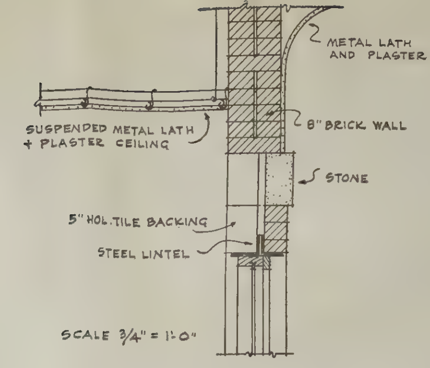
SCALE 3/4" = 1'-0"



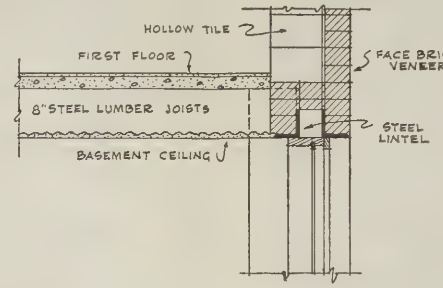
DOUBLE WINDOW · SINGLE WINDOW

DETAILS OF WINDOW HEADS

SCALE 3/4" = 1'-0"

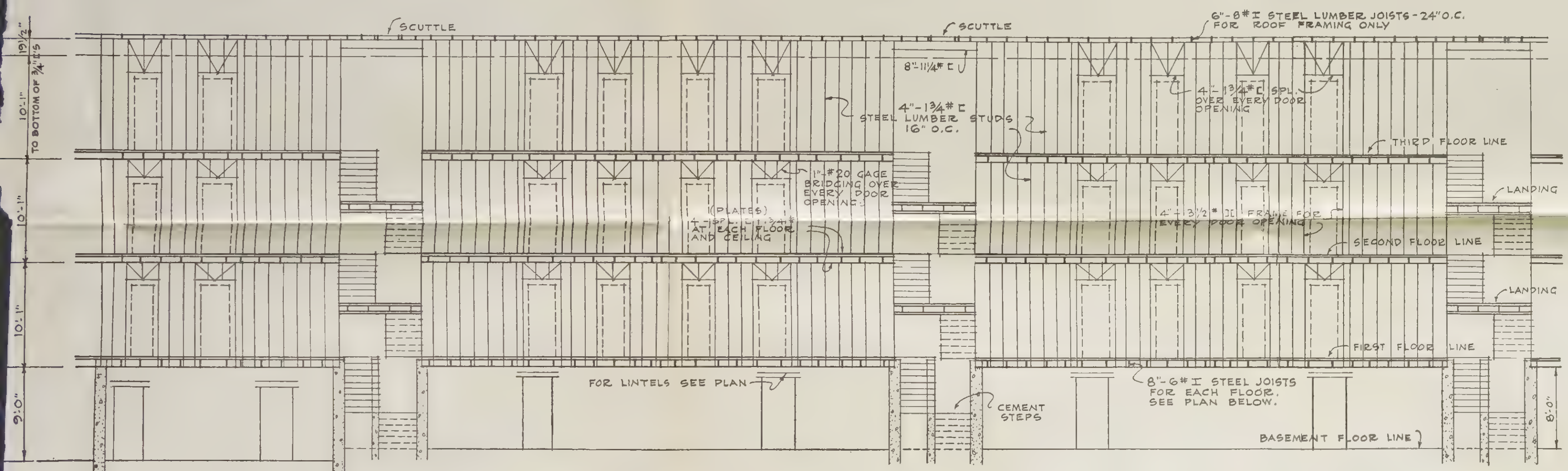


THIRD STORY WINDOW HEAD



BASEMENT WINDOW-HEAD

SCALE 3/4" = 1'-0"

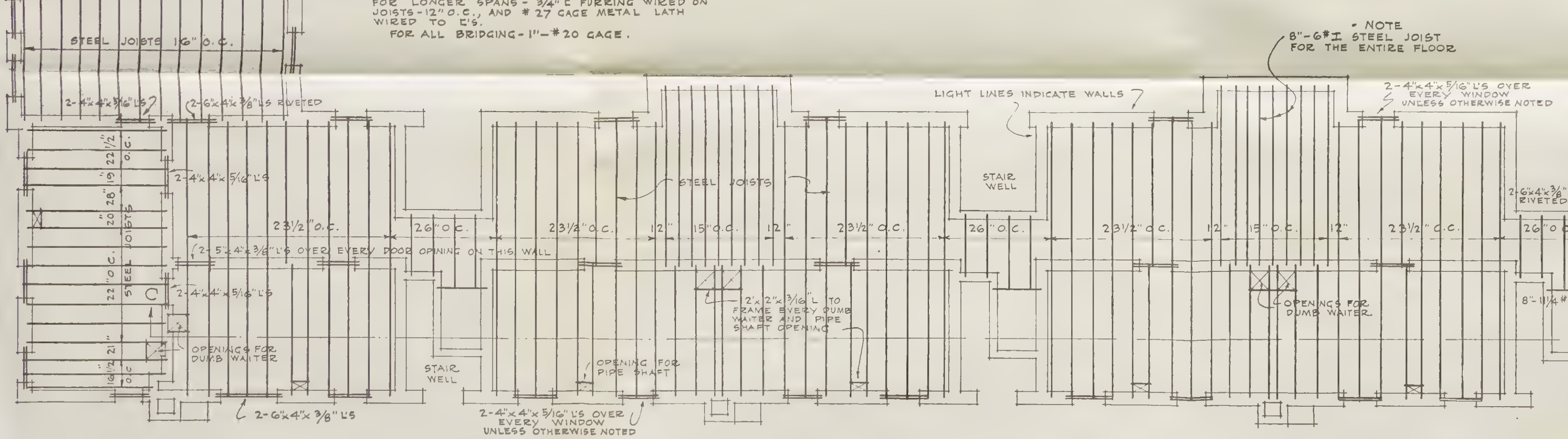


SECTION THRU BUILDING ON LINE "C-C"

SCALE 1/8" = 1'-0"

NOTES

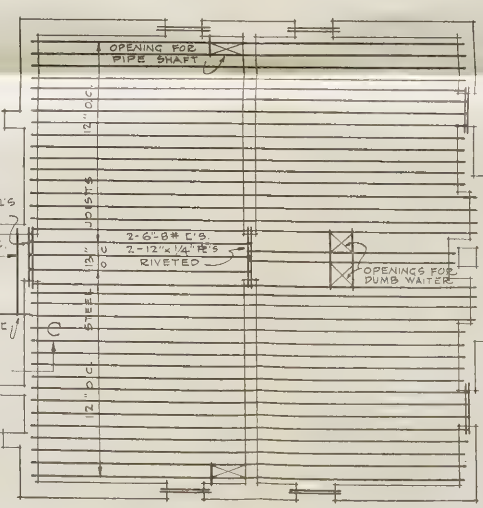
METAL LATH FOR FLOORS:-
FOR 23 1/2" SPANS - #26 GAGE - RIBBED - 3/8" MESH
FOR 12" SPANS - #26 GAGE - PLAIN - 3/8" MESH.
METAL LATH FOR CEILINGS:-
FOR 12" SPANS - #27 GAGE - CLIPPED ON JOISTS.
FOR LONGER SPANS - 3/4" E FURRING WIRED ON JOISTS - 12" O.C., AND #27 GAGE METAL LATH WIRED TO E'S.
FOR ALL BRIDGING - 1" - #20 GAGE.



FIRST FLOOR FRAMING PLAN OF SOUTH SIDE PORTION OF BLDG.

(OTHER FLOORS SIMILAR)

SCALE 1/8" = 1'-0"



National Builder

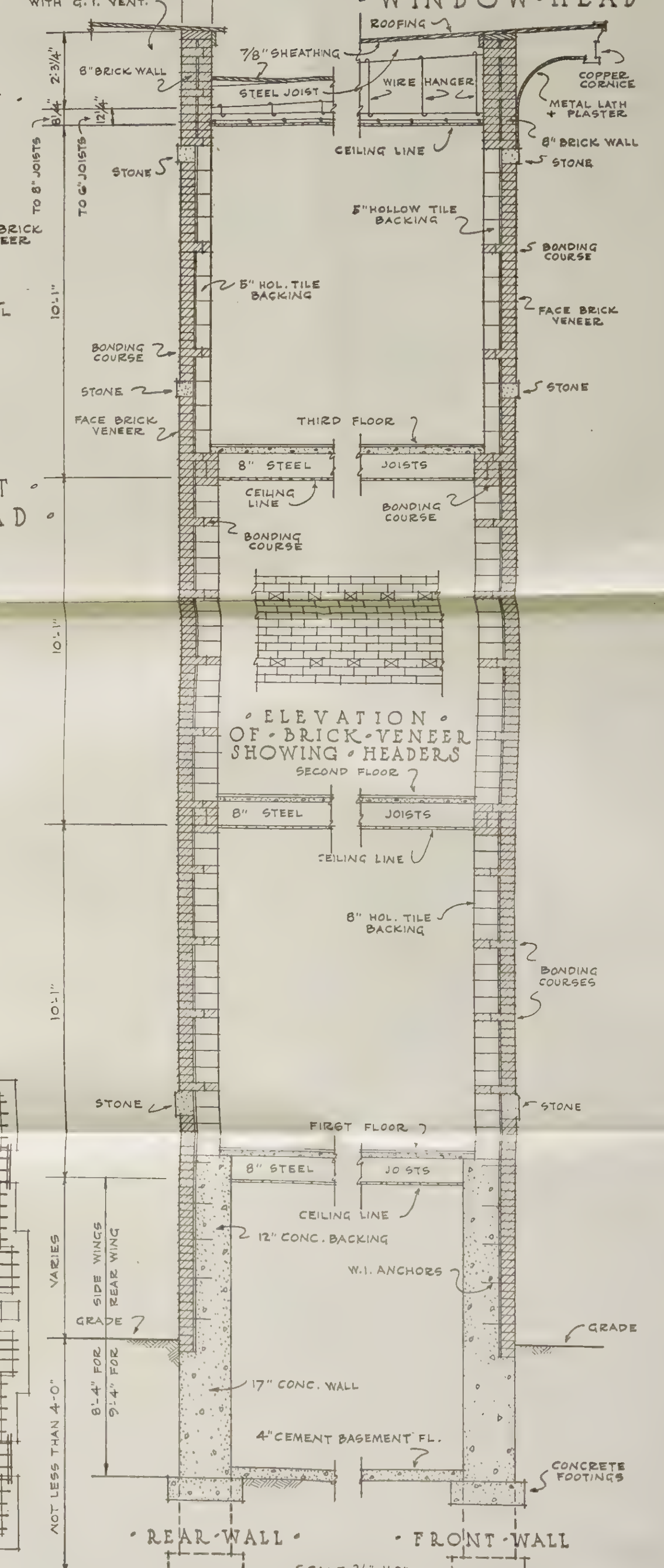
November, 1921

Details of Apartment House

Metal Lumber Framing and Metal Lath Construction

The E. G. Spink Company, Indianapolis, Ind.
Architects, Builders and Owners

See Photographs and Description in Reading Pages



TYPICAL WALL SECTIONS

E. G. Spink of Indianapolis

Builder, Owner and Operator of Successful Apartment Houses—A Building Contractor With Vision

STARTING out in his business career as a telegraph operator and according to his own admission, he was not a particularly successful one—E. G. Spink learned the building business in an architect's office and as a practical building contractor for small homes.

With vision and foresight he studied the problem of furnishing homes to city dwellers as *a public utility,* in the same sense that a street railway, or an electric light and power company, is a public utility. By his observations as a business man and employer, he saw what hundreds of thousands of other business men and employers have

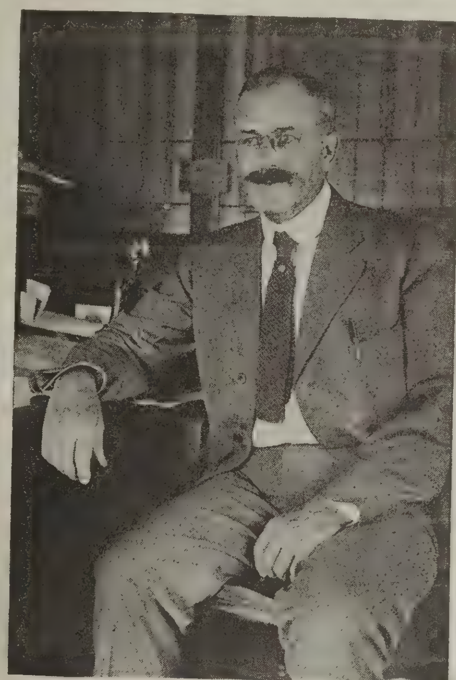
W. K. Eldridge, architect

seen and are constantly seeing, unheeded, that the *business woman*—the bachelor girl—most of all, lacks adequate housing facilities.

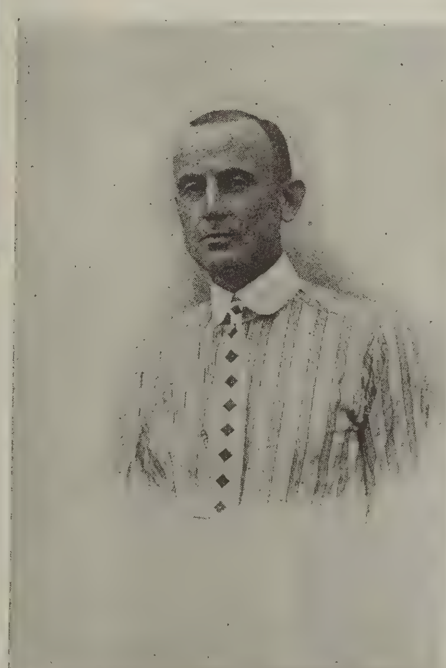
He understood the psychology of womanhood so well that he could see the average woman in business retains enough of her domestic characteristics to want a little home all her own—be it ever so small. He saw that Y. W. C. A.'s and other institutional rooming houses did not fill the bill. Women do not take to club life or boarding house variations of it, like men; and business girls often resent the paternal oversight of such institutions as the Y. W. C. A.

The First Apartment

His plans to meet this problem crystalized in 1916, less than six years ago. He built a 36-apartment building with apartments consisting of a light, airy, combination of living and bed room, a little, a very



E. G. Spink



A. H. De Hart, general superintendent

little, but still a serviceable, kitchenette, and a bathroom. He equipped the apartments with gas stoves, ice boxes, and in-a-door beds; and in addition hot and cold water, gas, electricity, telephone, ice and janitor service were all included in the monthly rental.

Also, Mr. Spink's vision extended beyond this single building. He trimmed his cloth to the means of prospective customers. He rented the apartments, with all the utilities mentioned, for the modest sum of $22 per month. (The rent is only $30 a month now.)

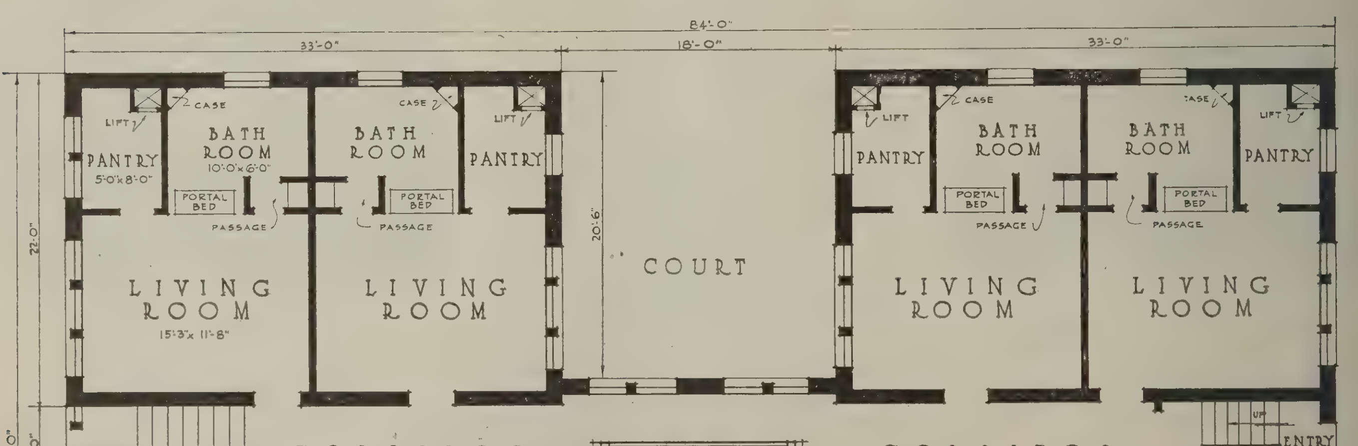
Immediately this apartment house was filled with business women and school teachers, and Mr. Spink operated the building with as much care and foresight as he

Charles J. Schuh, secretary

had planned it. He has never had to advertise for tenants. He has since 1916 built a score or so of similar apartment houses. But he has never been able to keep anywhere near up to the demand. Right now he has about 3600 applicants. The "outs" watch the "ins" with eagle eyes for the first sign of moving.

Although at present the proprietor of sixty-five apartment buildings—some 1200 apartments—Mr. Spink takes his greatest pride in this original 36-apartment building. It was not only the crystallization of his plans for housing on the lines of a public service, but it was the proof of his theories and the beginning of his road to fame. Fame is meant, too, because today Mr. Spink is regarded in Indianapolis just as much of a public benefactor as many men

The Latowa Apartment Buildings



Floor plan of one of the three units of the Latowa apartment building

A type of apartment construction adopted during the war, when brick and some other building materials were hard to obtain, and speed was the prime essential

Another apartment house erected during the war

A 32-apartment war-time building. Built in identical units or sections, eight apartments to a section. Rents at $37.50 per month

War-time apartment house—apartments have living room, bedroom, kitchen, bath, reception hall, and Pullman diner. Rents $37.50 a month

Double apartment house, 72 apartments in all; living room, kitchen, bath and bedroom. Rent for $33 a month

Double 6-apartment building. Apartments of eight rooms each; two baths, electric kitchen ranges. Rents at $100 per month

there and elsewhere who have achieved fame by gifts for charity rather than deeds.

Rapid But Logical Growth

From a single apartment house in 1916 to sixty-five in 1921 seems a remarkably rapid growth, but analyze it and that

Double 6-apartment building. Apartments of eight rooms each; two baths, electric kitchen ranges. Rents at $100 per month

ones, and has therefore built with progressive experience.

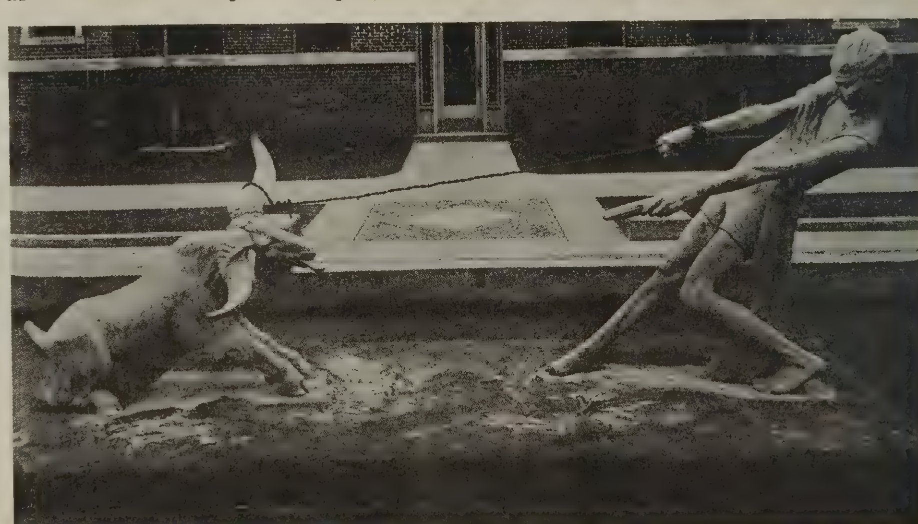
For a short time he confined his energies to the type of building which his first experience proved was in such great demand. Then he found his women tenants were getting married, and that for newly wedded couples these little apartments were just as much in demand as for bachelor girls. Then the married couples began wanting a little larger quarters and he rapidly expanded his operations to include apartments of various sizes up to six or more rooms—always keeping maximum service in mind.

By and by children began to appear on the scene, and Mr. Spink found his plans open to criticism because he had not made provision in his apartments for the youngsters, and because, as in most city apartments of this class, tenants with children were not particularly desired. But since Mr. Spink's success was founded on being able to fathom the needs of human beings for suitable living quarters—and fulfilling those needs—a little matter like that did not bother him long.

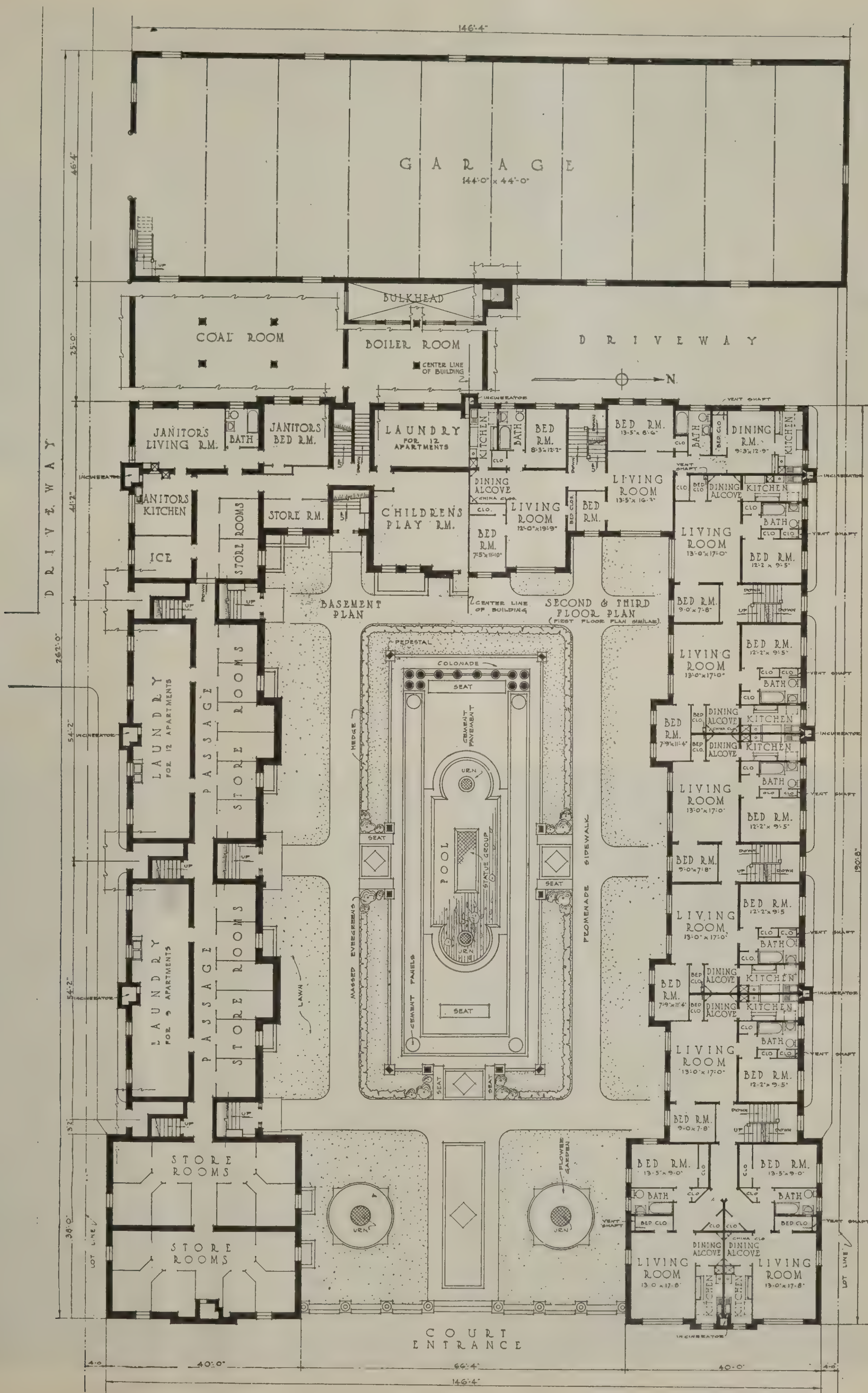
The children's apartment house—the latest of Spink Company's types of "public utility" housing

growth is a perfectly logical growth. Mr. Spink built for permanence and service and an investment for the same reason any other public utility is created. He did not build for speculation as so many city apartment houses are built. Consequently he had little or no real competition at the start. Having visions of creating the city's largest home-giving service, he aimed to have satisfied tenants.

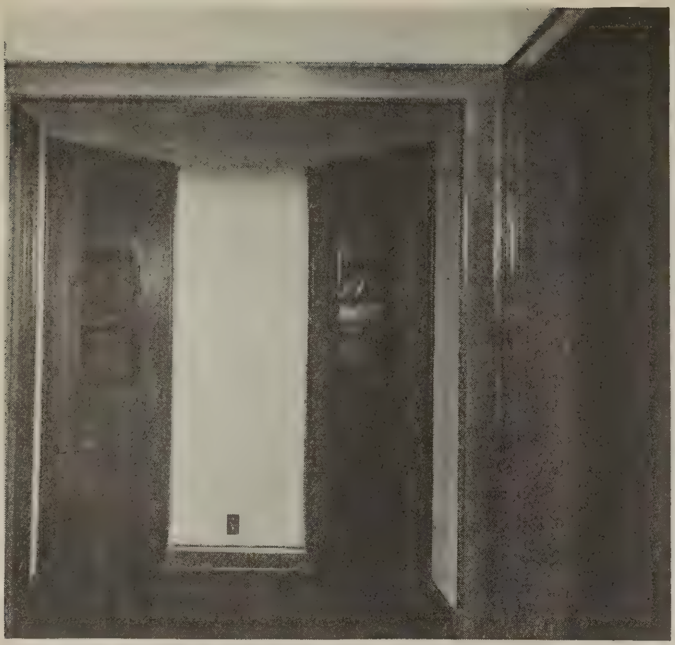
Each apartment building that he has constructed has contained new features to better serve its purpose. Sometimes these improvements have been experimental, but they have all been tried with the intent of treating and solving the housing problem as a public service. Unlike many apartment house contractors and architects he has had the experience gained in managing the buildings to use in designing new



Wading pool, children's apartment house



Plan of basement (above); typical floor plan (below); "children's" apartment house of the E. G. Spink Co., Indianapolis



Alcove with china closets: children's apartment

Alcove arranged as a "breakfast room"

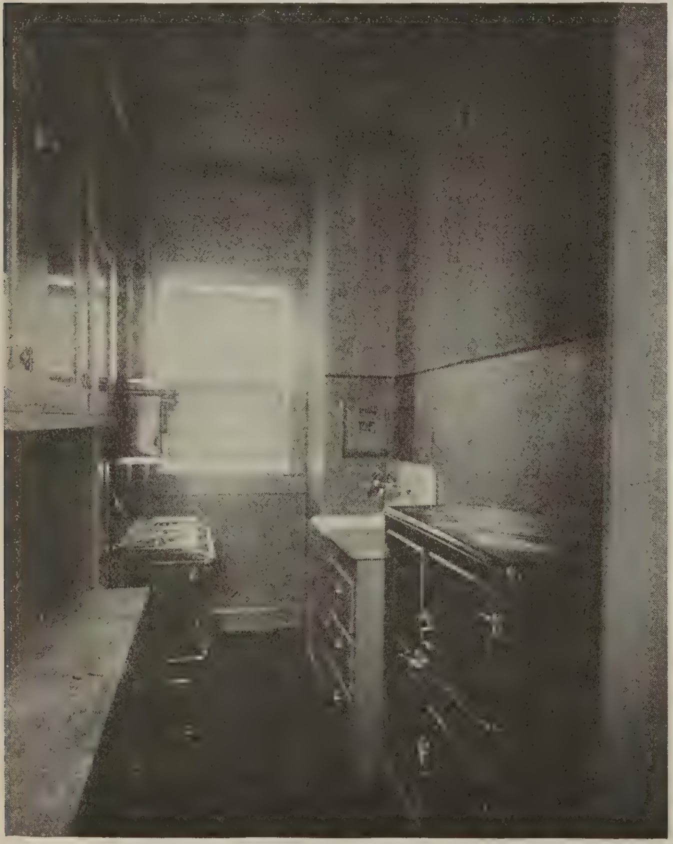
A Children's Apartment House

To meet the needs of city dwellers of moderate income who are so unfortunate as to have children, Mr. Spink has designed and built the apartment more particularly illustrated in this issue. This differs from the regulation city apartment house in several ways.

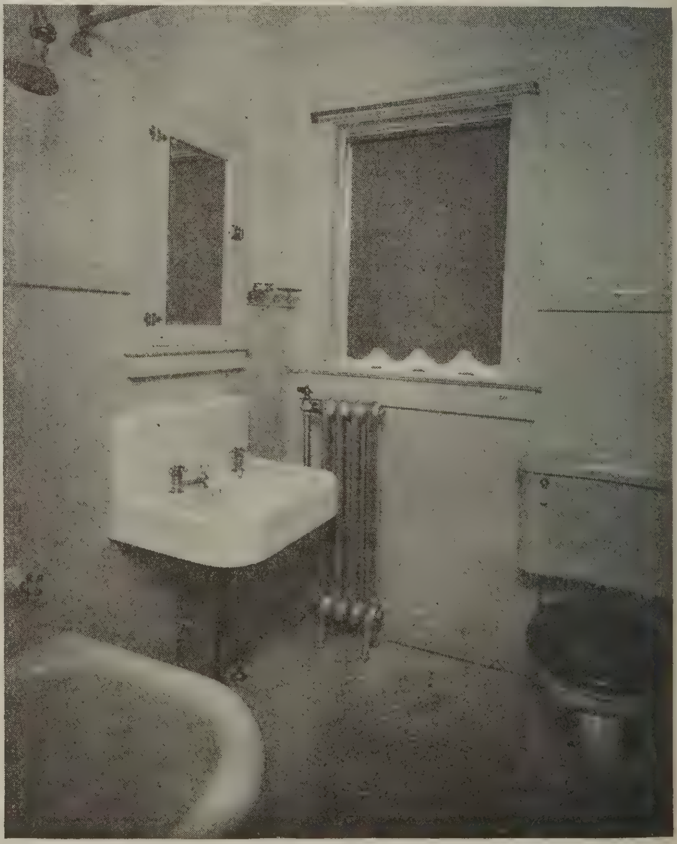
A child does not require so large a bedroom as an adult. Nevertheless it requires a room all its own. Adults may sleep on an in-a-door bed in the living room and thus economize in floor space, but the in-a-door crib and nursery paraphernalia have not yet made an appearance, and it is doubtful if they would be desirable or allowable in good society.

So the children's apartment house is designed to give every apartment at least one little bed room, especially intended for the baby. And, as in all Mr. Spink's apartments, every room has windows into the outdoors. He does not have air shafts or other make shifts for air and sunlight in any apartment.

In the basement, in the main central part of the building, is a large room to be furnished with children's play things and to be in charge of a nurse or matron, so the mother will be relieved of the anxiety of watching her offspring and of protecting the furniture in a rather restricted floor space from the excess of energy children



Kitchen in the children's apartment house



Bathroom in the children's apartment house

Typical living room in children's apartment house

An entrance hall showing magnesite stucco wainscoting

generally have, which conditions should meet.

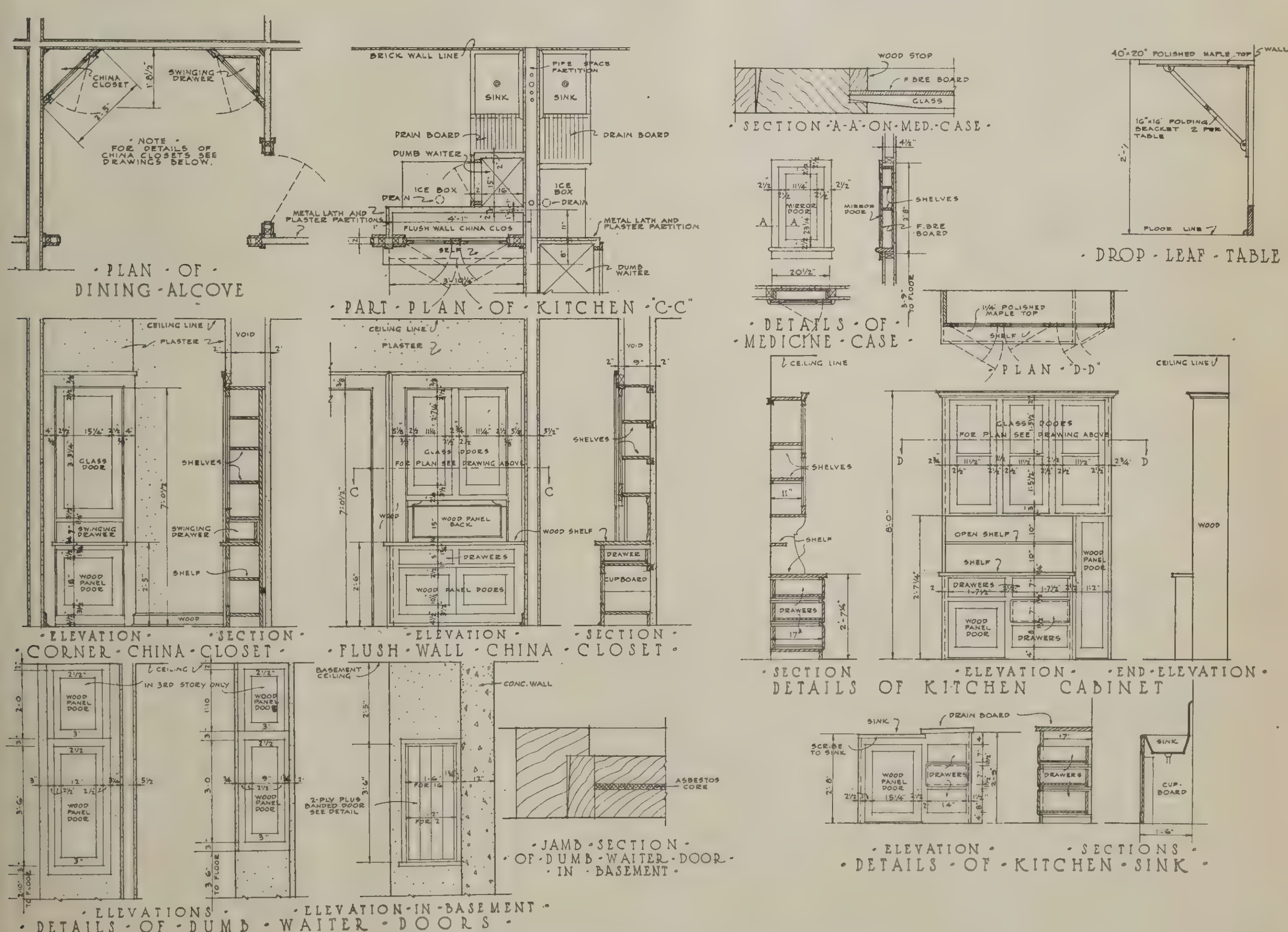
The other features of the apartment house are similar to the other Spink apartments. They have built-in kitchen cabinets, china closets in small breakfast alcoves and medicine cabinets in the bath rooms.

The kitchens are equipped with small gas stoves, especially built for Mr. Spink. These have fireless cooker ovens. Ice boxes are furnished. Each kitchen has a dumb waiter for receiving groceries, provisions and ice. This eliminates the necessity of back porches. The ice is furnished by the management as in other Spink apartments. Also, alongside each kitchen sink is a covered opening to a shaft leading to a garbage incinerator. Kitchen waste and trash dropped into this are automatically disposed of. The incinerators are arranged around the outside wall of the building as one of the plans show.

The boiler, piping, etc., are in a sub-basement. The basement proper is devoted entirely to storage rooms for tenants, laundries with steam-heated dryers, etc.

Construction Details

This apartment house is fire-proof con-



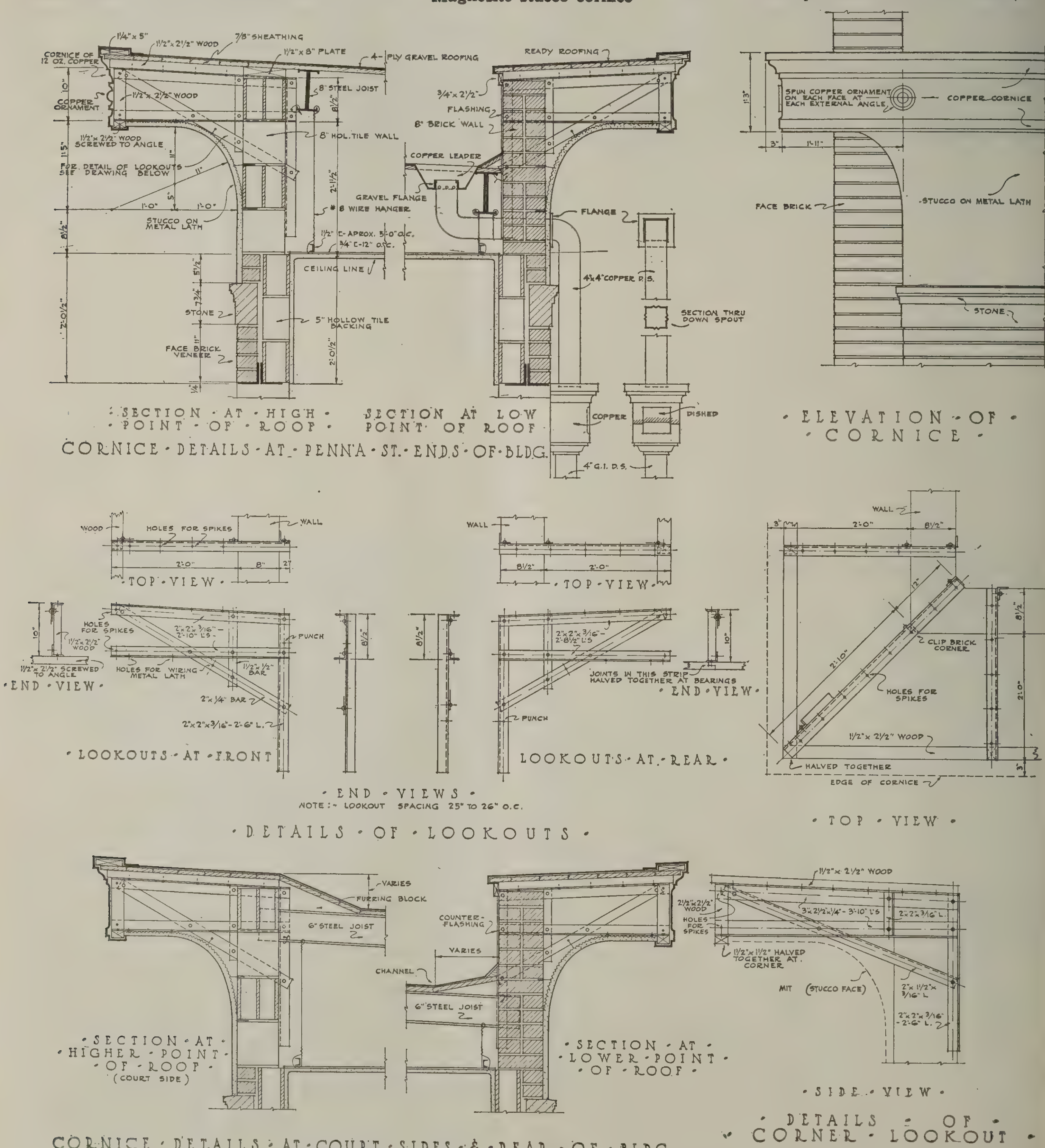
Interior details of the children's apartment house struction throughout. The walls are brick masonry and all interior framing, floor joists and partitions are pressed steel lumber or standard structural steel shapes. The room partitions, as the plans show, except where provision was made for plumbing or other interior features, are only 2-in. thick —¾-in. channel steel studs with metal lath and solid plaster filling. The floors are of linoleum over the concrete.

The drawings and the photographs herewith show many construction details, some of them unusual. The outside hall wainscotting is of pebble-dash magnesite. Here again the fact that small children are expected to be numerous was duly allowed for. It is believed that interior walls of this character will retain a presentable appearance longer without special attention than any other kind of surfacing.

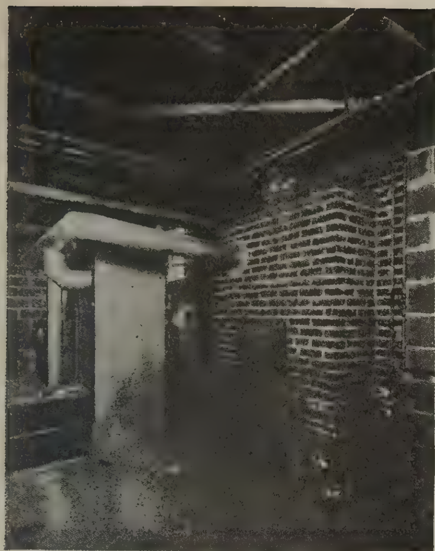
Magnesite stucco cornice

The architect or builder reader will note many other little details which distinguish this building from the average; but as the plans are quite complete no attempt will be made to enumerate all of these here.

These apartments rent for from $55 to



Roof and cornice details of the children's apartment-house building



Garbage burning plant

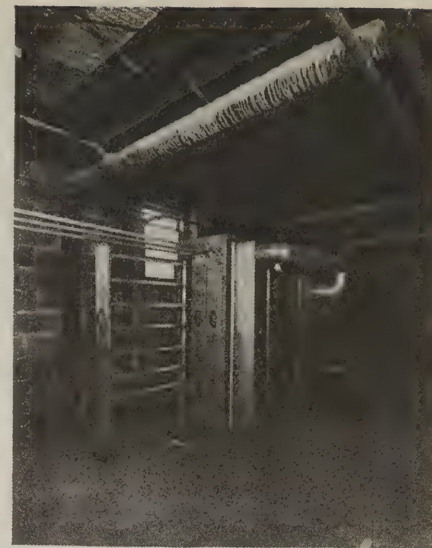
$100 per month (the largest having six rooms), including however, gas, electricity and ice, not to repeat the special features which make them desirable to city mothers.

In a nutshell, Mr. Spink's experience has been that the class of people with moderate-sized incomes who rent his apartments are people who want every comfort and convenience that any class of people can have. The only way to supply this demand at prices within their means is to limit the floor space. In other respects, these apartments rank with the highest priced.

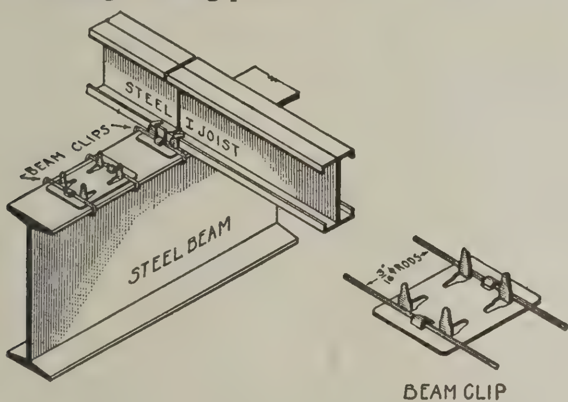
Provision for Automobiles

In all his family apartment house projects Mr. Spink has made some provision for the cars of his tenants. Most of these garages are of standard design with separate compartments for each tenant.

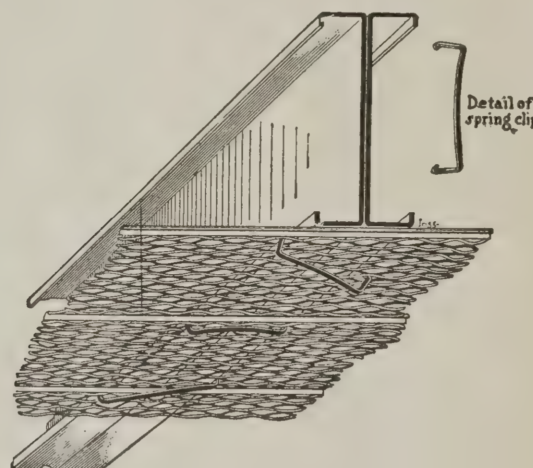
In the apartment house above described the garage is built on the lines of commer-



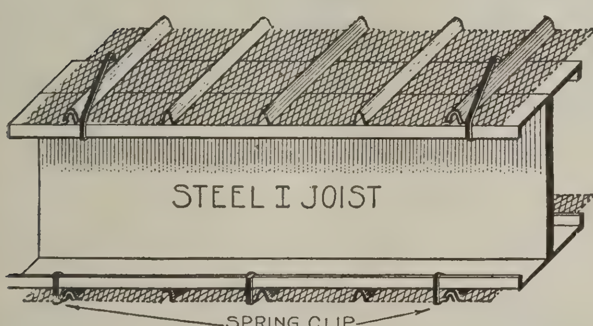
Clothes dryer



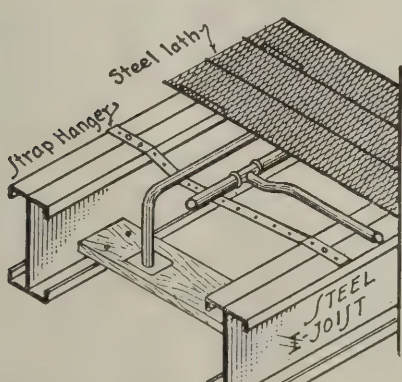
Beam clips



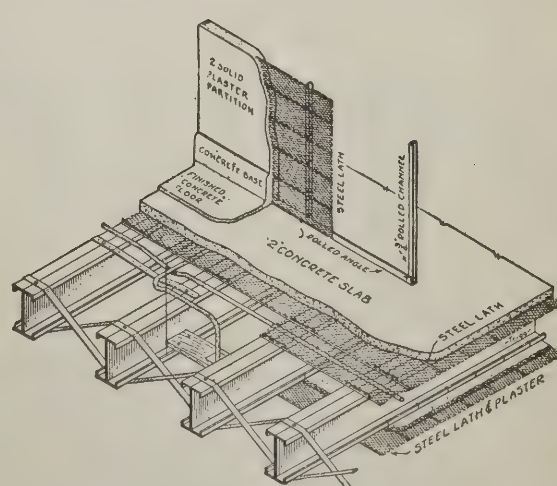
Lath in position on ceiling



Clips sprung over ribs



Details showing piping, screens and outer box support

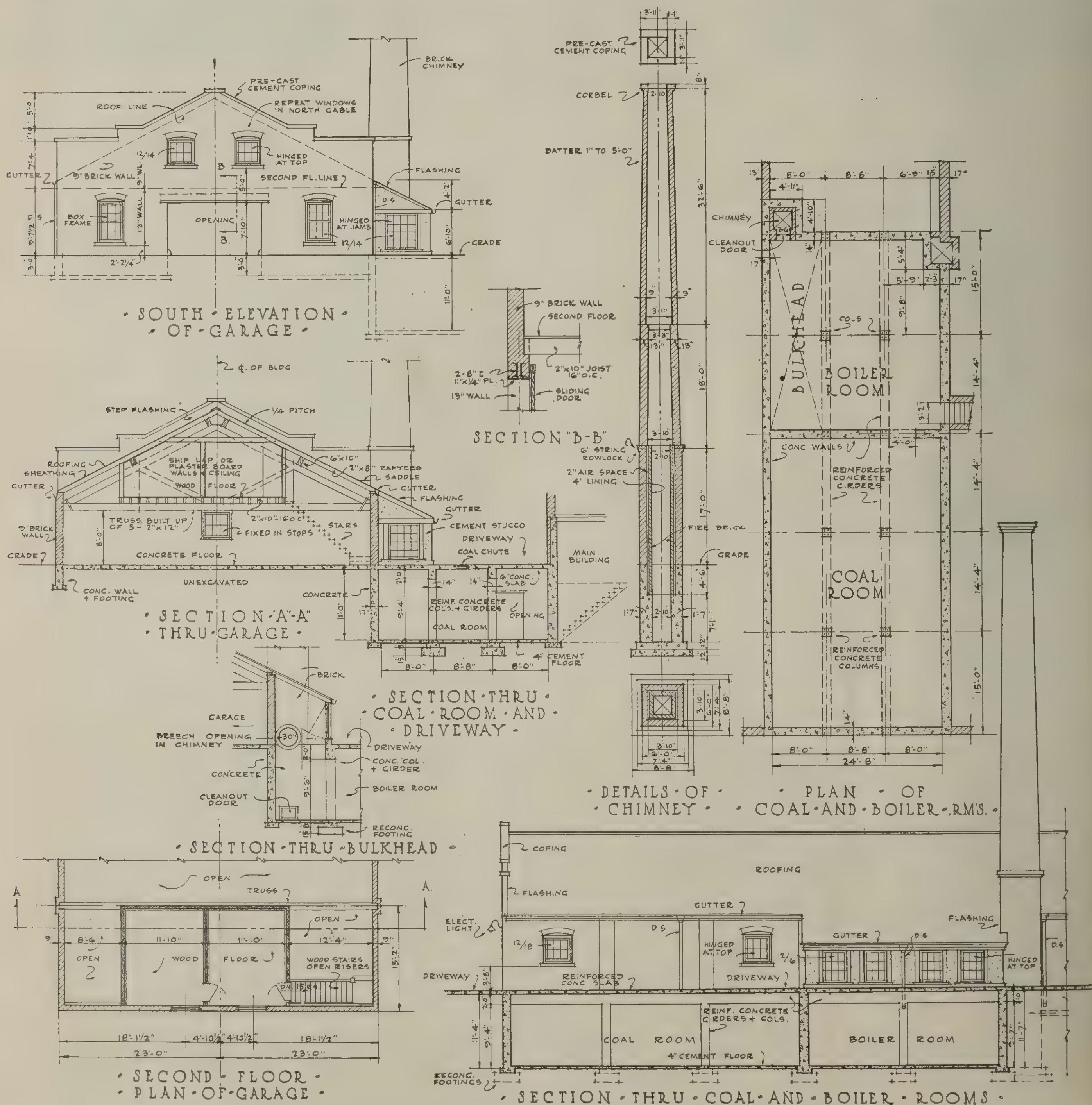


Showing two-inch solid plaster and steel lath non-bearing partition, conduits and water pipes, with wood floor finish

DETAILS OF STEEL LUMBER CONSTRUCTION USED IN CONSTRUCTION OF THE "CHILDREN'S" APARTMENT BUILDING AND TO BE USED IN ALL THE NEW APARTMENT HOUSES OF THE E. G. SPINK CO.

Typical entrance to children's apartment house

Garage and alleyway over coal vault



Details of community garage, coal bins and boiler plant of the children's apartment building

The "Spink Arms"—an apartment hotel now being duplicated on adjoining lot

cial garages. It has space for 66 cars. An attendant is constantly on the job to assist the car owner and to wash the cars, if employed to do so. Space in this garage is rented for $7.50 per month.

The garage and the basement of the apartment building are connected by a concrete-paved areaway between the buildings. The coal bins and part of the heating equipment are located in this compartment, which avoids the fire hazard arising from the storage of soft coal in the apartment building proper

The Spink Arms Hotel

Mr. Spink considers the crowning achievement in his career of building apartments as a public utility the construction of the Spink Arms hotel. This is a combination apartment and transient hotel. The apartments, consisting of a living room, bed room and bath, rent for $200 per month and up. They are elegantly and tastefully furnished to suit people with the most discriminating taste.

The Spink Arms was constructed in 1920 and has been such a success that a second unit of identical construction is now nearing completion. These buildings are of reinforced-concrete construction. The trim on the original building is Bedford limestone, but on the unit now under construction it is a concrete trim stone, which is made of limestone screenings and very closely resembles the Bedford stone.

In his choice of manager Mr. Spink was particularly fortunate in getting J. Guy Haugh, who like himself is filled with enthusiasm and who has many original ideas on what hotel appointments and service should include. Mr. Haugh's preparation for the position was that of a successful business man—haber-dasher and shirt manufacturer, whose real education in the hotel business developed from powers of keen observation as a hotel guest in both Europe and America.

Mr. Haugh personally selected the furniture, appointments and made the arrangements of the Spink Arms Hotel. He firmly believes that the hotel business of the country will soon undergo a revolution; and he is in the vanguard of revolutionists. He believes that the fine hotel of the future

Lobby of the "Spink Arms"

Lobby—"Spink Arms" Hotel

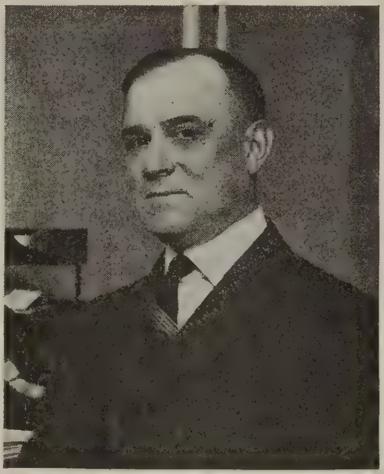
will be the one with the most home-like atmosphere, and he has endeavored by every means possible to give such an atmosphere to this hotel. He is ably assisted by Mrs. S. M. Marshall as manager of the dining rooms, candy shop, kitchen and all food details.

E. G. Spink Co. Organization

Considering that the E. G. Spink Co. collects about $1,000,000 a year in rentals, manages sixty-five apartments buildings and always has two or more buildings under construction, the organization is remarkably simple and efficient.

Mr. Spink is of course the very active head. He has three principal assistants: Charles J. Schuh, a lawyer by profession, but a home builder by instinct, is secretary of the company and the all-around business manager. W. K. Eldridge is the architect who makes the plans. General specifications are not considered necessary as the organization makes all of its own purchases and does all of its own building work.

The construction forces are in charge of A. H. DeHart, a building contractor of long experience, as general superintendent. The foremen in charge of various groups of workmen are directly responsible to him. While work is generally going on at two, three or more buildings at one time, Mr. De Hart keeps in the closest possible touch with each and no other superintendents are needed.



Manager Haugh, Spink Arms Hotel

In handling the various construction jobs the work is so planned and laid out that each group of building trade workers follows the other in logical sequence, so that all are kept busy practically the year round and there is no lost motion and no waiting around for one group to finish before the next can begin. In other words the smallness and the tightness of the organization —with practically no overhead—makes a nearly perfect co-ordination of the construction work possible.

For the last year or so Mr. Spink has operated on an open-shop basis. He has succeeded in building up as good a reputation as an employer as he has that of a builder. That and the fact that he has so organized and co-ordinated his work as to give steady employment, with the union scale of wages, permits his building organization to get the cream of building mechanics in every trade.

In spite of the fact that during the last six years he has done about $20,000,000 worth of construction, he has but a very

Coffee shop—"Spink Arms" Hotel

Dining room—"Spink Arms" Hotel

Private dining room—"Spink Arms" Hotel

Two-room suite—"Spink Arms" Hotel

modest construction plant. This consists essentially of a small saw mill set up in a vacant lot, a one-ton Ford truck for service of the saw mill, two concrete mixers, and the usual hoisting and scaffold equipment. (A few of the apartment houses were purchased from other builders.)

Financing

How could a building contractor finance and retain the ownership of sixty-five apartment houses in less than six years? The answer is startlingly simple. Mr. Spink, after the bonds were sold, did not have quite enough capital to swing the first 36-apartment building. But he had absolute faith in his project. He is said to have been short about 20 per cent of the cost of the building. He persuaded some dozen or so of the principal material men who furnished the wherewithal to complete the building to share with him in the venture. Thus the E. G. Spink Co. was born. As already noted the original project was a striking success.

Each new building project—that is each apartment building—is separately incorporated—under the name of some realty company. Originally first mortgage bonds were issued to cover approximately 75 per cent of the cost, the remainder being made of common stock in the realty company, which was taken over by the Spink company with funds supplied by the sale of the Spink company's own stock.

As the E. G. Spink Co. grew and its finances became stronger the mortgage bonds were dispensed with and the difference of approximately 35 per cent in the cost of the building and the proceeds from the sale of preferred stock of each of these realty companies was made up from the surplus of the Spink company and through the sale of its common stock. The preferred stock has guaranteed dividends of 5½, 6 or the current rate of return on a first-class security.

The object of issuing preferred stock in lieu of mortgage bonds is to take advantage of an Indiana law which makes preferred stock in a real-estate holding company tax-free. Under the same law there must be common stock issued to half the amount of the preferred stock. The common stock in each realty company is owned entirely by the E. G. Spink Co., which now finances the purchase of it largely out of its surplus, and the corresponding Spink company stock is held as treasury stock.

It is Mr. Spink's intention to so complete the cycle of operations that eventually the 35 per cent difference between the preferred stock issue and the cost of all new building work will be financed out of the surplus of the Spink company earnings, and there will be no necessity for issuing new stock in the Spink company. (It is said that Mr. Spink is satisfied with a return of 12 per cent gross on his properties.)

In the operation of the Spink Arms hotel a similar scheme, whereby the enterprise stands entirely on its own feet, has been developed. The real estate and improvements are owned by a realty company, the common stock of which is in turn owned by the E. G. Spink Co. This realty company in turn leases its property to a hotel company which operates the hotel. In this company the manager of the hotel has a large block of shares, so that the sole object of the hotel company is to operate the hotel at a profit.

There is no speculative valuation nor inflated costs in his operation. Indeed they do not include the ordinary contractor and architect's profits. And as Mr. Spink's reputation for building apartments that are occupied is established he has no difficulty marketing the securities of these various realty companies. Each project is intended to stand on its own feet and show a profit. And the scheme of operation makes it easy to carry out this intention.

The preferred stock has guaranteed dividends and is practically as good as bonds. A liberal allowance is made for operating costs including depreciation and obsolescence, so that the preferred stock is retired before the building becomes obsolete in the ordinary course of events. Profits over and above those required for the preferred stock dividends are paid as dividends on the common stock, which is all owned by the E. G. Spink Co. In addition to these, of course, after the preferred stock has been retired, the common stock will represent the unencumbered ownership of the properties.

In other words Mr. Spink and his associates are content to wait a considerable period for the full measure of their profit. Their time and effort is not expended for immediate large financial returns, but is permanently invested in projects which yearly become more remunerative.

Financing Home Building

SOME OF THE PROBLEMS of the building contractor arise from the fact that he must often be a good deal of a banker, or broker, as well as a builder, because the average person desiring to build a home of moderate proportions generally is entirely ignorant of ways in which the building may be financed. Part of the regular business of many building contractors is therefore to nurse along such prospects and help them solve these financial problems.

To help people of moderate circumstances build their own homes there is now a national institution known as the "Union Home Builders." It operates as a common law trust under the laws of New York state, but has its executive offices at 1342 G St., N. W., Washington, D. C. It differs from the ordinary building and loan association in a number of respects.

The contract that a prospective home builder or home purchaser makes with this organization provides for the loan of from $1,000 to $10,000 to be paid for in 100 monthly installments of $10 each for each $1,000 of the loan. The borrower begins the payment of the $10 monthly installments at the time the contract is signed. On the scheme the organization now operates (in $500,000 groups), at the end of 22 months, it would be this borrower's turn to receive a loan.

This loan must be invested by the borrower in property approved (or the title rather) by the Union Home Builders, which of course holds the mortgage until the 100 payments have been made. The contract has liberal terms for repaying these sums with 4 per cent interest in case of the death of the owner of the contract, and is liberal in the matter of grace for non-payment of installments in the case of sickness or misfortune.

If a prospective home owner can not wait 22 months to get his loan, he may be able to purchase a contract which has already run 20 or 22 months. The sale of these contracts (or borrowing privileges) usually brings the holder of the contract a bonus of $100 to $150 per $1,000 unit. Or, in other words, the man who demands an immediate loan pays an additional interest of 1½ per cent on $1,000 for 10 years, making the total rate for his loan 5½ per cent instead of 4.

This feature of the plan gives the contracts an investment feature which draws into the organization additional funds from people who may not have any definite plans for building. Thus a person who has bought a $1,000 contract on which he has paid $200 may sell this contract for $200 plus $150 or $350 at the end of 20 months. The organization maintains a brokerage departments to handle such transfers.

The profit to the organization comes from the difference between the interest on $1,000 for 100 months at the rate of 4 per cent per annum, which the borrower pays, and the return on his monthly payments at compound interest. For example, the borrower pays interest on $1,000 for the whole period of 100 months; although at the end of 50 months he has actually paid back half of the principal, he continues for 50 months more to pay interest on the whole. The organization loaning this money out as fast as it comes in of course makes a fair profit.

The Union Home Builders organization is spreading its activities quite rapidly and builders and contractors in various localities can get in touch with any local branches by writing to the home office at Washington.

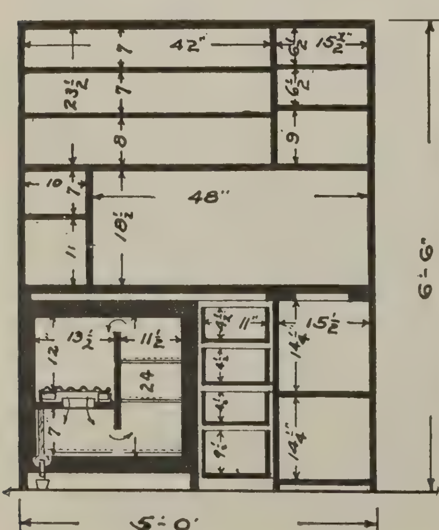
A New Ready-Made Kitchen Cabinet

A KITCHEN CABINET that is meeting with popularity in Indianapolis building work, both in apartments and private homes, is known by the trade name of the "Kozy-Kitch" kitchenet. These contain ice boxes in addition to the more usual kitchen cabinet features. It is claimed that this feature was designed by the chief engineer of one of the largest refrigerator manufacturers and conforms to the best in refrigerator constructon.

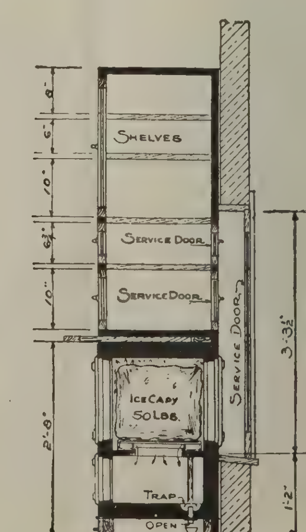
In another model provision is also made for a folding electric range with two burners. In a third model there is neither refrigerator nor range, but extra large cabinets.

The "Kozy-Kitch" cabinets are manufactured by the Electric Kitchenet Co., Fort Wayne, Ind.

Range of types of houses in which the kitchen cabinet is installed



Front Sectional Elevation



Section through refrigerator end

Formula for Strength of Rope

How strong is a rope? At the Bureau of Standards laboratories in the Department of Commerce, Washington, D. C., tests have been made that have resulted in answering that question with a formula.

For three-strand regular lay manila rope from ½ to 4½ inches in diameter, the following computation will give the breaking load of the rope:

The average breaking load in pounds equals 5,000 multiplied by the diameter of the rope in inches, multiplied by the diameter of the rope increased by one.

This will give, of course, the average maximum weight that the rope will hold, but the working load or the load that a contractor or safe-hauler may apply with propery safety and precaution would be considerably less than the load given by the formula.

Other data on rope are contained in Technologic Paper of the Bureau of Standards No. 198, by A. H. Stang and L. R. Strickenberg, which has just been issued.

The Building Contractor's Opportunity in the Industrial Field

The Builders Construction Company of Indianapolis Combines Engineering, Architecture and Construction

EXPERIENCED IN ALL KINDS of building construction work, the Builders Construction Co., Indianapolis, Ind., prefers the construction of moderate-sized industrial buildings to all others. It is a field often overlooked by the local building contractor, and work that he should be amply capable of performing is often let to outside firms of engineering contractors because the local contractor lacks sufficient confidence to tackle it.

Harry R. Fitton, president

Most manufacturers prefer to give their construction work to their own neighbors—their friends—and it would seem that the same opportunity that the Builders Construction Co. has made use of in Indianapolis exists in many localities. This company has made such a success of its specialty that it is fast outgrowing the confines of even such a large city as Indianapolis.

The Builders Construction Co. is perhaps the highest type of building organization included in our NATIONAL BUILDER field. Its president, Harry R. Fitton, and its secretary and treasurer, Owen M. Mothershead, are both technically trained men. Their experience proves beyond doubt that scientific and engineering principles can be applied to the simpler forms of construction with as much profit and success as to more pretentious kinds of structures.

This company specializes in the designing and erection complete of all types and classes of industrial and commercial buildings constructed of steel, slow-burning mill construction and reinforced concrete. The company also builds houses and apartments. It contracts for the building complete—in the case of a furnished apartment house, for the building fully equipped and ready for tenants.

The staff of the company includes draftsmen, engineers and building superintendents so that every phase of building design and construction is taken care of within this one organization, including the design and installation of all mechanical equipment needed—heating, plumbing, light and power wiring, elevators, automatic sprinkler systems, etc.

Method of Operation

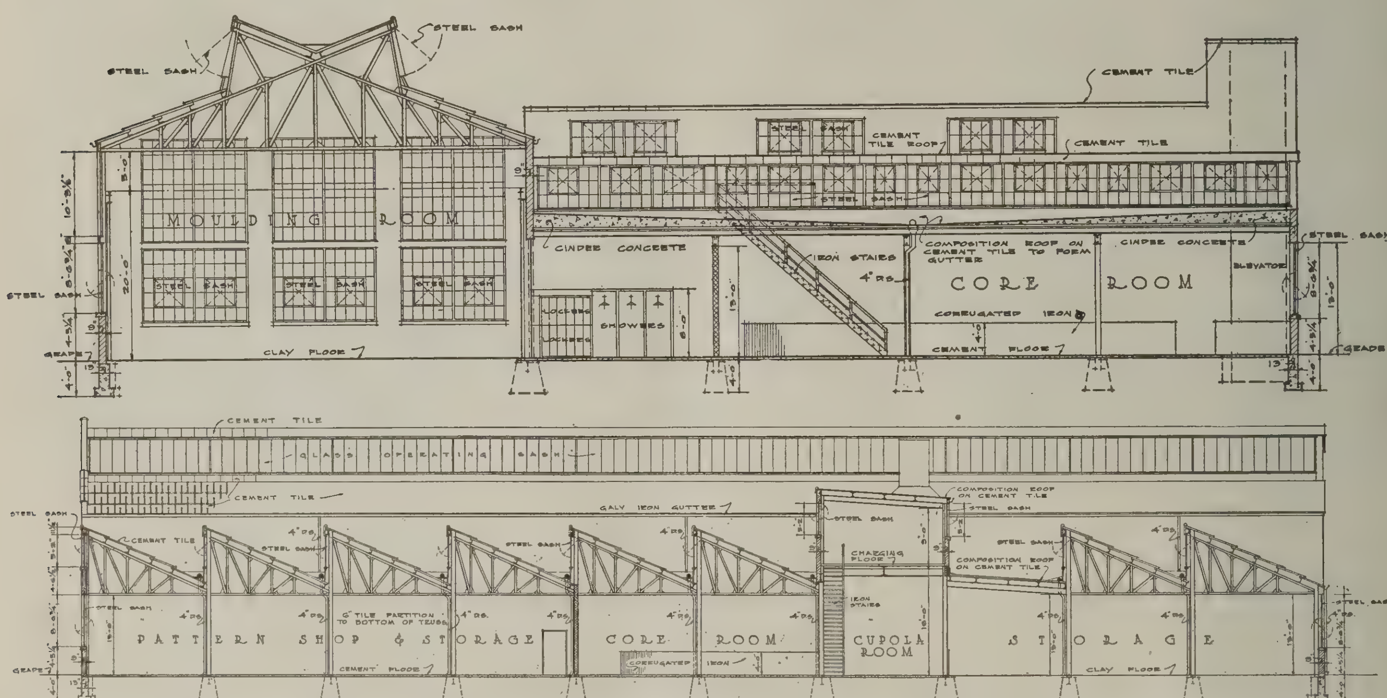
When the owner sets a certain sum that must cover the cost of his new factory building, the Builders Construction Co. immediately sets to work to design a structure that, from experience and accurate knowledge of costs, the designer knows will come within the specified sum. It has never been the policy of the company to

Owen M. Mothershead, secretary-treasurer

The Rockwood foundry building, complete except for foundry equipment, cost $125,000—Exterior and interior details

Interior of the Rockwood foundry—Steel and reinforced concrete construction throughout

Typical construction view—The Builders Construction Co. rents all major construction equipment



Elevation and cross-section of foundry of Rockwood Manufacturing Co., designed and built by the Builders Construction Co.

convert the owner to the idea of thinking that his building is to be a monument to himself, and as such needs elaborate and costly design.

It has been the company policy to assume that the average factory owner requires only enough floor space for his immediate needs, and it suggests to clients a small building with heavy foundation walls and columns that will support in the future extra stories as needed; or, if a one-story structure, provision is made always in the brick gable ends for a steel truss to be inserted at the time of building, which will allow future additions to the building. Such an addition can be built absolutely complete and ready for occupancy before the end brick wall and gable are obliged to be torn away.

It has been demonstrated that by operating the drafting department in strict conjunction with the estimating department, the designer at all times is in constant touch with costs, so he feels safe in the positive knowledge that the particular part of the building he has on his drafting board will come within the costs set down by the estimate. So when the plans are finally completed and ready for the estimating room, no freakish or costly ideas have been inserted in the plans that would run up the cost of the building, and not add one iota to the strength or durability.

The same idea is carried out in making purchases of material and equipment for the building. Mr. Fitton has a card made up for each project containing all the items used in making up the estimate. Opposite each item is the estimated cost. Then follows a column with the actual cost of that item complete, or installed, followed by a column which shows the amount by which the actual cost is less than or exceeds the estimate. This sheet Mr. Fitton has mounted on cardboard and constantly at his elbow, so that he is posted up to the minute on the cost every item in his building, and knows whether or not he is keeping within his estimate, not only on the whole, but on every individual item as well.

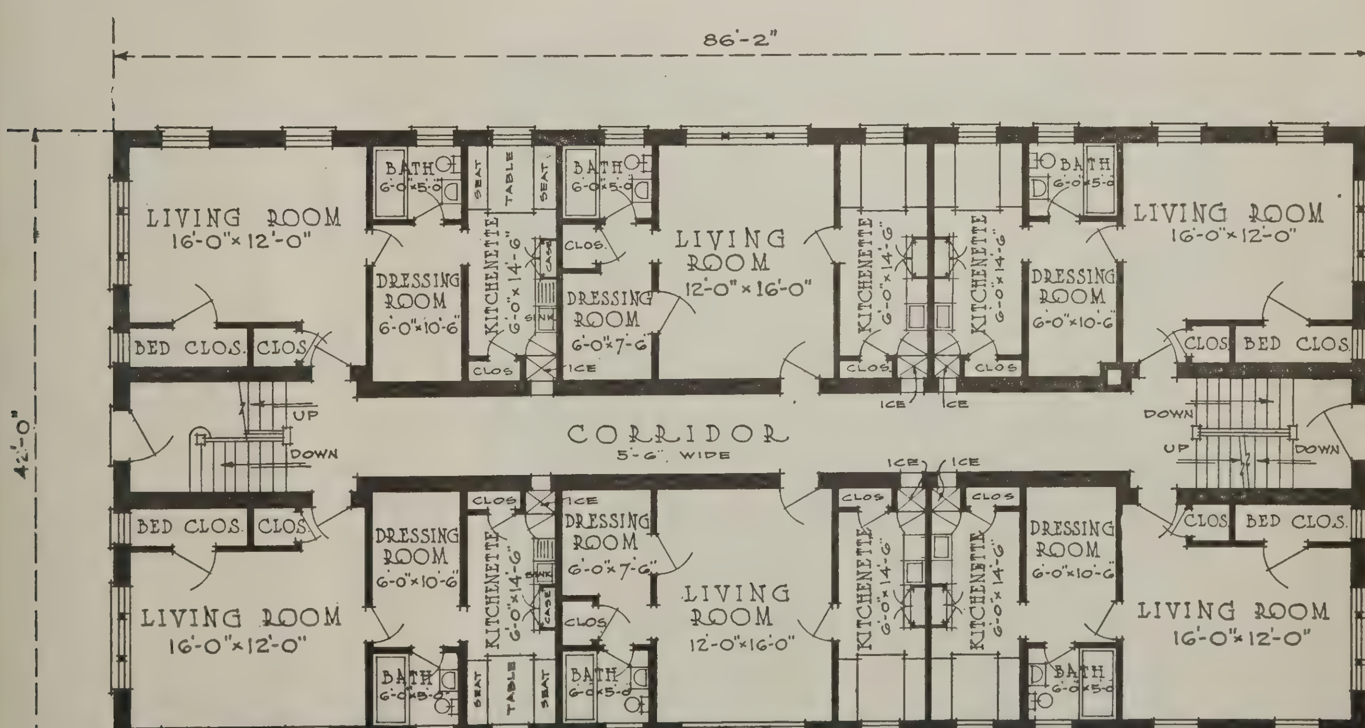
Handling Contracts

The business end of the office is well taken care of, and so systematized, that a small office force is able to take care of an enormous volume of business.

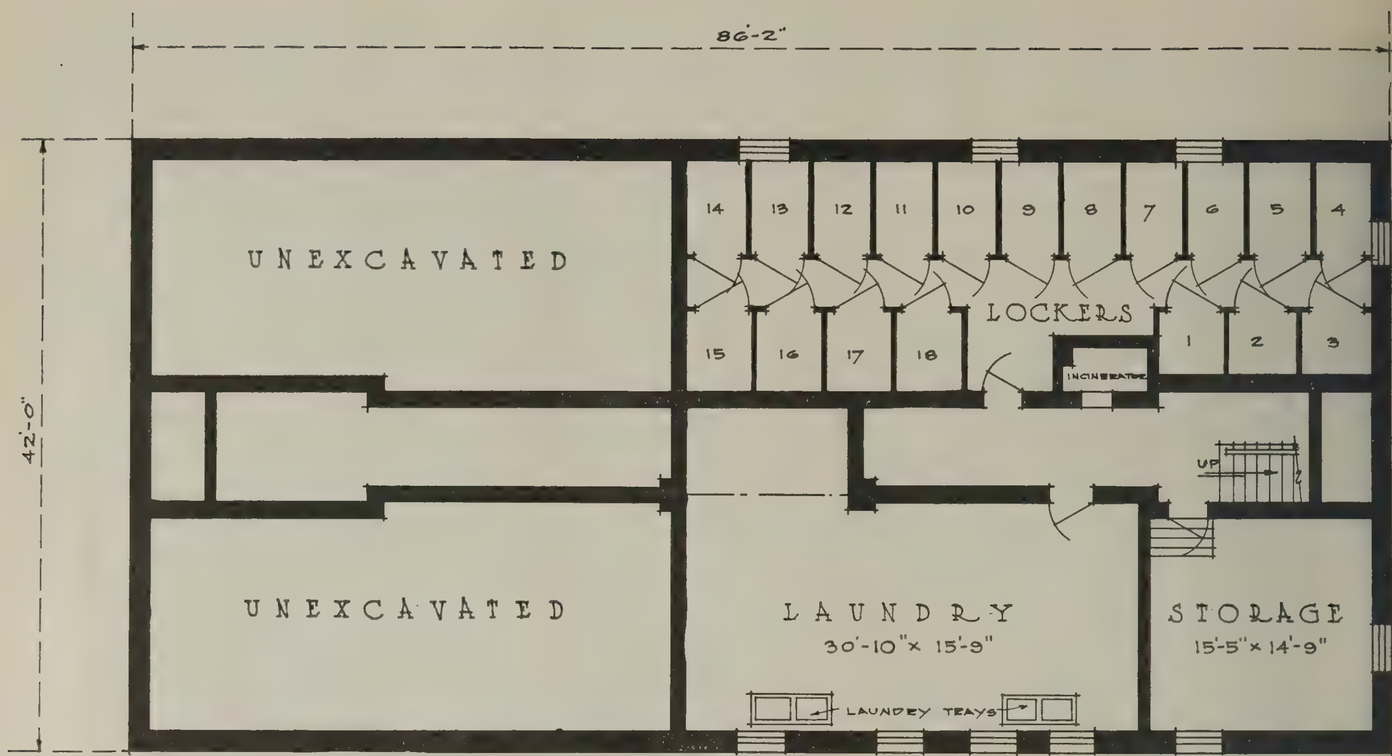
The plan of operation as to contracts is

The Rodman apartment building cost $210,000—$70,000 per unit

simple and founded upon well defined business lines. The company agrees to take over the complete design and construction upon a guaranteed cost basis, which includes a fee of 10 per cent based on the gross cost of construction, with a charge of 1½ per cent for the plans, engineering drawings and specifications and working drawings. In the event the cost does not exceed the guaranteed sum, then the contractor divides with the owner the saving, upon a basis of 75 per cent to the owner, and 25 per cent to the contractor. In the majority of cases, the cost has been under the estimate, with the aid and assistance of the owner, to such an extent that the Builders Construction Co. has realized a much greater profit, from the job, than



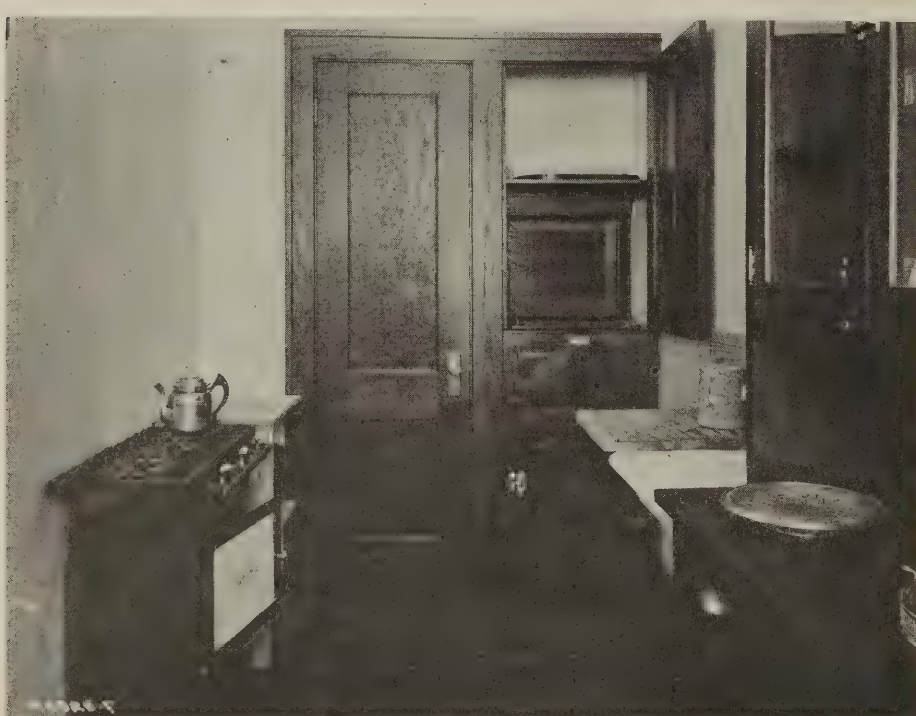
Floor plan of typical unit of the Rodman apartment building



Basement plan of the Rodman apartment house unit—There are three units in the entire building

when it operates on a strictly cost plus percentage basis. The average owner is quick to take advantage of this form of contract. He has nothing to lose in the transaction and everything to gain, and if he has faith in the integrity and ability of his builders, Mr. Fitton claims it is the fairest kind of contract for both parties.

According to Mr. Fitton's experience where a number of bidders are called into an architect's office, it sometimes happens that the lowest bidder is low for one of three reasons: (1) Complete ignorance of the plans and cost of the work contemplated; (2) an insane desire to cut under the other fellow's figure simply for the sake of landing a job, no matter at what loss to themselves; (3) to make the original bid as low as possible, even below his own estimate cost, if necessary, and take the chance, that he can recoup his losses by substitution or on extra work. So Mr. Fitton has adopted a scheme of operation to avoid these chances.



One end of kitchenette, showing china closet, sink, stove and refrigerator, Rodman apartments

Practices Architecture

Mr. Fitton's early experience, on top of a civil engineering education, was in house architecture. He has always had a keen appreciation of the value of art and architecture and his company is by no means devoid of the architectural talent that makes for handsome as well as useful structures. In its capacity as architect this company on its own initiative has designed and erected both dwellings and apartment houses.

In its apartment house work the one idea continually uppermost in the minds of the promoters is to give to the tenant all the possible comforts of a home and the conveniences of an apartment as well. This is evidenced by a number of apartment house projects built in Indianapolis on the hollow square idea. Hampton Court consists of a block of house units, 30 in number, forming three sides of a rectangle. Thirteen houses face each other across a beautiful court, on the long sides of the lot, and four houses face the court from the rear. These houses are heated by one central heating plant and are each 24 ft. wide by 40 ft. long, set between fireproof walls. Each tenant has a basement, first, second and third floors, and enters his own door into his own private hall. Service entrances are also private and individual for each apartment.

In the smaller apartment buildings that this company is continually constructing, it is usual to provide a six-room accommodation in a three-room space by the installation of disappearing beds, combination

Residence of Harry R. Fitton, president of the Builders Construction Co., designed and built by himself

kitchenette and dining room, etc., that are so popular with small families in these days.

Very strong connections with financial institutions enable the Builders Construction Co., in almost every case, to take over for the owner, in addition to the regular designing and building work, the problem of financing the project and for this no fee is charged.

The Builders Construction Co. has been operating in Indianapolis and Indiana for the past 16 years, and in that time, it is claimed, has never exceeded the first estimate of the cost of a building, and has to its credit a long list of satisfied clients, some of whom are continuous clients from month to month, either for new construction or additions or changes in their present plants—a long record and surely an enviable one and one that proves conclusively to its originators that their method of operation is a correct and justifiable one and acceptable to their class of clients.

Typical Work

The pictures shown here are typical examples of the work of the Builders Construction Co. and show careful attention to all actual practical needs for each type of building.

The two-story factory office building is a well designed type of the common reinforced-concrete building, with just enough elaboration in design to give it character and remove the blankness usually found in buildings of this kind.

The foundry of the Rockwood Manufacturing Co. is a model of its kind and has provoked considerable comment and favorable criticism from all parts of the country.

This building is of steel frame, enclosed in brick and steel sash. The heating is an underground blast system. The ducts are 6 ft. square, laid under the floor and carry the hot air from the steam lines and the fan to the point of distribution, which is 10 ft. above the floor level, blowing the air over and above the workmen's heads.

A large, double saw-tooth roof covers the moulding room and a single saw-tooth construction is used for the pattern shop, core-makers room and other portions of the building.

The charging floor and the method of firing the cupola are of special interest. The charging floor is of reinforced-concrete and set at proper level below the firing door. Immediately adjacent to the main building is a reinforced-concrete structure 25 ft. x 75 ft., the second floor of which is on a level with the charging floor.

The lower floor of this building houses clay and sand. The second floor is taken up by the storage of coke and pig iron. The coke is stored in the two storage bins and is handled by the means of a caterpillar electrically operated derrick car, with clam-shell bucket on boom. When pig iron delivery is wanted from a railroad car a large magnet is substituted for the bucket, and the pig iron is lifted up on the second floor of this building ready to be wheeled in directly to the charging floor. Separate bath and shower rooms are provided for colored and white men. The roof over the entire building is covered with several types of cement tile.

The apartment house illustrated is of the popular small-apartment type, three stories in height, constructed of interior wood framing, with hollow tile and brick for interior walls.

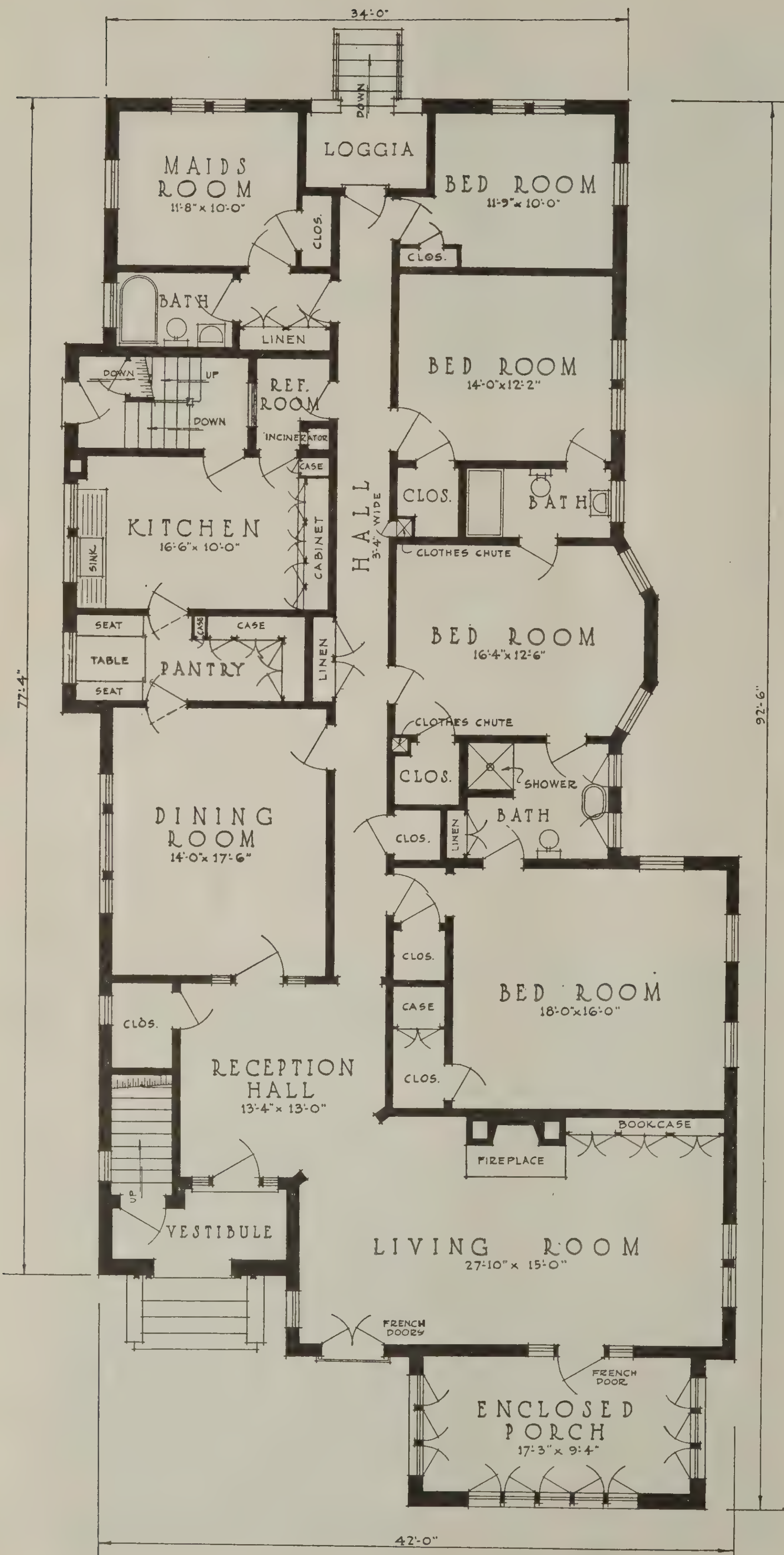
There are three unit buildings in this group, with six apartments on each floor of each unit, making a total of 54 in all. Each apartment is furnished complete, with the exception of such personal items as bed and table linen and towels. All needed items such as ice, hot and cold water, heat, electricity and gas are included in the rental price.

Each apartment consists of a living room 12x16 ft. with an in-a-door bed, a small dressing room, tile-floored bath room, combination kitchenette and dining room and three closets. Locked storage space is provided for each tenant in the basement. Parquetry oak flooring is used in all units. Thirty-six of the apartments are corner suites, and as such have windows on two sides, which afford excellent cross ventilation.

Making Concrete Laundry Tubs

J. D. B., of Cedar Rapids, Iowa, writes us: "Please put me in touch with someone that manufacturers forms for cement laundry tubs, or give them my address, as I might be in the market for something of the kind." The Portland Cement Association, to whom this inquiry was referred, replies in part: "As far as we know there is no concern which specializes in making forms for this kind of work. Generally the companies undertaking this kind of business develop their own forms or have them made to order." The addresses of some manufacturers of concrete bath tubs were given this subscriber, with the thought that he might make some arrangement with them for having forms made.

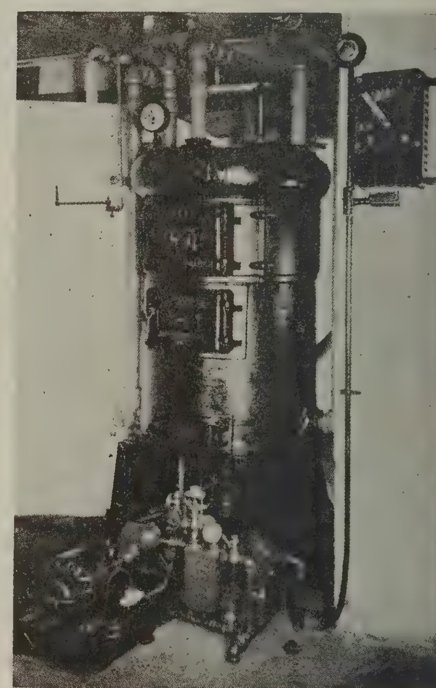
Administration building, R. H. Hassler Co.—A typical modern factory office building, designed and constructed by the Builders Construction Co.



Floor plan of the two-family residence of Harry R. Fitton

A New Oil Burning Mechanism for Industrial and Domestic Uses

The uncertainty attending both the price and the supply of coal has stimulated the search for other fuels, and in the field of fuel oil burning mechanisms what promises to be a revolutionary development has been accomplished by Hardinge Bros., Inc., Berteau and Ravenswood avenues, Chicago, Ill., a concern bearing a high reputation for its products. An illustration of one of



A Hardinge oil-burning machine with a 3-inch burner under Mueller hot water boiler. This equipment is suitable to heat a 10-room to 15-room house

the machines is shown herewith. It is made in various sizes adapted to industrial or domestic uses, and uses every description of fuel oils from the heaviest and cheapest up to kerosene. Heat is developed instantly and can be regulated to any degree. Cleanliness is secured and the fuel room can be made as neat as any apartment in the house and absolute safety insured, with permanent low cost of operation. The market price for fuel oil, it is pointed out, has remained around 5 cents a gallon, but the advantages of the machine allows a wide margin for price increase.

Wants Ideas for Dance Pavilion

J. F. B., of Utica, N. Y., writes: "I am interested in erecting a dancing pavilion. Have you any sketches or plans you can send me?" We have explained to this inquirer that NATIONAL BUILDER has no plan service, but we should like to help him out. Perhaps some of our readers can give him some ideas on the subject of dance pavilion design. How about it?

A Grocer Evolves a Popular House

Taylor Powers of Indianapolis Learns Home Building by Experiment and Personal Experience "Living in 'Em"

EXPERIENCED architects and building contractors may obtain a larger appreciation of their opportunities when a gro-

Two of Mr. Powers' brick veneer houses

One of the most popular houses

Type of Colonial house

Side view

ceryman turns to home building, designs his own plans and organizes and directs his own workmen and personally supervises the construction of a group of houses that sell readily at from $15,000 to $20,000. You have to hand it to him for having possibly discovered something about the building game that the more experienced builder may have overlooked.

Taylor Powers of Indianapolis says he always had a leaning toward building work from the time he was a boy in high school. However, somehow or other, he got into the grocery business and became a successful grocer. But he indulged his building instincts by building his own home after his own design. He sold his first home at the first opportunity and built another. In 10 years he built 30 houses—and lived in nearly all of them.

Meantime he acquired a family, and recently his long-suffering wife objected (we are willing to believe it, anyhow), to this procedure and having been very successful with his latest ventures, he has given up the grocery business to build homes exclusively.

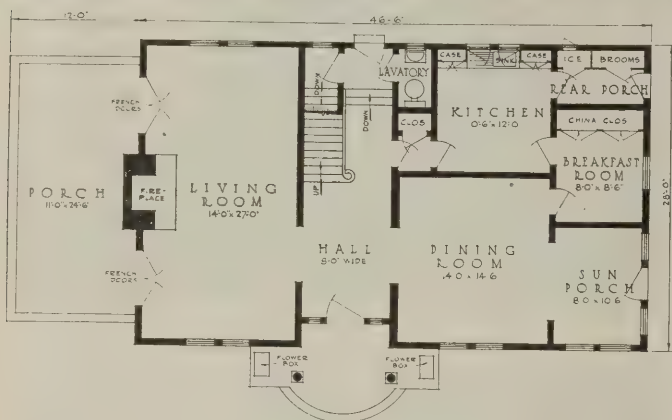
Detail of Colonial doorway

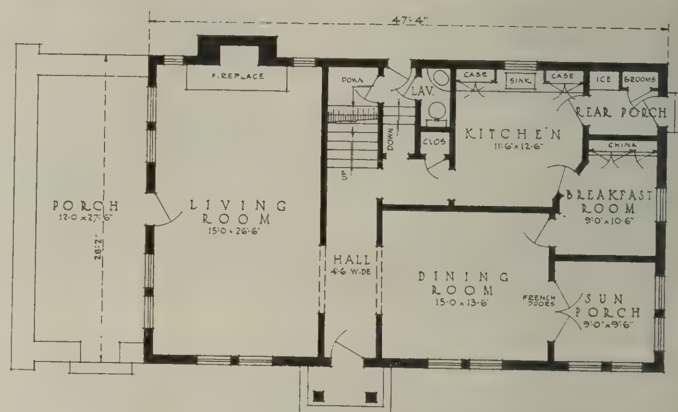
Now Mr. Powers never had a technical education, never took a correspondence school course in building, drafting, or anything else connected with the building game. He gained his knowledge entirely in the school of experience, building and living temporarily in his various creations. While very few building contractors would care to follow his example, it must be admitted that he probably has acquired a highly specialized knowledge of homes and home building. (He admits he got some hard bumps doing it.)

Mr. Powers considers his lack of traditional architectural knowledge rather an asset than a handicap. Other architects and builders will hardly agree with him, but one can see from his work that undoubtedly this attitude has led to an extreme simplicity of construction detail which has been a real advantage. He says he has tried to do for house-building what Henry Ford did for the automobile industry—


Row of Powers houses showing variations in exterior treatments


A very popular type of Colonial house

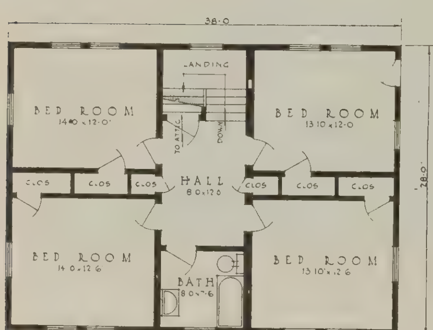


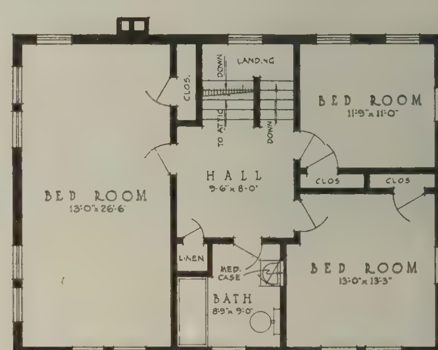


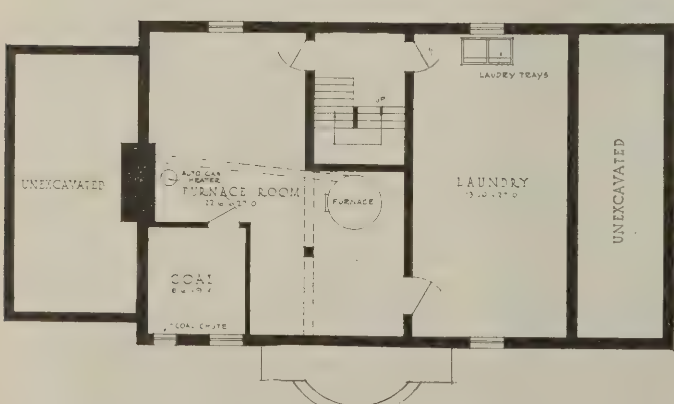
standardize and simplify manufacturing operations to the limit.

Nevertheless, Mr. Powers has shown true artistic instinct in his treatment of exteriors; and he has produced a house that ranks among houses very differently from the way a flivver ranks among automobiles. His houses are liked and bought by people with discriminating tastes and with money enough at their disposal to build houses from any architect's design if they chose.

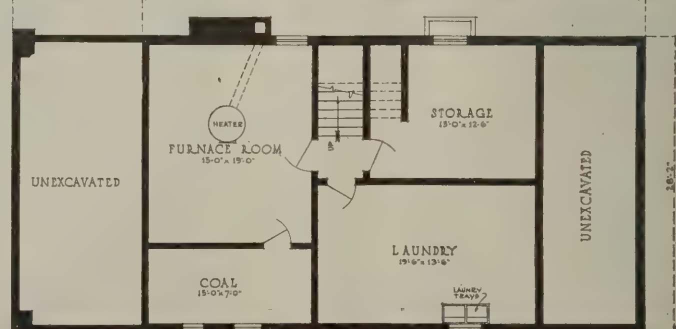
The views and the sketch floor plans herewith show the character of the work Mr. Powers is doing. These houses are simple, rectangular structures approximately 26x38 ft. over all on the first floor, and almost square at the second story.







Floor plans of the brick veneer house—first in the row, top picture



Floor plans of Colonial-type house shown in view above

Cellar and hall entrances—Downstairs toilet at left

Different roof treatments, chimney arrangement, porches, entrances, etc., give them distinctive appearance, even when placed side by side as the views show. As can be seen readily all of these changes can be made after the foundations are already in and much of the material ordered. Consequently a house may be sold in an unfinished state and finished to meet the tastes and desires of the purchaser, without any alteration of the fundamental scheme or construction.

Good Judgment and Salesmanship

In the construction of his most recent houses Mr. Powers has introduced certain features which make fine selling arguments. Starting with the basement he has provided a separate exterior entrance, so that the man who takes care of the furnace can go and come without having access to any other part of the house than that room in the basement which contains the furnace.

The basement itself is divided into an entrance hall or vestibule at the foot of the cellar stairs, with doors into two large rooms. The partitions throughout the basement are full size concrete foundation blocks and serve to carry the wall and floor loads of the floors above, as well. The entrance hall keeps the cellar warm.

The laundry can be entered either from the foot of the stairs or from the furnace room. Hot-water pipes are arranged around the walls for heating if desired. An opening from the laundry into the space under the kitchen extension of the house makes possible the use of this space for a vegetable cellar if desired.

Beside the cellar entrance is a door leading into the main hall of the first floor, which is about 30 inches above the ground entrance level. To the left of this entrance is the downstairs toilet, which is thus readily accessible from the outside as well as from the main hall.

The arrangement of the downstairs hall is convenient and pleasing, and a spacious hall closet in the entrance hall to the kitchen makes a special selling feature. The sun parlor, which could readily be converted into a den, study or office, is another feature which appeals to the husband as well as the wife. In the house Mr. Powers lives in, this was his office and drafting room until very recently.

Showing vista in Powers houses under construction

The doors from the sun parlor into the dining room, hall and living room are so lined up that one has a vista extending the longest way of the house and out into the street and neighborhood. Mr. Powers said with as much truth as poetry that this vista was "worth a thousand dollars."

The arrangement of the halls, upstairs and down, greatly simplifies heating and plumbing layouts, as can readily be seen. Mr. Powers claims no originality for this floor plan. In fact, it is the most popular one in Indianapolis with nearly all builders and architects. He has, however, introduced original features, as already described.

Upstairs the floor plan is extremely simple but effective. The breadth of the hallway itself is pleasing. The linen closets on the two sides are most convenient for both bathroom and bedroom use.

The provision for closets in all the bedrooms is simple, uniform and ample. A special feature of these, or of one or more of them, is a shelf, about waist high, with drawers below. This makes a strong appeal as a repository for "my lady's" hats and similar articles.

Creosoted Wood Silos

The wood-preservation studies at the Forest Products Laboratory have shown that the value of wooden silos can be greatly increased by proper treatment with coal-tar creosote. A good creosote treatment will not only increase the durability of the wood, but will reduce the tendency of the staves to shrink when the silo is empty. A creosoted silo cannot be painted afterwards; however, it does not need painting, for the creosote protects the wood, and its color is pleasing.

Highly durable woods, such as heart cypress or redwood, do not need protection against decay so much as the non-durable woods, but a thorough creosote treatment will make the non-durable woods, such as sap pine, last longer than durable species will without treatment.

Contamination of the silage by creosote from the staves need not be feared. This is borne out by experiments and by careful inquiry among the many farmers who have used creosoted silos. In order to be quite sure, it is well to allow the creosoted staves or the finished silo to stand a few weeks before filling.

The most thorough creosote treatment can be given by pressure methods. If pressure-treated wood is not available, very good results can be obtained by the hot and cold bath treatment. If a good penetration of coal-tar creosote is obtained by either of these processes it is not too much to expect the silo staves to resist decay 25 or 30 years.

Other methods of creosoting, such as painting, spraying, or dipping can be used. They are less costly than the pressure treatment, but they are also less effective. They will probably add several years to the life of the silo and thus pay for themselves, but the more thorough treatments should be used wherever possible. Instructions for treating silo staves by these various processes may be obtained from the Forest Products Laboratory, Madison, Wis.

Detail Sheets are substituted for building plans in the insert in this issue of NATIONAL BUILDER. The suggestions of readers are requested in this regard.

Typical Colonial "Central Hall" House

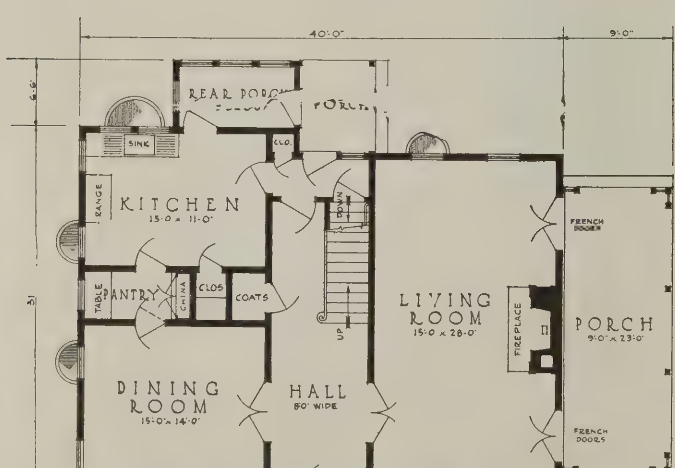
MENTION has been made elsewhere of the very great popularity of the "central-hall" type of house in Indianapolis during the present home-building boom. Herewith are floor plans and views, exterior and interior, of one of the best examples of a house of this type in that city.

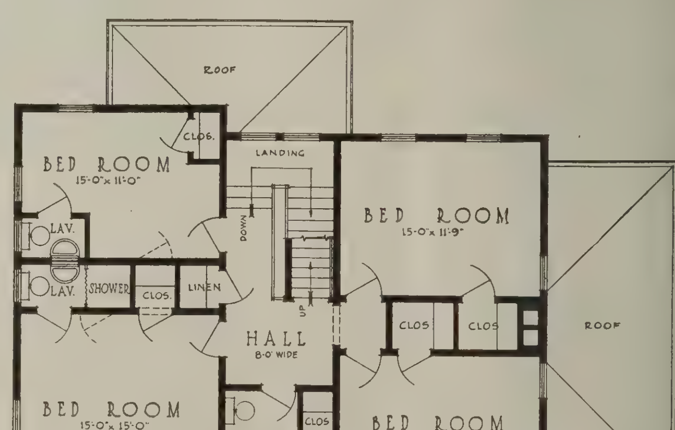
This is the recently completed home of C. S. Eaglesfield, a prominent hardwood flooring manufacturer of Indianapolis. The architect was Robert Frost Daggett and the contractor William Dungan. This house is more of a pure Colonial type than some of the others shown in this issue.

The floor plans show considerable difference from the plans of the Taylor Powers' houses, or the Jose-Balz houses. As originally designed by the architect there was but one bathroom and toilet. The two bedroom toilets and the shower bathroom were added by the contractor at the suggestion of the owner.

The closet arrangement in this type of house lends itself readily to such a change,

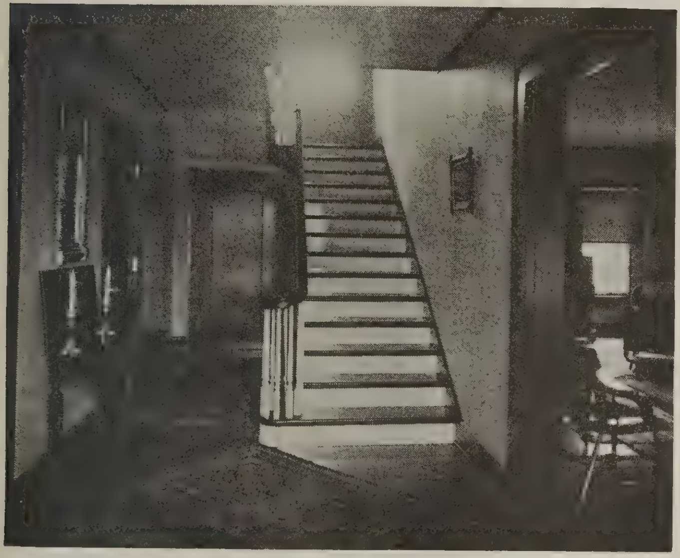
Residence of C. S. Eaglesfield, Indianapolis, Ind. Robert Frost Daggett, architect; William Dungan, contractor





Living room

Dining room



Hall and stairway

Bedroom

INTERIORS OF THE HOME OF C. S. EAGLESFIELD, INDIANAPOLIS, IND.

and with a modern 10-room house one bathroom and toilet is hardly considered enough.

It will also be noted that the entrance to the front bedrooms differs from the commoner design.

The location of the stairway is such that both front bedrooms must be entered from a small hall opening out of the main hall. The other way of handling this upstairs floor plan is shown elsewhere in this issue in the descriptions of the Jose-Balz Co.'s and the Taylor Powers' houses.

Why Lumber Is Steamed During Kiln Drying

From the questions asked by numerous students taking the short courses in kiln drying at the Forest Products Laboratory, Madison, Wis., it is evident that many who operate kilns and handle lumber do not understand the object of steaming lumber in a kiln. There seems to be a common impression that the purpose of steaming lumber is to "remove the sap." This is far from being the fact, for when lumber is steamed it takes on moisture, as a rule, instead of giving off anything.

The reason for steaming lumber during drying depends on when it is done, but nearly always the treatment is given for one of the following purposes: (1) to heat lumber through quickly at the start; (2) to relieve stresses which otherwise would produce checking, case hardening and honeycombing; (3) to equalize the moisture content and condition the lumber ready for use at the end of the run; (4) to kill fungi and insects in the wood.

When lumber should be steamed, how long the treatment should last and what temperature should be maintained are points which have been determined at the Forest Products Laboratory by experiments on many species of wood. A thorough understanding of the steaming operation is essential, because the whole kiln charge can easily be ruined by too severe a treatment. One of the chief needs of many commercial kilns is proper steaming facilities, without which a high degree of success in the artificial seasoning of wood is impossible.

Wants Ideas for Dance Pavilion and Open Air Swimming Pool

S. C. R., of Pittsburgh, writes: "A number of local men in our city are considering forming an amusement association, to include an up-to-date dancing pavilion and an open-air concrete swimming pool. It has occurred to us that perhaps you could advise us where we could secure plans or suggestions as to construction of both, particularly the dancing pavilion, which would include the necessary refreshment booths, dressing rooms for swimming pool, etc."

Wholesale Home Builders

The Jose-Balz Company of Indianapolis Specializes in High Grade Homes Costing From $15,000 to $20,000

ONE OF THE OLDEST, and possibly the largest, building contracting and realty company in Indianapolis is the Jose-Balz Co. Mr. Jose is the head of a lumber and mill-working company and of a plumbing concern, as well as the president of two or three realty companies. Mr. Balz is a real estate man.

The Jose-Balz Co. maintains its own architectural and building construction organization. It builds both houses to sell ready-made, and those especially designed for owners. This company specializes in the development of large subdivisions and has been very successful in selling ready-made houses of a class not usually dealt with in such wholesale quantities.

A typical development handled exclusively by the Jose-Balz Co. is the Central Court addition in the southeast corner at Central Avenue and 36th Street, Indianapolis. This is near the heart of the best residential district of the city.

A square plot of ground 660 ft. square was subdivided as shown in the accompanying plan. The lots are approximately 50x110 ft. The lots of the inside corners of the court have only 25-ft. fronts, but are the most popular lots in the layout because of their larger area and because a house properly placed on them provides a fine vista each way of the court, from the front windows, or porch.

Corner lot house—25-ft. frontage

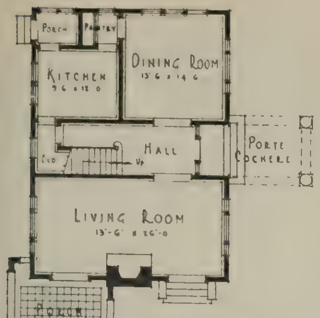
Stucco with odd roof treatment

Row of stucco houses

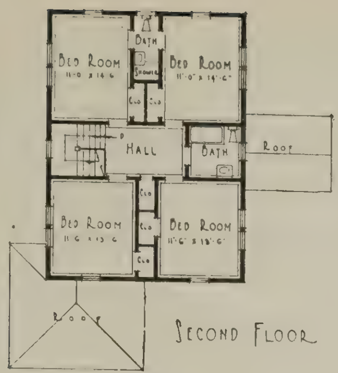
Unusual exterior treatment of a "central-hall" house

View giving idea of variety of exterior treatments

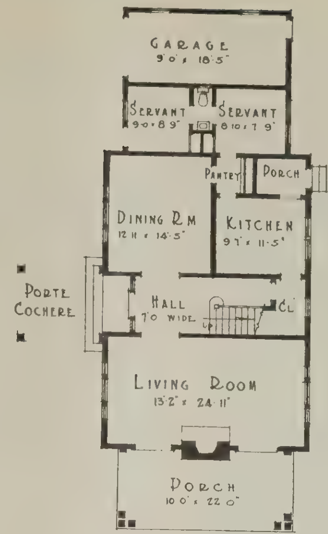
All these have practically the same floor plan



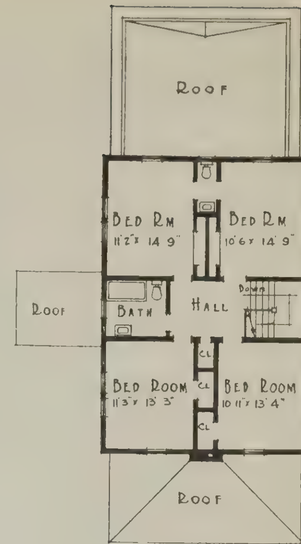
First Floor



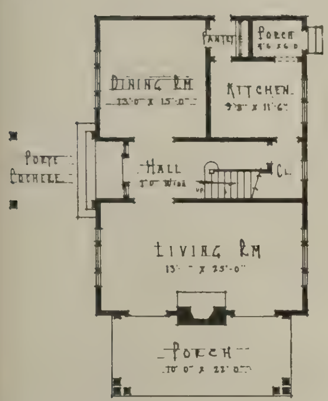
Second Floor

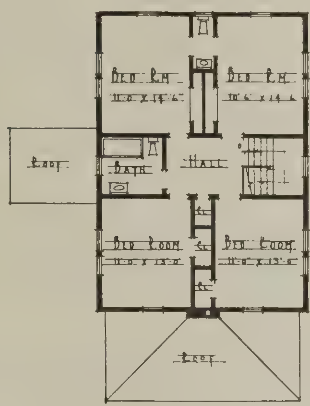


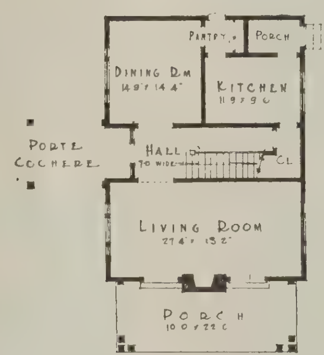
First Floor

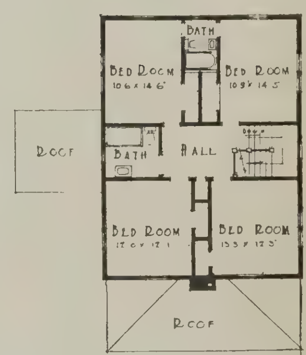


Second Floor









First Floor

Second Floor

First Floor

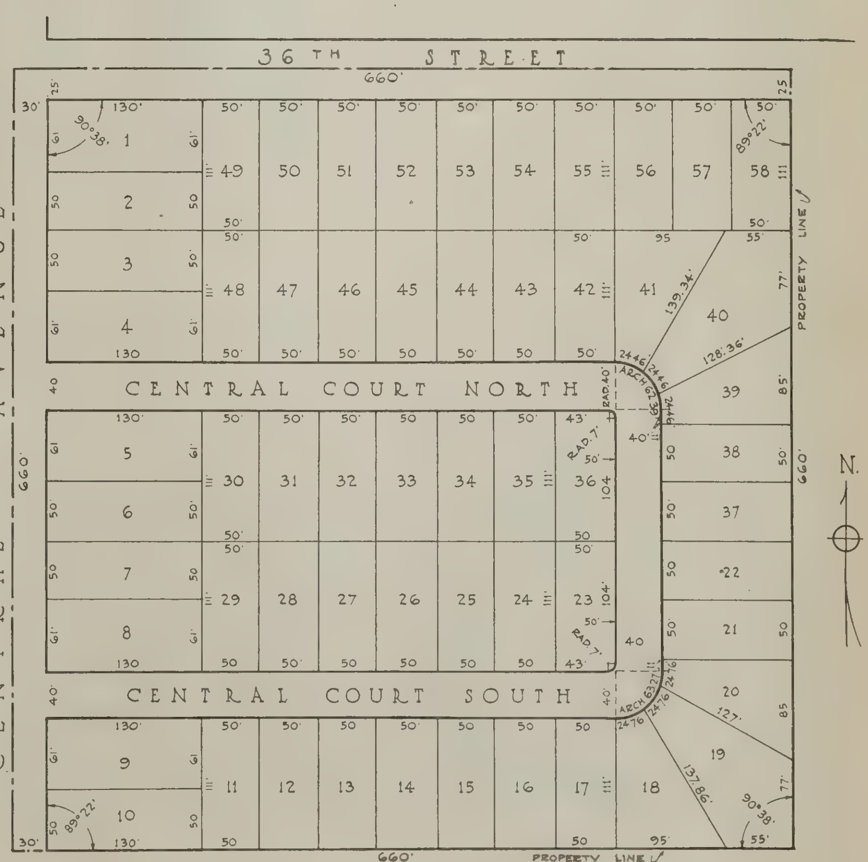
Second Floor

The views herewith show typical houses used in this development. The average selling price is about $16,000, with the lot. Practically all these houses are built to a common floor plan. They are what are known locally as "central-hall" houses. Typical floor plans of four of them are shown.

No two houses have the same exteriors and the interiors are varied somewhat by placing the fireplace at the end of the living room instead of the middle of the front. Various other minor details are different in some cases, but it will be seen that all the houses are of simple rectangular plan without bay-windows or other complications.

Most of the houses have no front entrances. The difference in their exteriors is achieved largely by the roof and entrance features, as well as the method of surfacing. Stucco was used on many and seems to be very popular. The color treatments are conservative and harmonious.

In connection with this style of house, which is probably the "best seller" in Indianapolis, it is interesting to note that this same organzation under the name of the City Builders Realty Co. also develops property and builds houses in Palm Beach and Daytona, Fla. At Palm Beach a subdivision of about 1000 lots is now under development. Here, as in Indianapolis, the central-hall house is very popular. In the Florida houses a first-floor, rear addition is usually made for servant quarters, as is shown in one of the floor plans herewith.



Sanitation, Heating and Lighting for a Suburban or Country House

By Edward E. Ashley, C. E.

THERE are ten all-important factors which are indispensable to the salubrity of a house.

1—A copious pure water supply
2—Pure air
3—Free and abundant light
4—Freedom from dampness
5—Well drained grounds
6—An efficient system of plumbing
7—Well balanced and adequate heating system
8—Good roads
9—Pleasant and attractive surroundings.
10—Accessibility to good schools.

Water Supply

In the selection of a site for building it is not always possible to select one where a public or private water system is available. If this be the case, it is advisable to consult with someone who is familiar with local conditions relative to obtaining a pure water supply, or to consult published reports of the United States Geological Survey.

There are several sources of supply from which pure water may be obtained

From Rivers
From Brooks
From Deep wells
From Surface wells
From Rainwater
From Springs
From Lakes
From Dammed up water sheds.

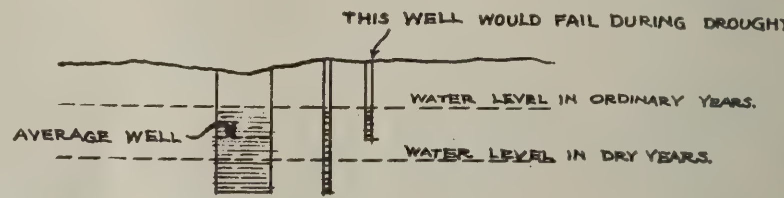
In this article only such sources of supply will be discussed as are likely to be of immediate interest to those responsible for the suburban building—to-wit:

Deep wells
Shallow wells
Springs
Brooks
Rainwater.

The deep well obtains its water supply from a water-bearing stratum of sand or gravel or, if drilled in rock, from a stratum or seam in the rock generally below an impervious stratum of clay or rock. The source of supply for this water-bearing stratum or seam may be many miles away or within the immediate vicinity from rainwater which has percolated through the soil to a water-bearing stratum; this water is filtered by the process of percolation and has also taken up soluble minerals from the strata through which it flows. These strata follow the geological formation of the ground; as for instance, the water bearing sands in Northern Texas are about 1000 feet below surface at Ft. Worth and about 1700 to 2000 feet at Dallas—only thirty miles away. Wells close to tidal waters are sometimes influenced by the tides.

A deep well may vary in depth anywhere from 40 feet to 3000 feet. They are usually bored or drilled and are provided with a steel casing inserted or forced to near bottom except where in rock. Inside this casing a well pipe is inserted and the water is raised either by a plunger placed in the well or by air lift; the latter being preferable for wells of exceptional depth.

The shallow well really is no different from the deep well except perhaps the fact that it obtains its water supply from a water stratum generally directly above an impervious stratum of clay or rock.



RELATIVE STORAGE CAPACITY OF DUG AND DRILLED WELLS WITH RELATION TO WATER LEVELS

An artesian well or flowing well is created by boring or drilling as for deep wells and the water flows or rises above the surface of the ground due to some hydrostatic pressure exerted at the source of supply.

A spring obtains its supply in a similar manner to a well; only difference is that it has a natural outlet. Spring water is usually wholesome and free from organic impurities.

The brook and stream are water supplies which are available as a rule under legal restriction; and water laws should be looked into before undertaking any extensive work.—See Fig. 6.

The brook or stream is in constant danger of pollution by surface washings from nearby barn yards, privies, etc., especially if it travels through small villages. This pollution tends to increase with the growth of the villages, and therefore should not be used unless some provision is made to filter and purify it.

Where streams flow through uninhabited and uncultivated upland regions, the rate of flow is very changeable and should be avoided as reliable water supply.

Lake water may be used provided same is not polluted by settlements along its shores. See Fig. 7.

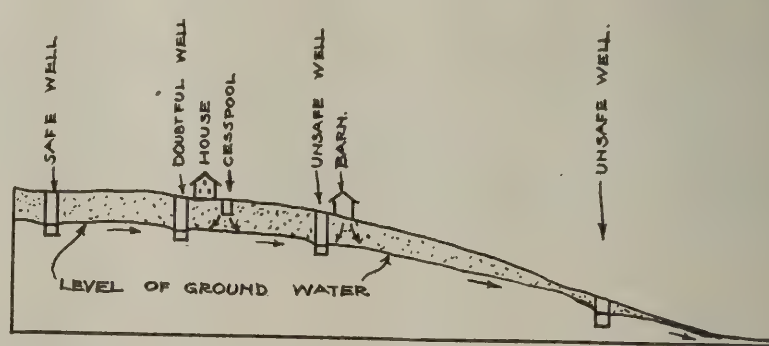
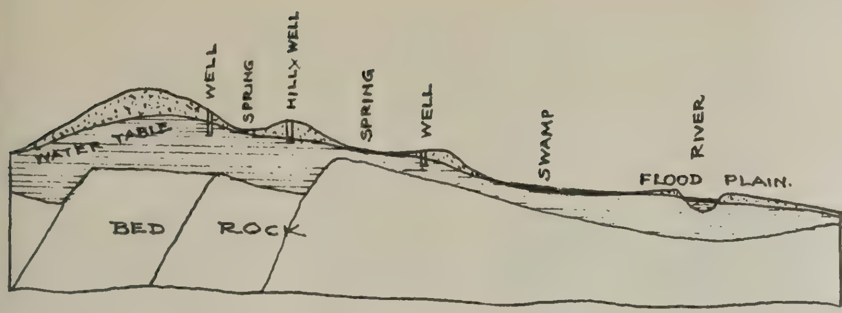


DIAGRAM SHOWING ORDINARY LOCATION OF FARM WELLS.

The rainwater may be collected from the roof, provided the first part of the storm water is allowed to waste away, for the first washings from the roof are quite impure. Very often where spring or well water is "hard" the rainwater is desirable for laundry purposes. It is generally stored in cisterns located in attics or underground and usually provided with some means of filtration.



SECTION SHOWING RELATION OF WATER TABLE TO SURFACE IRREGULARITIES.

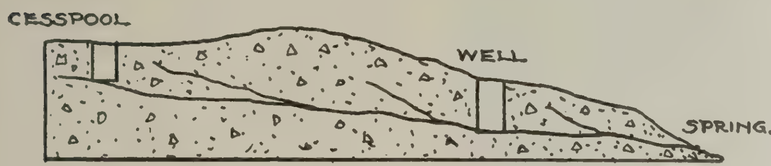


DIAGRAM SHOWING POSSIBILITY OF POLLUTION OF WELLS AND SPRINGS BY MATERIAL CONDUCTED FROM CESSPOOL THROUGH TUBULAR WATER PASSAGES.

Fig. 7—A water supply for a New Jersey town

Contamination of Water Supply

It is of the greatest importance that the water shall be free from impurities and contamination; and before locating a well a careful investigation should be made as to the direction or flow of the source of supply—especially where the drainage of the nearby houses depends on cesspools. The physical location of a cesspool in relation to a well may be favorable and at the same time the underground flow to the well may be contaminated by it. This is partially so in sandy soil similar to that found throughout Long Island. See Figs. 8 and 9.

Quality of Water

If water is to be obtained from any of the several sources outlined, it must be carefully determined what the quality of the water is—this should be done by taking samples of the water and sending them them to the nearest Public Health Office that is equipped to make water analyses. It is necessary to have a complete bacteriological analysis to determine its suitability for drinking purposes and also a chemical analysis to determine its physical characteristics, such as mineral contents, hardness, color, etc. Where water supply is taken

Fig. 6—Attractive but dangerous

from a stream, lake or brook, several samples should be taken from different locations rather than one sample at the suction of the pump.

It is generally advisable to avoid, where other supplies are available, water taken from streams, lakes or brooks, for often

Fig. 8—How wells can become polluted

they are convenient outfalls for sewers or drains to empty into. See Fig. 10.

Amount of Water

The amount of water for drinking, cooking, washing, bathing and flushing closets will average 40 to 50 gallons per head per day. Part of the amount, of course, is intentional waste, such as leaving faucets running, over-abundant flushing and carelessness in not keeping faucets, etc., in repair.

Fig. 9—Lake pollution

Where there are considerable lawns and gardens—for example, say a quarter of an acre—an allowance of from 100 to 125 gallons should be allowed for this purpose. An allowance should also be made for automobile washing, poultry, etc., of from 50 to 100 gallons.

Fig. 10—This is a poor water supply. Note stagnant pools to right

Consideration should be given to the matter of ample storage or supply of water for fire protection. The danger of fire is ever present and its seriousness is proportional to the distance you are from the nearest fire department.

Where water supply can be obtained from town, city or water company, all the prospective builder's troubles are over as far as quality and quantity of water is concerned. All he has to do is to arrange to have a service brought into his property. Generally, the size of such service is determined by the town or water companys' rules. However, where possible, it is desirable to obtain a tap and service of sufficient size to permit of using a 1¼-inch fire hose on each floor of house.

Where the water supply is obtained from a well, or other individual source, provision must be made to distribute the water under suitable pressure, which must be adequate to provide a substantial flow at all fixtures and if used for fire purposes it must have sufficient pressure to throw a stream over the roof of house.

Generally, town or water company service is maintained at about 30 to 40 pounds, which is ample for all needs.

Water Works

When other than town supply is used, some provision must be made for pumping and storing the water, except where a gravity supply is obtainable, which would hardly be possible with the average small house, unless located on a very large plot or farm.

Whatever method of pumping is used they all require some method of storing of water, either in gravity or pressure tanks. Where gravity tanks are used, which are commonly located in the attic or on a tower they should have a capacity of one week's supply. Although this is desirable, where automatic control of the pump is available this capacity may be reduced.

With pressure tanks, which are generally placed in the cellar or underground, the capacity varies materially with the system used for a storage of about 100 to 500 gallons of water and air (⅔ water and ⅓ air) and larger when used in connection with fire hose service.

Generally, the pumping plant is automatically controlled, maintaining a pressure of 30 to 40 pounds continuously. There are various methods of elevating or pumping water, from the primitive tipping buckets and camel-driven water wheels of the Pharaohs down to our modern electrically driven pumps.

Invariably hand pumping is unsatisfactory and undesirable excepting where, as in the case of many New England towns, the people still use their wells for their drinking water although their houses are connected to water service mains.

In outlying districts where large plots are available windmills may be used, which, when properly installed, provide a very economical and satisfactory water supply. However, this method depends on the wind, which is somewhat uncertain and does not always blow with sufficient force to operate the windmill. Wind velocities of from 6 to 16 miles per hour are required to operate a mill successfully. Considerable judgment must be exercised in the location and storage capacity of tanks, which must be so proportioned as to allow for about eight pumping hours per day with ample allowance for calms.

(To be continued)

Plans for a Small Hot House

A. E. T., of Wapato, Washington, writes us that he is in need of "plans or suggestions for a small hot house about 50x100 feet."

His request has been referred to the Portland Cement Association, who reply in part: "We find that we do not have plans for any building of this kind as small as the one you have in mind. . . . The April issue of our 'Concrete Builder' magazine, contains several designs for a concrete greenhouse together with illustrations of the interior of a greenhouse. . . . The November, 1920, issue of the 'Concrete Builder,' contains a good article on making concrete hotbeds."

How about it? Has any of our readers some suggestions in line with this subject that he would like to pass on to A. E. T.? We shall be glad to hear from him.

Homes for Wage Earners

Well-Built Small Houses—Financed to Suit Individual Cases—In Restricted District

THE OPERATIONS of the Jose-Balz Co., Indianapolis, in providing homes for people capable of financing $16,000 propositions, described elsewhere in this issue, are only a part of the activities of this organization. Under the name, City Builders Realty Co., it is giving equal attention to providing homes for the working man who has to finance the purchase of a lot on a basis of a dollar down and a dollar a week.

The two subdivisions selected for this development lie about a mile or more west of the city limits of Indianapolis. This land is much less valuable than the country to the north of the city, toward which the higher class residential district is expanding. Being unprovided with railway transportation facilities it has not heretofore been as popular as the north side. This handicap was overcome by the City Builders Realty Co. through the promotion of a motor-bus line, which gives excellent service at rates as low as suburban carfares.

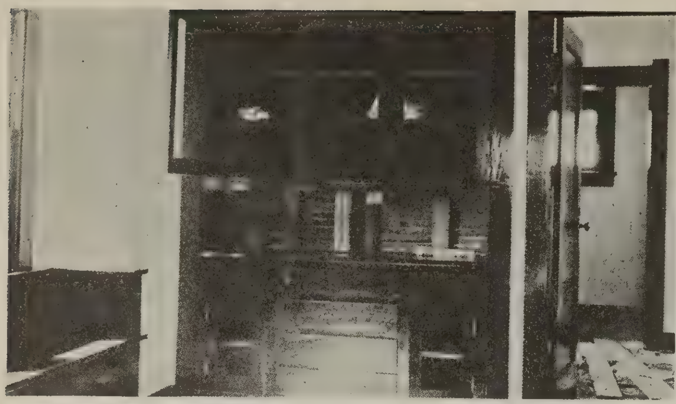
W. M. McVey, general superintendent

While the realty company does not control the bus line, it took a block of shares in the company to help promote it.

These houses, of which some typical views and plans are shown, are all built of first-class lumber and are as well built structurally as the company's more expensive houses. There is no public water supply as yet, and these houses are therefore not provided with bathrooms and toilet facilities, it being assumed that the owner would provide these when the state of his finances permitted. The aim of course is to keep the first cost down to the lowest possible point consistent with all considerations.

The lots are approximately 30x150 ft. Most lot purchasers buy two or more lots. The idea was to make the unit so small that the poorest man could finance the purchase of the ground on which his house stands. The area of the subdivision is so large that there has been no necessity yet of crowding the houses on 30-ft. lots, and

Types of $3,000 to $3,500 houses for the wage earner



Built-in features in $3,500 house: buffet

Built-in features in $3,500 house: window seat

probably most house owners will have an opportunity of acquiring the adjoining lot before it becomes desirable for the company to build on it.

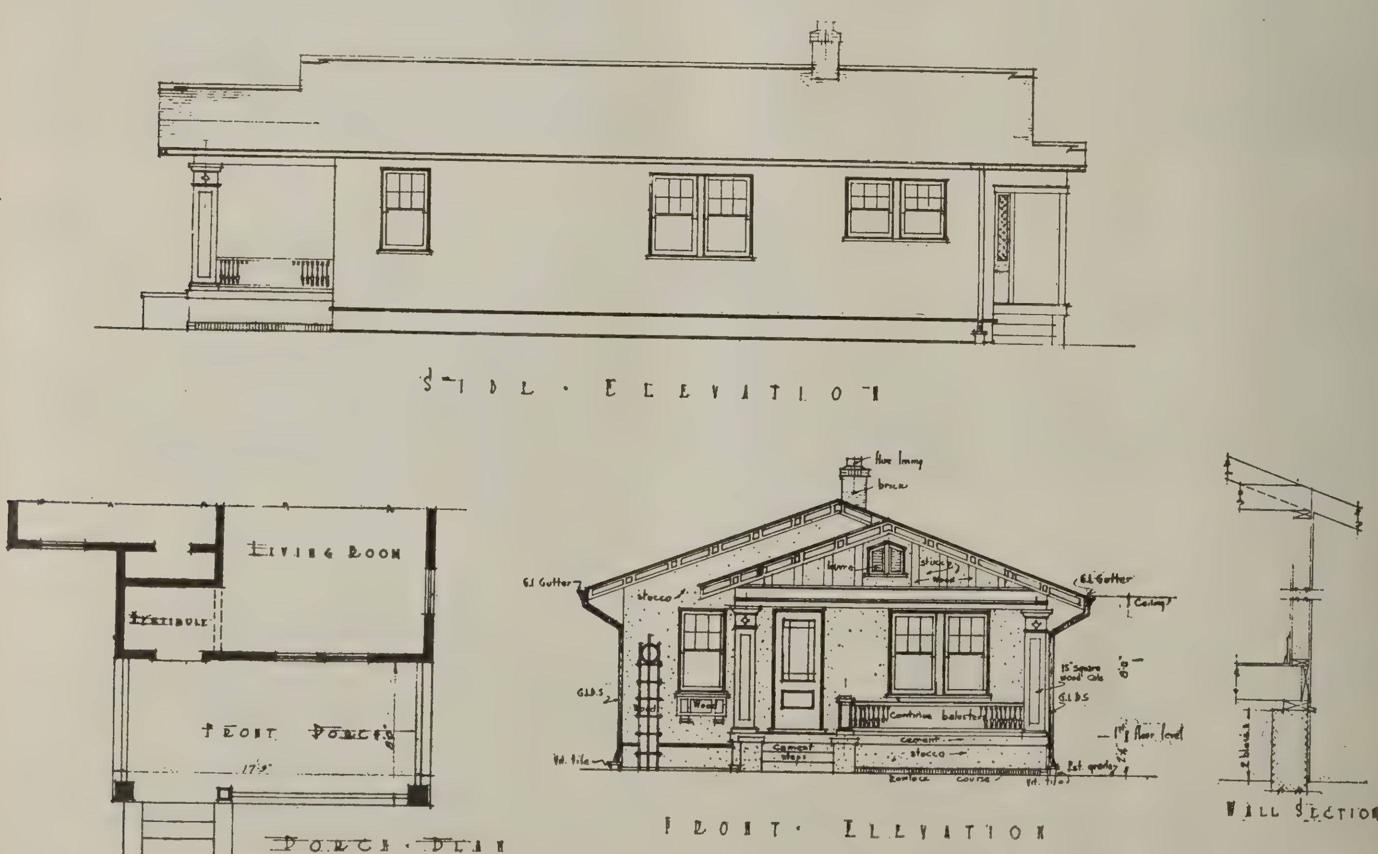
No attempt is made to standardize the method of financing the building of these houses, and probably therein lies the secret of the success of the venture. The company selected a natural born salesman, who, although he can neither read nor write, understands well the people with whom he deals. This man is a native Kentucky mountaineer—one of those individuals who is instinctively trusted for genuine honesty and fair dealing.

This man stays on the property, does odd jobs of tree-planting, grading and the like, and personally meets all prospective purchasers. He is a man of their own kind and he has no difficulty understanding their problems, their aims and their desires. Each case is handled individually. If a man is a carpenter and has $200 to invest, the realty company contracts with him for the lot and the materials and he builds the house under the general plan and supervision of the company, the cost to be repaid in monthly installments or in some other convenient form.

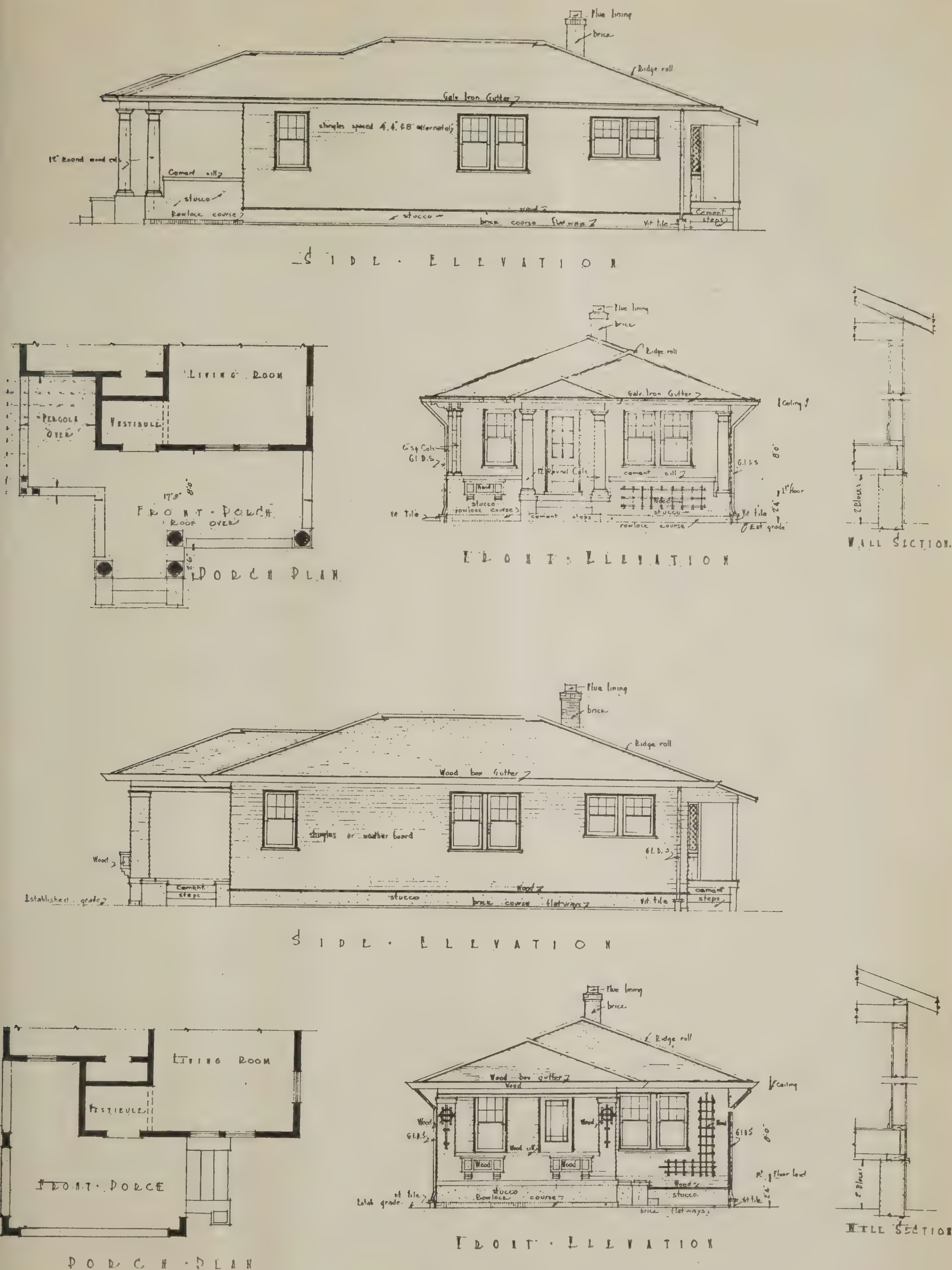
In other cases the realty company furnishes the lot, the plans and the material and the owner himself contracts for the labor, having the privilege, of course, of helping out himself, as most mechanics like to do, not only for economy, but for real love of that kind of work. When the owner desires it the company's own building organization erects the houses. Obviously, the number of ways in which these contracts may be drawn are infinite.

Of course sales are not made to Tom, Dick and Harry. The realty company does not sign contracts with men who are not likely to make good. On the other hand the purchaser is protected by restrictions on the property which prevent its sale to undesirable foreigners and to blacks, which is rather unusual in developments of this character.

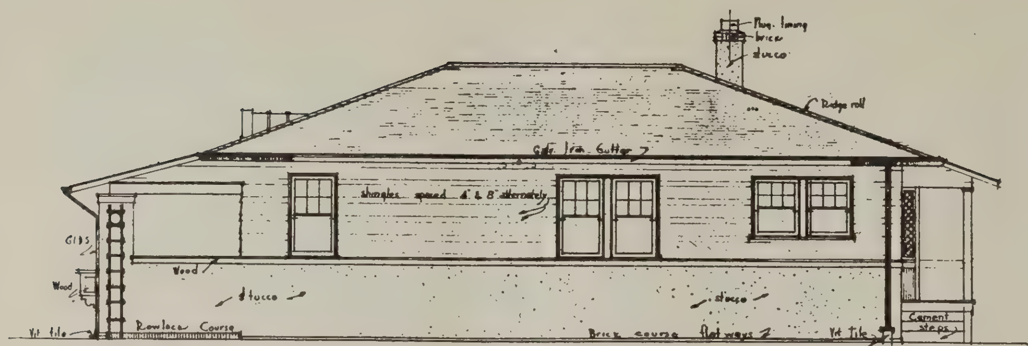
The houses shown are all designed to cost the purchaser, together with the 30 ft. lot, not over $3,500. They are roomy and attractive inside with built-in china closets, window seats and kitchen cupboards. They have no cellars, but are provided with openings for cellar windows in case the cellar is subsequently excavated.



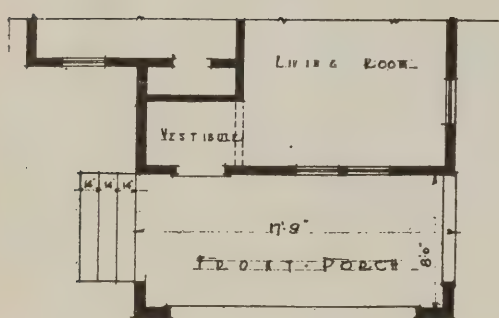
Elevations and plan of typical $3,500 house



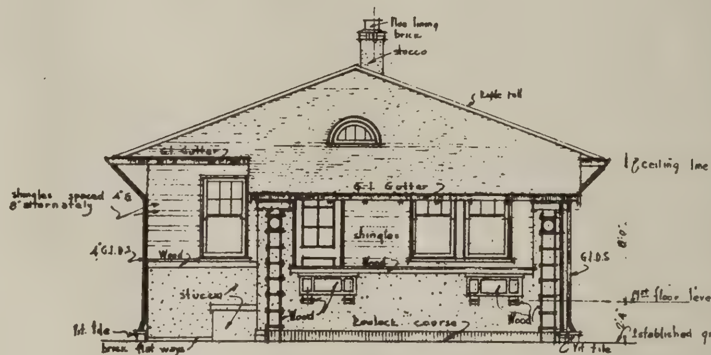
Examples of small houses for wage earners—Plans more or less standard are varied with each house to suit the purchaser



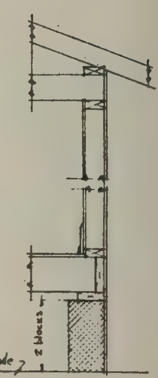
SIDE · ELEVATION



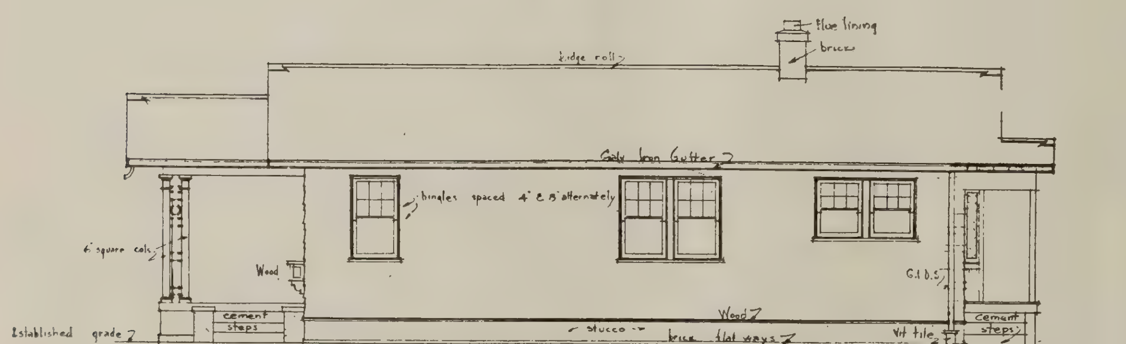
PORCH · PLAN



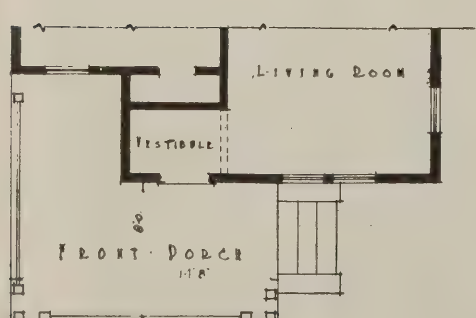
FRONT ELEVATION



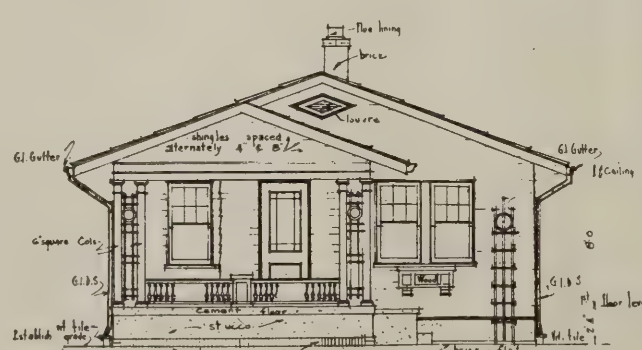
WALL SECTION



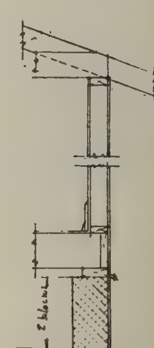
SIDE ELEVATION



PORCH PLAN

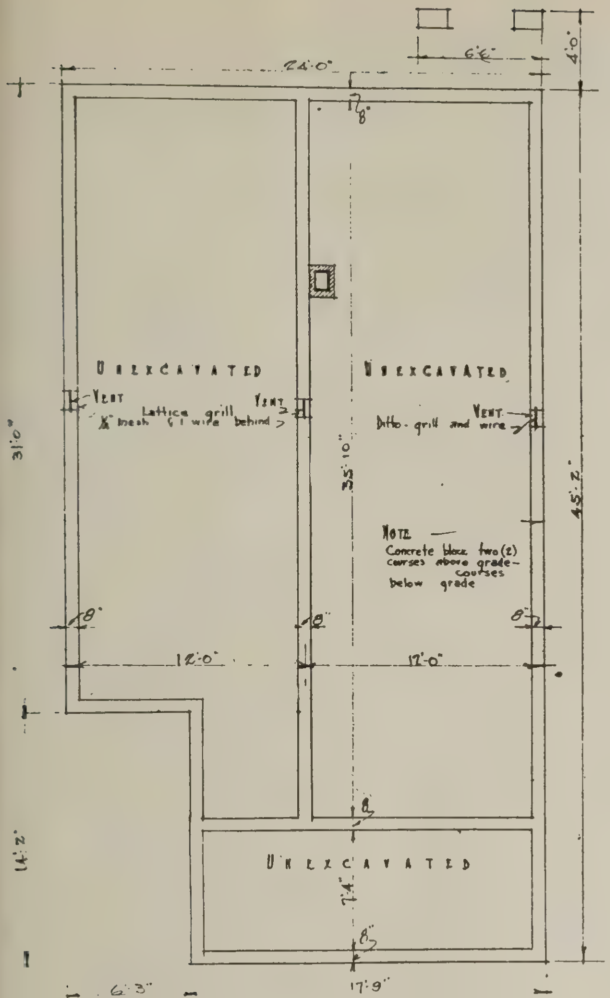


FRONT · ELEVATION

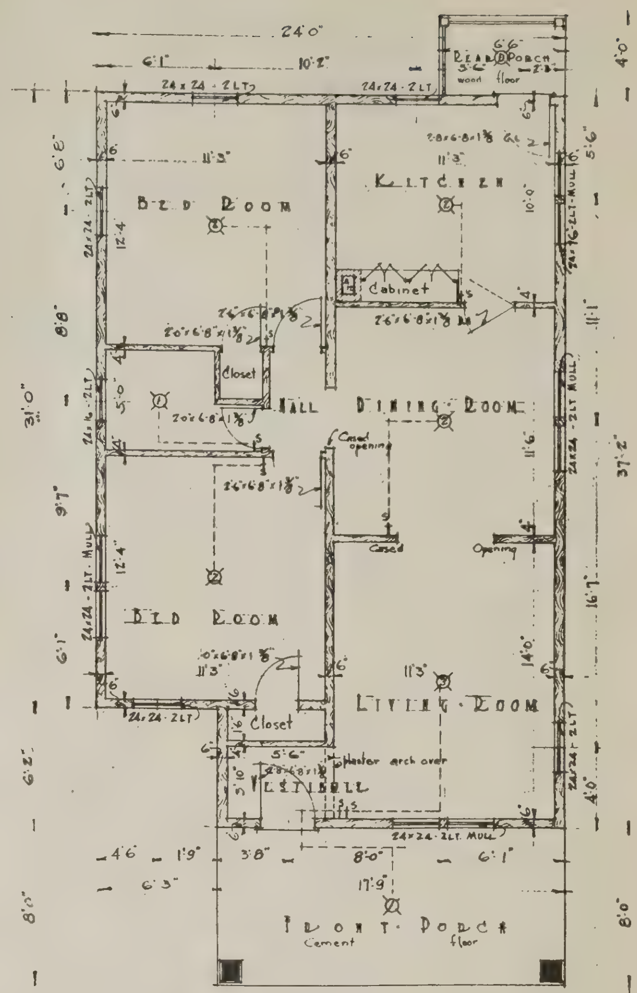


WALL SECTION

Other examples of small houses built of first-class materials by an organization specializing in much higher-priced houses



Foundation · Plan



Floor · Plan

Typical basement and floor plant of wage earners' house

The chief feature of this development is that the work was undertaken by a realty company which had hitherto specialized in houses of a much higher type, but saw in the housing problem of the working man the same opportunity to sell a product of real merit at a fair price that exists in the higher class of house building. It was recognized that a small profit on many units is just as large as the bigger profit on a higher priced proposition.

W. M. McVey is the man who has been largely responsible for these developments of the City Builders Realty Co.

Glass Standardization

Standardization of the different kinds, qualities, and sizes of window and plate glass used as a building material and for many other purposes was discussed at a conference between glass distributors, architects, and engineers of the Bureau of Standards of the Department of Commerce held October 19 at the Bureau of Standards, Washington, D. C.

Confusion is declared to exist in the glass and glazing fields so far as qualities and sizes of glass are concerned and this conference outlined a program that will be participated in by the manufacturers, distributors, architects and the Bureau of Standards, and which it is believed will result in the elimination of unnecessary sizes, standardize quality, and enable a more efficient use of this building material that is becoming more important as industrial and domestic architecture demands more light through increased window area.

The task, as outlined at the conference, included the formation of a commercially usable scientific classification of glass. At present building glass is classified as rolled plate glass, blown cylinder or drawn sheet glass. The plate glass includes polished glass ranging in grade from that used for the highest quality mirrors to that used for skylights, different kinds of glass in which wire netting has been placed to prevent shattering and ornamental glass of various sorts. The drawn sheet glass is used for windows in different qualities.

Committees were designated by the conference to gather data on and consider these phases of the window and plate glass situation.

The nomenclature in the glass industry will be studied and an effort made to define trade terms that are likely to be used with various meanings.

Another group of interested men will consider the important subject of the simplification and standardization of the sizes and qualities. Data presented at the conference showed that one jobber alone stocked more than 150 sizes of single strength window glass and nearly as many sizes of double strength window glass. It is believed that the total number of different sizes will greatly exceed this number.

Polished plate glass is now made in thicknesses ranging from one-eighth of an inch to one and one-half inch, with weights per square foot of from two to 20 pounds. But the most commonly used thicknesses are from three-sixteenths to five-sixteenths of an inch. Plate glass can be made in practically any size up to 250 sq. ft., with maximum dimensions not more than 12 feet by 21 feet. From these figures it can be realized what is the magnitude of the task before this committee.

Accounting--Industry's Guide and Light--By G. W. Hafner

Manager, G. W. Hafner, Inc., Audits, Systems, Federal Tax Service, Industrial Engineering, Chicago

Exact Knowledge of Your Affairs, Based on Facts and Figures, is the Only Guaranty of Adequate Profits

IN A REPRESENTATIVE MID-WEST CITY the editor of NATIONAL BUILDER recently learned—first-hand—that the personnel of the builder-contractor fraternity changed nearly completely every five years. Progressive carpenters, grocers, real estate agents, and business men of all kinds "take flyers" in building construction, and at the end of a brief period are "frozen out," or drop out disgusted.

Success in the building industry depends on many factors, perhaps no one the most important, certainly, however, an expert knowledge of building and construction is a prime essential. This knowledge may be acquired in numerous ways, and by grocers and real estate men as well as carpenters, building foremen, architects and engineers, but obviously the intelligent and enterprising carpenter, building foreman or engineer is the best candidate for success in building contracting, other things being equal.

Apparently the thing that men of this character most lack in their equipment for success in contracting is a knowledge of business and business experience. The prime fundamental of business knowledge is a knowledge of accounting, and unfortunately the early training of most building contractors does not include the acquisition of this knowledge.

It is fully realized that the practicing builder is too busy or too set in his ways to turn now to schools of bookkeeping and accounting for making good a deficiency that he very likely fully realizes. But the editors of NATIONAL BUILDER believe that one of the most useful things it can do for the building industry is to put before building contractors a series of articles that will give them, in small doses, the fundamentals of the most approved methods of accounting as especially adapted to their industry.

At no time in industrial and commercial history has good management been more essential than at present. We are in an era the like of which we have never experienced before. We can argue until blue in the face regarding the importance of money or capital in business. All sorts of arguments may be advanced in an attempt to prove that industry—hard work—is the keystone of our commercial life. The fact remains, nevertheless, that, in the last analysis, the thinker who conceives, plans, organizes and puts his ideas into effective action is the real director of affairs, because *he* co-ordinates the dollar and the hour to *results*.

Success in business exacts from the business man the broadest kind of knowledge of his affairs. No judge or juror in civil or criminal case ever had to unravel testimony, to sift and weigh conflicting statements, more carefully than a business man has now to balance probabilities, and decide what and when it is best to buy and sell. Only the sharpest sagacity, the most far-reaching penetration and the soundest judgment will now enable him to discriminate between what is profitable and what is ruinous. The day has gone by when mere industry and honesty would qualify a man for success in business. The times demand men who *know* the *facts* of all their affairs, and who base their conclusions and judgments upon them; and the man who insists upon doing business in the old-fashioned, jog-trot, hum-drum way is as much out of place as he who insists on traveling with an ox team instead of by railway, or on getting news by the old stage-coach instead of by the lightning telegraph.

How to Get the Facts and Figures of Your Business

The question is, then: How to get the facts of business? The only way is through an adequate and comprehensive system of accounting and cost finding. *The correct keeping of accounts is the means by which the business man may know all the vital facts in connection with his business, in order that he may plan providently.* The business man today needs to have records of all the transactions of his business, and especially records of the relationship which one transaction bears to another transaction, as well as to all others. He needs to have these records at his command while the transactions are yet fresh. He must have each fact interpreted for instant use.

"Come, now, let us reason together." You know that the real need—the vital need—is for better business methods. You know that the day is past when we were all working on a wide margin of profit, and when it was a case of filling orders at a price that was large enough to cover any sort of laxity and waste and inefficiency. You know that we have got to get down to the hard facts of business, that we have got to learn precisely what they are and that we have got to know where the weaknesses and losses exist. What we need in order to do this—what we need above all else—is to install and *use* adequate methods of bookkeeping and cost-finding.

The Purpose of Good Accounting

There is no business which does not demand a good, dependable, complete accounting plan. The smallest business, as well as the largest, exacts it, and will go to ruin without it. It is this that binds all the parts together, and gives unity to all the details. Receivers and commissioners of insolvency say that the books of ninety bankrupts out of a hundred are found to be in a muddle—kept without plan or method. There is hardly one bankrupt in a hundred who can tell with any exactness what has become of the property which he had in his possession, what he has spent for expenses, what he made or lost in his business transactions—in short, whose accounts are not in a muddle.

The most effectual manner in which to attack the problems which daily face you is to secure and maintain control of the business which you are directing. The era of bigger profits, indeed of any profits at all, has had its beginning in many instances with the inauguration of proper accounting methods. For the purpose of good accounting is to present the facts of business, to direct our judgment of business events, to trace the connection of causes and effects, and to draw from past occurrences general lessons of commercial wisdom. Estimates and approximations may be had for the asking. But for cold facts, the one weight and the one measure, there is no where else to look except to the accounting records.

Are You Guessing, or Do You Know?

As a matter of fact, how much do *you* know about your business? Can you tell, from the actual facts of figures, whether or not each of your jobs or contracts is profitable? Can you tell this in detail, for each item of material and labor under each subdivision of the work? Do you know

Balance Sheet Modern Building Construction Co., August 31, 1921

ASSETS

CURRENT			
CASH			
On Hand		$ 100.00	
In Bank		3,464.90	$ 3,564.90
NOTES RECEIVABLE			
Sundry Notes		$ 2,429.13	
LESS: Notes Receivable Discounted		1,429.13	1,000.00
ACCOUNTS RECEIVABLE			
Customers' Accounts	$28,939.45		
LESS: Uncompleted Contracts	13,080.25	$15,859.20	
Personal Accounts		500.00	
		$16,359.20	
LESS: Allowance for Bad Debts		856.20	15,503.00
INVESTMENTS			
U. S. Liberty Bonds		$ 1,000.00	
War Savings Stamps		200.00	1,200.00
INVENTORIES			
Material		$ 3,106.58	
Investment in Buildings Under Construction	$15,856.00		
LESS: Completed Work Charged Out	12,285.75	3,570.25	6,676.83
TOTAL CURRENT ASSETS			$27,944.73
PERMANENT			
Land		$ 5,000.00	
Buildings	$ 2,975.00		
LESS: Allowance for Depreciation	178.50	2,796.50	
Equipment	$ 997.50		
LESS: Allowance for Depreciation	299.25	698.25	
Autos and Motor Trucks	$10,547.75		
LESS: Allowance for Depreciation	4,219.10	6,328.65	
Horses, Wagons and Harness	$ 2,106.80		
LESS: Allowance for Depreciation	1,264.08	842.72	
Office Furniture and Fixtures	$ 925.25		
LESS: Allowance for Depreciation	227.56	697.69	
TOTAL PERMANENT ASSETS			$16,363.81
DEFERRED CHARGES			
Insurance Prepaid		$ 182.50	
Liability Insurance Deposit		385.00	
Interest Prepaid		82.20	
Prepaid Rent		100.00	749.70
TOTAL ASSETS			$45,058.24

LIABILITIES

CURRENT			
NOTES PAYABLE			
For Borrowed Money		$ 2,000.00	
For Material		1,582.65	$ 3,582.65
ACCEPTANCES PAYABLE			
For Material			1,826.90
ACCOUNTS PAYABLE			
For Material		$ 4,372.05	
Sub-Contractors' Accounts	$ 8,892.85		
LESS: Sub-Contractors' Uncompleted Contracts	6,450.00	2,442.85	
Personal		155.00	6,969.00
ACCRUED ACCOUNTS			
Salaries and Wages		$ 251.50	
Interest		28.50	
Taxes		304.25	
Compensation Insurance		68.95	653.20
TOTAL CURRENT LIABILITIES			$13,032.65
RESERVES			
For Federal Taxes		$ 89.24	
For Contingencies		1,774.40	1,866.64
CAPITAL STOCK			
Capital Stock Authorized		$30,000.00	
LESS: Unissued Capital Stock		10,000.00	20,000.00
PROFIT AND LOSS			
Surplus		$ 9,000.00	
Profit, Current Month of August		1,158.95	10,158.95
			$45,058.24
TOTAL LIABILITIES			$45,058.24

how your actual costs are matching up with your estimates? Do you know at the end of each month how much money you are making, or do you have to wait until the end of the year to find out?

You ought to have all this necessary information at your finger tips. You should be able to know at any time if your expenses are becoming too heavy or your profits too small to make a good net return, and you ought to know this for each job or contract in detail and in total. You ought to have this information in order to make changes and adjustments before you suffer either a loss in money, or in the confidence of your fellow men. Too many contractors and builders really don't give any serious attention to their affairs until they are brought up short by the inability to meet bills. Then it's too late.

It's the easiest thing in the world to know all about your business all the time, if you have the right sort of accounting methods. The Balance Sheet, and Profit and Loss Statement presented herein illustrate what information every contractor and builder should secure from his books once each month. In these the proprietor or manager has a recital of the complete story of his activities for the past month. The whole situation of his business lies plainly bared—the condition of his finances, the amount of money tied up in materials, what is due to him from others, what is due to others by him, the strength or weakness of the various jobs or contracts from the standpoint of profits.

Is there any question that such statements and reports—the result of proper accounting methods—would be of instantly practical use in the way of directing and controlling your building activities? The right sort of an accounting system has functions of usefulness which are addressed to the most weighty of human interests, and the objects of it have calls upon contractors and builders which it is inconsistent with the dignity of the industry to disobey.

Profit and Loss Statement, Modern Building Construction Co., August 31, 1921

SALES		
Completed Contracts	$36,084.50	
Material	1,126.54	
Miscellaneous	129.00	$37,340.04
COST OF SALES		
Completed Contracts	$23,512.46	
Material	1,084.26	
Miscellaneous	104.80	24,701.52
GROSS PROFIT		$12,638.52
PER CENT OF GROSS PROFIT TO SALES		33.8%
ADMINISTRATIVE AND OFFICE EXPENSES (As per detailed statement)		$11,653.31
PER CENT OF EXPENSE TO SALES		31.2%
NET PROFIT IN OPERATIONS		985.21
PER CENT OF NET PROFIT TO SALES		2.6%
OTHER INCOME		
Interest Earned	$ 26.50	
Discount Earned	178.84	
Teaming	226.50	
Bad Debt Recoveries	68.40	$ 500.24
		$1,485.45
OTHER DEDUCTIONS		
Interest Paid	$ 52.80	
Allowances	273.70	326.50
ADDITION TO PROFIT AND LOSS, MONTH OF AUGUST		$ 1,158.95

Developing a System of Accounting for Contractors and Builders

It is evident, then, that the question of what is adequate in the way of bookkeeping and cost finding for the building industry is one which contractors and builders, individually and collectively, would like to have clearly answered for them. Hence, the purpose of this series of articles is to develop, fully and completely, for this industry, methods of accounting and cost finding procedure which will serve to furnish building contractors everywhere with the facts and figures of their business affairs.

To accomplish this task, we evidently must work out a certain accounting mechanism. This mechanism is, of course, to be used for the purpose of, first, securing the facts, and, secondly, presenting the facts. Hence, the plan developed will be designed to serve the estimating and selling end of your business as well as the financial. It will tell as much about what should be done as about what is being done; and, being designed to give due consideration of all the factors of the building contracting industry, will serve you well in these days of keen competition and swiftly changing conditions.

The accounting plan itself—the mechanism which will be perfected in subsequent articles of this series—will serve to secure a knowledge of your affairs, and make it available for your use and guidance, but you, yourselves, are responsible for the utilization of such knowledge.

Now, it is an easy thing for all contractors and builders to form just conclusions and judgments as to the financial position and operating condition of their business; and to do this no peculiar powers of mind are required, no college or university education, nothing which every man of ordinary intellect does not possess—observation and intelligence.

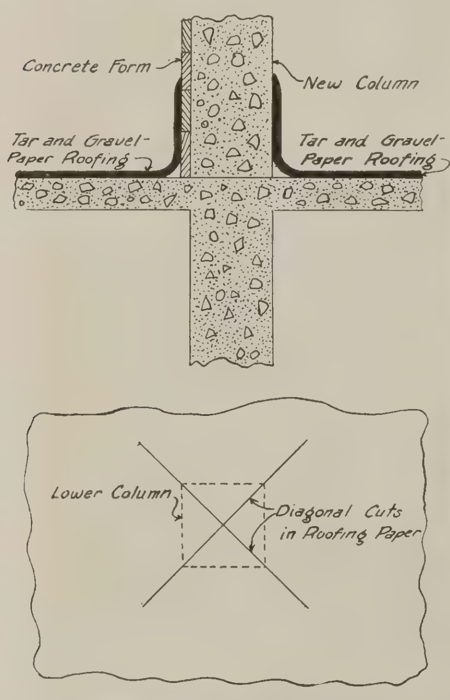
But until these powers of observation and intelligence are *used* in carefully and consistently studying all the *facts* of your business, as presented by the right sort of an accounting system, it is as absurd as it is audacious to pretend to form any correct judgments respecting your affairs. The contractor and builder who studies his business from reports such as are illustrated in this article, gets the *facts* of his condition and position in an organized fashion. When he does this, he has the sort of knowledge which, allied with practical experience, saves friction and waste, and insures fair profits.

And it will lead to some important and far-reaching results if the accounting plan to be developed in these columns is generally established and maintained in your industry, for nothing is more true than that *the correct keeping of accounts is the means by which the business man may know all the vital facts in connection with his business, in order that he may plan providently.*

Adding Six Stories to Eight-Story Hotel

THE ONLY BUILDING WORK of importance going on in the downtown district of Indianapolis is the six-story addition to the Lincoln hotel building. Office building work is remarkably slack in this city at the present time.

The Lincoln hotel building was originally constructed about three years ago and so planned that the additional stories might be added at any time. The building is of reinforced concrete with a buff brick veneer and Bedford limestone trim.



Detail illustrating method of keeping concrete roof watertight

As originally built the roof over the eighth story was a flat reinforced-concrete slab with a tar-paper and gravel roofing surface. The original roof, with the roofing material removed, therefore forms the ninth floor of the present building.

The reinforced-concrete columns for the upper six stories are built up over the columns in the structure below. They simply rest on the tops of the columns and are not tied into the concrete below in any way, the great weight of the upper six stories, of course, making it unnecessary, unless provision were made for earthquake shocks.

Lincoln Hotel as completed

It was necessary for the building contractor to carry on the work in such a manner as not to interfere in any way with the continuous operation of the hotel. The big problem was, of course, to keep the roof intact. The contractor is the Bedford Stone and Construction Co. of Indianapolis.

At the places where the columns for the upper six stories were to be erected the roofing paper was cut through in diagonal slits, as shown in the accompanying sketch, and the column forms erected. The roofing paper was then laid against the forms and the joints waterproofed with tar pitch.

When the concrete had set and the forms were removed the tar paper was peeled from the wood forms and laid against the concrete and made watertight again with tar pitch. In this way the roof, which now became the ninth floor, was kept intact until the walls and roof of the addition were completed. Then the roofing paper, tar and gravel were removed and the necessary openings made into the floors below.

Both workmen and materials were raised and lowered by a temporary elevator erected outside the building, as the view herewith shows.

Lumber Hard Hit by South Bend Code

The new building code of South Bend, Indiana, adopted August 22, last, is not at all considerate of the proper use of lumber as a building material. Some of the most outstanding faults of the code are that the allowable stress values for different species are low, several of the most important species are entirely omitted from the schedule and it contains no specifications as to limiting defects in structural timber. The use of wooden shingles is also to be restricted as the code will not permit their use within the corporate limits after January 1, 1924.

The report of the Conference on Unemployment justly says that the development of the art of building through the adoption of new and economical methods of construction is retarded throughout the country by the building codes of the various municipalities.

Concrete Roofing

A RED OR GREEN TILE roof unquestionably adds "class" to a house; and with the prevailing tendency of finishing the exteriors in light shades, tile adds color and tastefulness to the appearance. The use of concrete in making roofing tile is increasing, and judging by conditions in Indianapolis it can be had for about half the price of clay tile.

material. The slight change of color on weathering might be regarded as an advantage by some architects.

To overcome the chief objections the enterprising firm which makes concrete tile for the Indianapolis district has found it desirable to lay the roofs as well as make the tile. The drawings herewith show recommended practice for laying concrete tile

are cooler in summer than either a straight tiled or shingled roof.

The manner in which the tile manufacturing company operates is interesting. At the beginning of each season the sales manager gets in touch with building contractors or architects and makes a price of so much a square for so many thousand squares, to be applied when and where the building

Roofing with concrete tile in Indianapolis

No objections to concrete tile by Indianapolis builders were found, which did not also apply to tile of any description, except that the color is subject to some change. The chief objections are that the tile are liable to break when roughly treated either before or after they are on the roof, and that a tile roof is difficult to make weather proof. Both these criticisms could be laid to the door of workmanship rather than

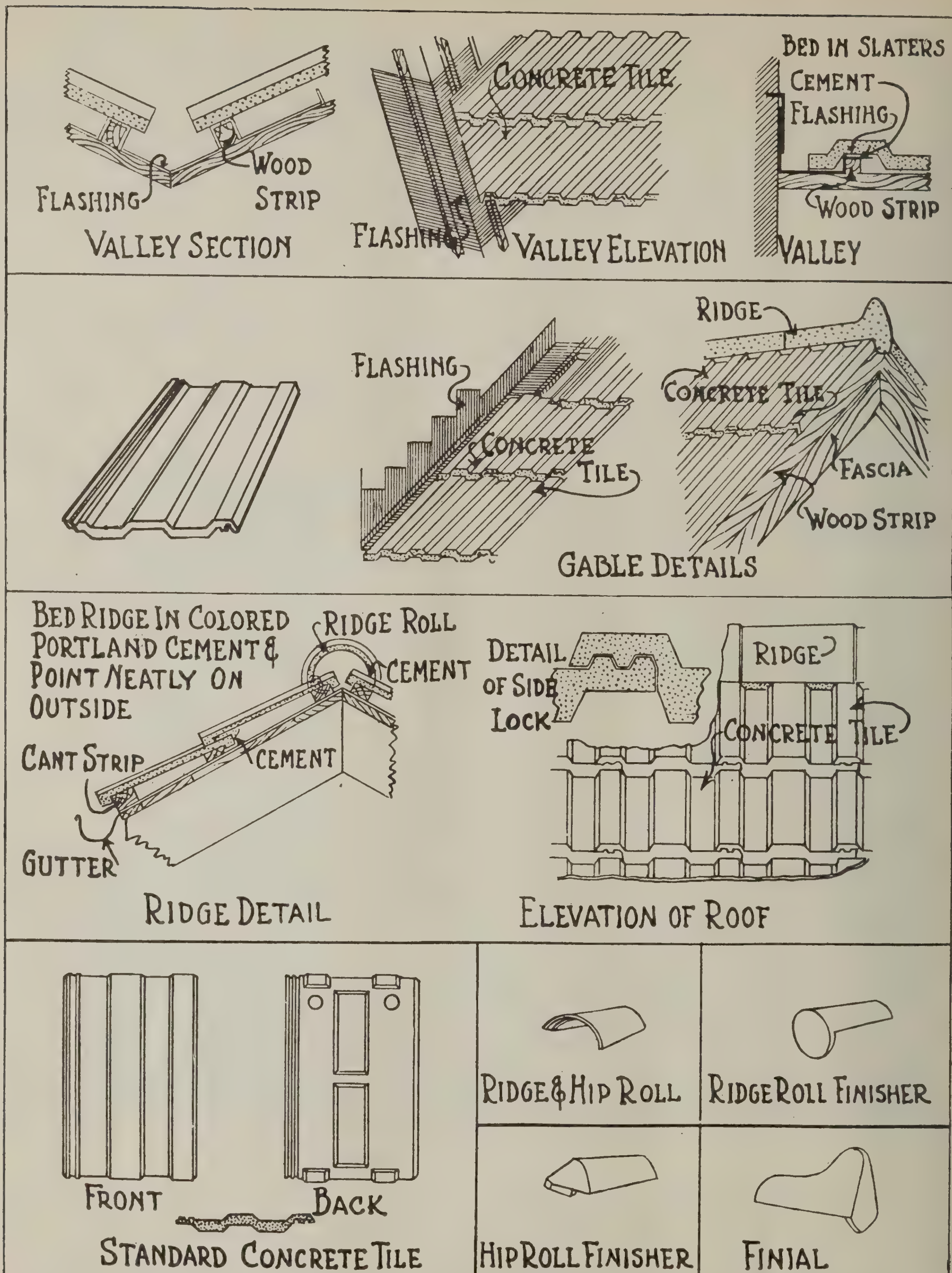
as developed largely by the experience of this firm.

A good share of the business developed by this firm of concrete-tile manufacturers is in reroofing existing houses to add that "class" which the increasing income of the owner may deem necessary. These double roofs are not only insurance of weatherproofness but because of the dead-air space between the old shingles and the tile they

contractor may subsequently specify. The same scheme might be used by any roofing contractor in dealing with building contractors.

STATISTICS

There is a definite need for statistics properly co-ordinated, accurately prepared, and furnished promptly — affecting production, capacity, and distribution of basic materials in the construction industry.



Details of concrete tile construction

Questions, Answers, Kinks and Discussions -- L. V. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

U. S. Veterans' Bureau

Two years ago last spring the disabled veterans of the great war were being placed in training in schools and business so that they might overcome by training any handicap occurring through their disabilities.

It was my good fortune to be connected in some small way with this work. I have followed it closely from an outsider's viewpoint, since I am not directly connected with the government, and I have watched the work progress through its various phases; slammed by this one and patted by that one. I have seen it spread, decentralized, reorganized and, like any really worth while business, get to its feet and do business.

But better than that I have been in pretty close touch with the fellows themselves, every day, and that has been the real treat. It will not be long before a great many besides the few of us will know just what these men have done with themselves in their new schooling to overcome some serious handicap. Their ability is going to be a revelation.

In baseball slang I shouldn't hesitate to say, "Grab 'em Scouts."

If any young fellow wants to consult with me about training in carpentry or in regard to the announcement by H. J. Betty, chief of the co-operative division, subjoined hereto, all he has to do is to write to me and I shall advise him to the best of my ability.

Many Disabled Veterans Being Trained in Carpentry

By H. J. Betty

Over 100,000 disabled ex-service men are at present in training throughout the U. S. under the auspices of the U. S. Veterans' Bureau. This Bureau is the government agency recently established, upon the enactment of the Sweet bill, by the consolidation of the three old federal soldier relief agencies, namely, the Federal Board for Vocational Education, the Bureau of War Risk Insurance, and the U. S. Public Health Service.

In District No. 8, which comprises the states of Illinois, Michigan and Wisconsin, approximately 200 men are being trained in carpentry and allied trades such as cabinet making. These men are learning their trade in one of two ways, they are either enrolled in institutional training or in placement training. If a man chooses institutional training he is sent to some recognized and duly accredited trade or technical school where he receives instruction in carpentry. If, on the other hand, the man chooses placement training he is put out "on the job" with a master carpenter, and allowed to serve an apprenticeship, and in that way learn his trade.

H. J. Betty, Chief, Co-operation Division, U. S. Veterans Bureau

In Chicago there are approximately 75 men learning to become carpenters. These men are being trained principally at Lewis Institute, at Washburn Continuation School, and at the Government Trade School on Karlov Avenue.

But it is easier to find good schools in which to train these men in the carpentry trade than it is to secure placement opportunities for them. In view of the fact that these men receive maintenance pay, from the government, in the sum of $100 per month while in training, they are really not a loss to any carpenter or any firm who will give a man a placement training opportunity. Anyone interested in this matter is urged to write to the District Office of the U. S. Veterans' Bureau at 14 E. Congress Street, Chicago, Ill.

Leaky Windows

Two letters with new ideas have come in recently regarding leaky sills. Each writer has furnished a solution that would only be futile against a gale of wind and rain. What bothers me is that there should be leaks in an ordinary double-hung that is well built.

The cut, Fig. 1, might be an average sill section, which, if well made and well painted, should not leak.

Now for the casement window, especially the ones that open in. In my own place there are casements, opening in, and large double-hung. The latter have never given me a moment's concern, but the casements did leak slightly under the apron, in a driving rain, until the priming coat was covered and each sill was inspected and two or three caulked. Hall paint was used. The builder seemed anxious about the windows until the job was finished, and was pleased at the result. However, I had the best of him, for I knew before building that any of his work would be "tight," since the floors and walls would be as right and plumb as men could make them. The windows and doors are "tight," but open and close easily.

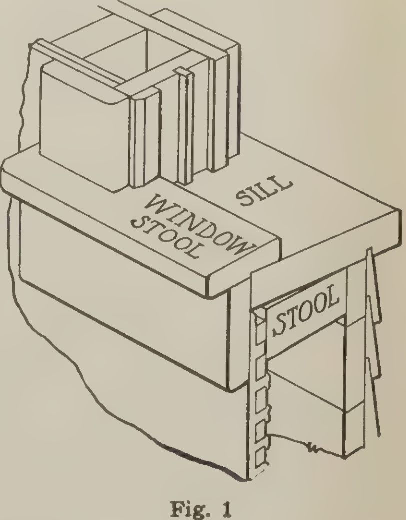


Fig. 1

Are there any other recommendations or complaints? Windows are becoming varied in style and build and are worth consideration. Let's have any reasons for leaky windows from the footing up.

Concrete Stairway of Irregular Curves

G. H. M., one of our Toronto subscribers, writes us: "For the past two years having taken great interest in your Questions, Answers, Kinks and Discussions column, I thought perhaps the accompanying sketch and explanation would help others to overcome that oft used and aggravating phrase, 'To be laid out on job and submitted to architect for approval.' The method used took the onus from my shoulders and placed it where it belonged.

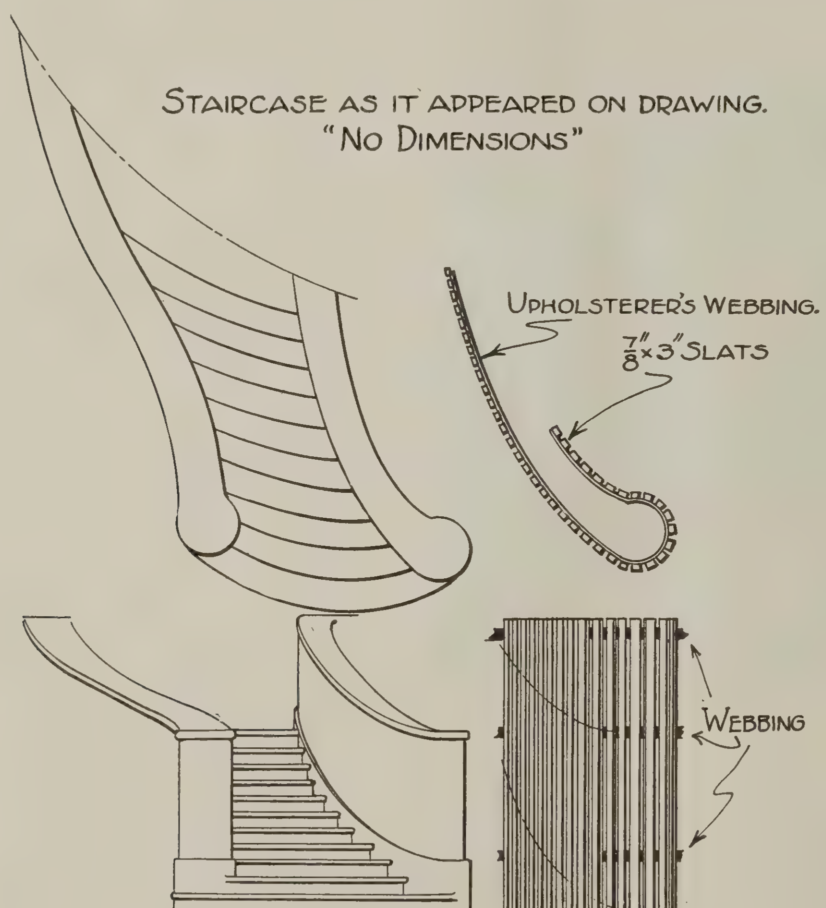


Fig. 2

"The sketch, Fig. 2, is intended to show a concrete staircase formed of irregular curves, as shown on drawings, no dimensions given.

"I had two walls constructed of ⅞x3-inch slats tacked on upholsterers' webbing, with quarter-inch spaces between slats. On the pliant webbing these walls could be made to conform to any desired angle or curve. In this case they were set up as nearly as possible to the curves shown in the meager drawings at hand, and the architect was called in to pass upon the layout. As is invariably the case, he shifted the walls several times before he was quite satisfied. Without a doubt, the cost of constructing these two walls was saved on this job alone, as the concrete forms for staircases of this description are elaborate and expensive, and one or two even slight alterations of the finished form would have cost a good deal more than did the lath-and-webbing walls. Moreover, from these walls all the difficult cuts were made easy.

"These two temporary walls have been very carefully preserved, and are considered a great asset in the shop, as they are used on almost every staircase where irrgular ramps are encountered."

Form for Setting Grounds

W. L. C., Boone, Iowa, writes: "Sketch, Fig. 3, is of a form used a good deal around here to set grounds with, and which I believe leaves the plastered job in as good condition to set jambs to as if false jambs were set, and is much quicker and saves lots of lumber. The form can be used an endless number of times if a little care is taken to make it accurate at first.

"To use the form, set it up straddle the studding on one side of opening; divide the distance between lath and form at top and drive a nail at *1*, into the stud. Plumb the form, and nail at *2*. Now take some straight

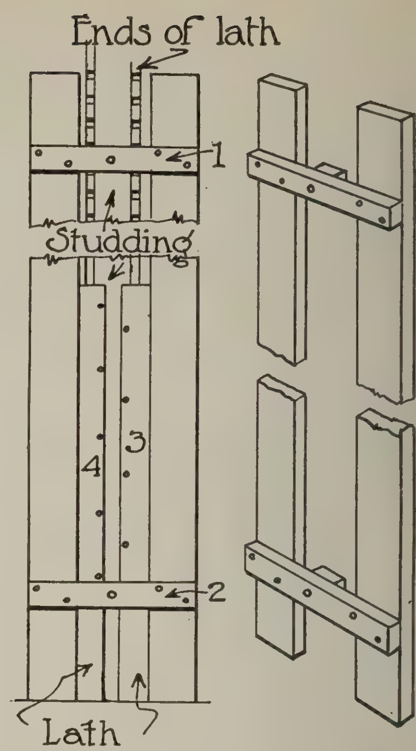


Fig. 3—Form for setting grounds

lath and place as *3* and *4*, press them out to the form and nail to studding. Continue them up to the top of the opening. The form can now be taken off and placed on the other side. When the same process is finished on that side it is easy to nail two short laths overhead to join the two sides.

"The use of this form overcomes the fault of crooked studding and studding of varying widths. The jambs may be made all one size and they will fit. The grounds may all be left on if the openings are made wide enough; if not, it is an easy matter to take them off."

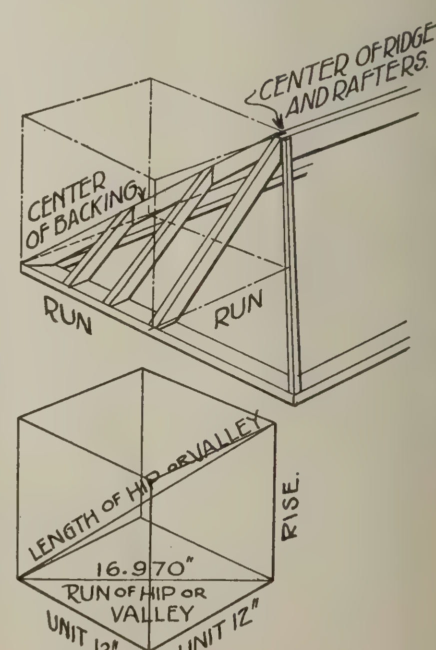


Fig. 4—Square-cornered hip

Square Cornered Hip

Where does the 7-inch come from in framing a hip for a square cornered house?

In Fig. 4, taking one side or half of the roof-end, a square is formed as a base, and the rise gives the third side of a square prism. With the diagonal of the square for one side, and the rise for another, you have a right triangle with the hip rafter length for the third side. The length of this diagonal is always 1.414 times the rim of the common rafter, and as 12-inch is used as the unit on the square, the answer is 1.6970-inch, or its practical equivalent, 17-inch.

Just as simple to say that taking 12-inch as a unit for the two sides of the square base, the diagonal is the square root of two times 12x12-inch, since the length of a hypotenuse of a right angle triangle equals the square root of the sum of the squares of the two sides.

Outside Steps

F. R., Easton, Pa., writes: "In these labor- and material-saving times I build

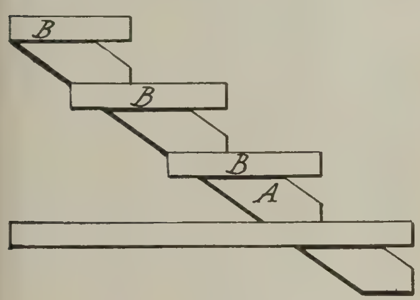


Fig. 5—Outside steps

outside steps as illustrated herein: Fig. 5, ledgers *B* are nailed to horse *A*. Horse, 2x6-inch, is notched 1x1-inch at intersection of step and rise. This replaces the old wide plank, saves time, and avoids waste with no sacrifice of strength. The ledgers as applied are ready for skirting, thus avoiding the old time extra framing. Scrap material may be used, stout 1x4, 2x4, etc. This method leaves an air space for the finished boarding, thus avoiding rot; and as the nails are driven in straight grain wood, the shrinkage (if any occurs), is uniform, making a finished step true to form."

Floor for a Dairy Barn

Another method of flooring the dairy barn is submitted by J. L. E., Bellaire, Ohio, referring to E. L. L.'s query in the August National Builder: "I am submitting a sketch of the method I have used in a large dairy barn here. Supplementary floor is as noted built up of flooring with end battens only, and can be easily taken up for cleaning. No stanchions are used in this section, as the chains on the slide rod as indicated at *E* gives the animal freer action and rest."

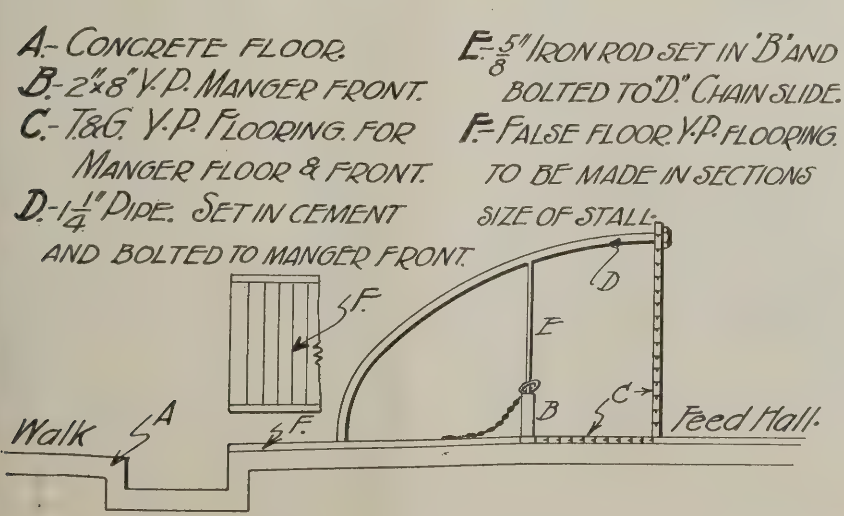


Fig. 6—Floor for a dairy barn

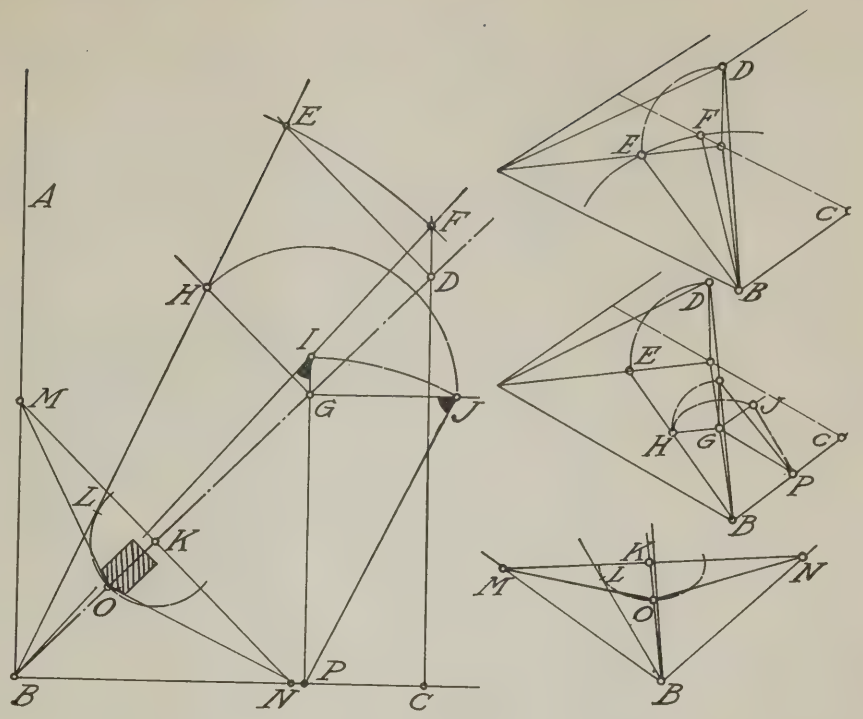


Fig. 7—Layout for hip and jack rafters

Hip and Jack Rafters

An old timer submits the layout shown to the left, in Fig. 7, which is simple and accurate. A, B, C represent the corner of the walls looking from above. BD is the hip rafter and PG a jack rafter. Draw DE at right angles to BD and equal to the rise. With B as a center and BE as a radius swing back to the point F. The operation is to lay the triangle of the hip back to a level with the plate, (see upper sketch to the right). BE or BF is the length of the hip. PI would then be the length of the jack rafter, and the angle PIB would determine the side cut.

In the first operation the triangle of the hip rafter was shown, laid flat, with DE equal to the rise. Then if GH is drawn perpendicular to BD the amount of rise in the jack rafter is GH. By swinging this triangle over on its side, with PG as an axis, PJG would show the angle for the down-cut.

To secure the backing angle of the hip rafter an arc is drawn with any point on BD, such as K, for a center, and tangent to the line BE. Suppose you were to cut a section through the hip at L, at right angles to the center line of the hip and perpendicular to the left of the hip, you would get the points M, K, and N. About MN as an axis lay this triangular section forward and you have the triangle MON, which is the proper backing angle.

Concrete Block and Tile Construction

This is the Fifth Article of a Progressive Series Begun in the February Issue—Questions in Regard to Concrete Block and Tile Construction Will Be Answered by Mail and Also in this Department

Footings and Basement Construction

THE saving of time, expense and labor made possible by the use of concrete block for foundation construction has led to the rapid introduction of block for this purpose almost everywhere. The prevailing method of construction consists of building the concrete wall up directly on a shallow footing of concrete deposited in place, without the necessity for erecting forms if the soil is sufficiently firm to serve in this capacity.

Fig. 9—The footing must go below frost penetration and rest on firm soil. Carry the excavation low enough to prevent heaving from frost, see that the ground beneath the footing is compact and that the footing has ample spread to carry the weight of the building. These precautions will practically eliminate wall cracks in the finished structure

The bottom of the footing must be below frost penetration. If placed in the winter time, the concrete for the footing must not be deposited in a frozen excavation.

The depth of the footing is usually about twice the width, but never less than 12 inches and always at least two to four inches wider than the wall it is to carry in order to allow some leeway in the placing of the block above.

Figure 9 shows the excavation ready to receive the footing and drain tile. In this case the earth was so light as to preclude the possibility of using earth forms for the footing. Figure 10 shows the layout for the footing forms, with the latter under

Fig. 10—Constructing forms for the footing. Where practicable the footing form may be dispensed with, using the earth instead

Fig. 11—Footing form in place and trench outside it ready to receive drain tile. The important consideration in placing the footing form is to get the top as nearly level as possible, so that the corners and the first course of block all around may be easily laid true and level

Fig. 12—Footing and tile completed

Fig. 13—Footing forms removed and drain tile covered with loose gravel, ready to proceed with the block walls

Fig. 14—Concrete block wall completed above grade, showing asphaltic coating used on the exterior of the wall below grade as a further precaution against the ingress of ground water.

construction. In Figure 11 the footing forms are seen completed and the trench at the side ready for the tile, which are seen in place in Figure 12. The following illustration, Figure 13, shows the footing completed with forms removed and the drain tile covered with lightly compacted gravel, to permit easy access for ground water to the tile.

Careful attention is necessary, even by the experienced workman, to get the top of the footing absolutely level. For this reason if the footing is placed in earth forms, it will be necessary to set stakes and put up horizontal rods from which to strike off the top of the footing. If built up forms are used, the upper edges must be leveled carefully and hold securely, to prevent movement when the concrete is deposited. The upper surface of the footing should be sufficiently rough to afford a good hold for the mortar bed in which the first course of block will be laid, and should be drenched before receiving the mortar.

With the footing carefully placed according to dimension, with surface level and slightly corrugated, little trouble should be experienced by the mason in laying the first and succeeding courses of block. Extra precautions should be taken in the laying of the block below grade in order to make sure that every mortar joint is water tight. The block should be thoroughly drenched before laying and mortar carefully buttered on both ends and top. The mortar bed must cover the entire thickness of the block walls. The joints must be carefully finished up on the outside, making them flush with the wall.

As a further precautionary measure against moisture, the walls below grade should be sealed on the outside either (1) by the application of a ¼-inch coat of portland cement mortar put on to clean, moist surfaces, or (2) by the application of a coat of pitch or any good asphaltic preparation recommended for masonry walls applied hot, to thoroughly dry surfaces. A wall treated according to the latter method is shown in Fig. 14.

The basement floor may be placed at any time after the walls, piers, and any other structural parts which might interfere, have been carried up above the floor level. The basement floor must never be made continuous with any part of the footings, piers or walls, and must be so placed that it can move independently of the latter. Figure 15 shows footings and piers being placed separately, in advance of the floor.

If the area the floor is to cover has been disturbed recently, the ground in such fills must be moistened and thoroughly compacted. If a fill is necessary to bring the subgrade to the desired level, cinders or gravel is preferable, and should be compacted before placing the concrete. Basement floor slabs for residences and similar buildings, where the traffic is not heavy, may be made 4 inches thick, being placed as a single course of 1:2:3 mixture concrete. Figure 16 shows a good general layout for constructing a basement floor.

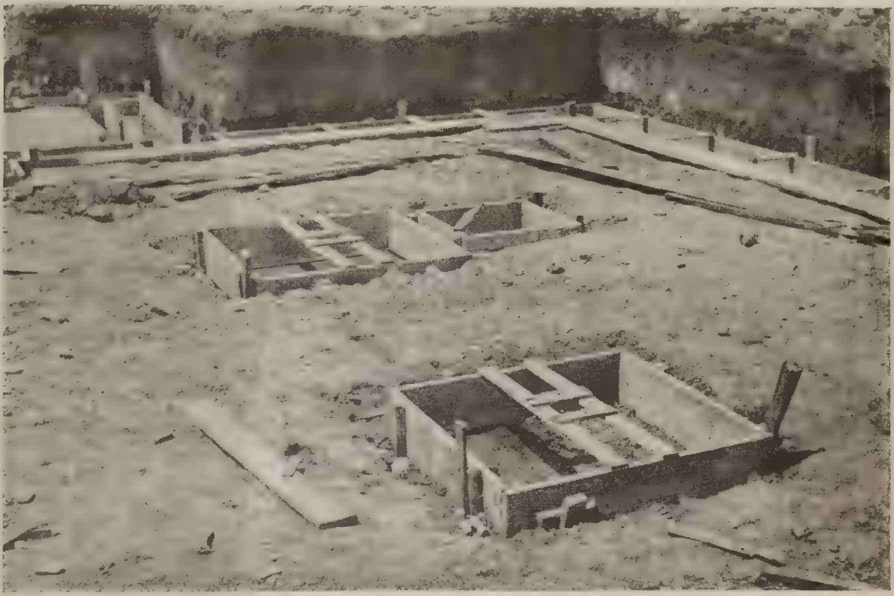


Fig. 15—The footings and piers are always constructed entirely separate from the basement floors, since the latter are but thin slabs not intended to bear structural weight

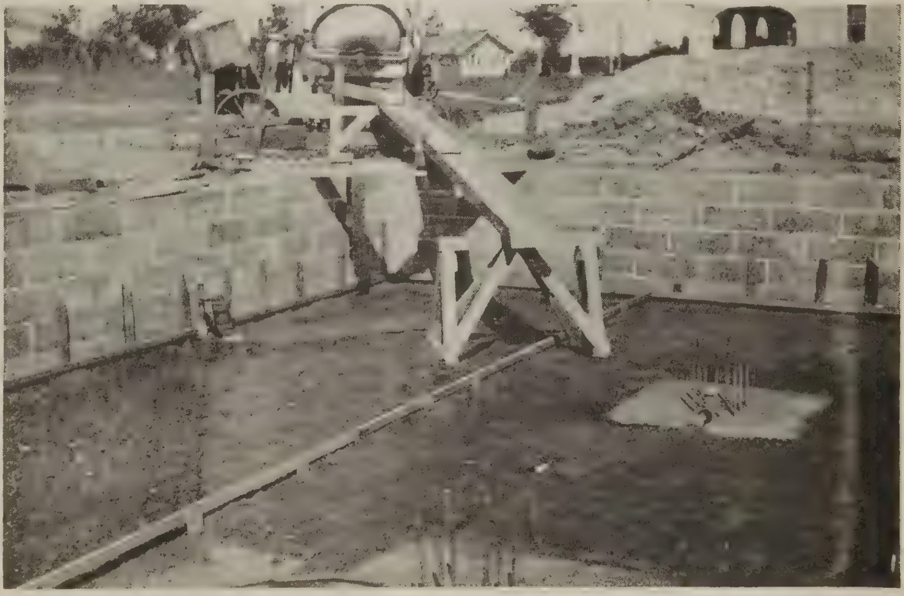


Fig. 16—It is usually handier to construct the basement floor early than to let it go until later. The layout shown in the illustration is simple and takes advantage of gravity in the distribution of the concrete

Ingenuity of a Building Contractor

ARCHITECTS AND BUILDING CONTRACTORS who have had an opportunity to examine a little booklet published by the American Face Brick Association in 1920, entitled "The Story of Brick," may recognize the view of the house reproduced here. It appears on page 50 of the booklet and there is absolutely no description accompanying it.


Residence, Newtonville, Mass. George H. Sidebottom, Architect
The beauty of the brickwork responds perfectly to this fine Dutch Colonial type

Brick has equal value for the poor man's cottage or the rich man's palace, for the cobbler's shop or the city hall, the wayside chapel or the metropolitan temple, and yet combines that strength and beauty which meets the requirements of both good taste and a thrifty purse. Other materials

A picture of a brick house in "The Story of Brick"

A house planned by counting the brick in the preceding picture

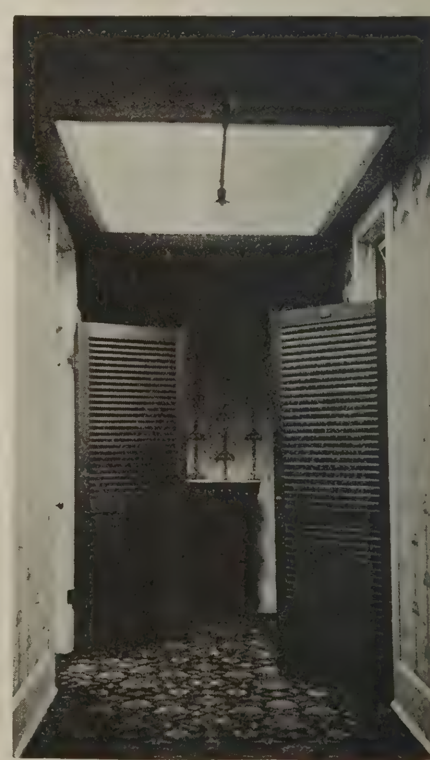
Among others this booklet fell into the hands of Taylor Powers, a builder of Indianapolis, some of whose work is described elsewhere in this issue. Mr. Powers "sold" this house to one of his clients. His letter to the architect, so he says, was never answered, but that did not discourage him from duplicating the house, as the second view herewith proves.

Mr. Powers got out a reading glass and laboriously counted the brick for every essential dimension of that house. There are some features he thinks he improved upon; but the moral of this little "story" and the two pictures is that old axiom we learned as children: "Where there is a will there is a way."

Under the same conditions, however, our advice would be to take the matter up with the brick association and let it use its influence to get copies of the original plans. The average architect and builder does not appreciate the many ways in which such a national association of building material producers may be of service to him in the solution of just such problems.

Louver Doors for Hotel Bed Rooms

The Hotel Fremont, at Fremont, Ohio, has installed bed room doors which permit a perfect circulation of air and render the rooms more comfortable during hot weather. The doors, as illustrated here, are built of wood and are provided with horizontal wood slats set apart and at an agle to prevent the admission of light and to make it impossible to see into the rooms. Phil A. Lins, proprietor of the Hotel Fremont, has had many favorable comments from his patrons since these doors were installed. They are not expensive, can be built by any carpenter, and are easily removed for storage through the winter.



Financing the Building Contractor

WHAT APPEARS TO BE a most feasible scheme for financing the construction of low-priced houses is that devised by the Holyoke (Mass.), National Bank. This Holyoke plan has already received considerable publicity, and has been brought to the attention of many bankers, but building contractors, who are really the ones most interested, probably are not generally familiar with it.

Through their influence, and the influence of other local business men which they might bring to bear, it is quite possible that contractors in many country towns or small cities could induce their local banks to adopt this plan. For the adoption of the plan is really good business for the bank and will very greatly increase its influence and prestige in the community. Indeed, if the average small-town banker were a better business man, there is good reason to believe that keen competition would develop in many instances, to be the first to adopt this Holyoke plan.

Unlike many such schemes, the idea is to finance the contractor, rather than the owner. By financing the contractor on decent terms the owner as well as the contractor benefits. During the construction stage the bank does not deal, technically, directly with the owner, but with the contractor, relieving him of an immense burden of financing problems, and leaving his hands and his head free to do the things he is best qualified to do—*build houses.*

The Ordinary Way

First consider the ordinary method. Smith with a capital of $1000 wishes to build a $5000 house. He purchases a lot and raises a mortgage on it. A part of his capital is gone for interest, fees and commissions before he has got started. The proceeds of the lot mortgage and the rest of his capital he pays to the contractor to start construction operations.

The balance—the major part—of the construction costs must then be provided by the contractor either by raising the money at a bank on his own notes or the notes of the owner. In either case there are discounts, commissions and difficulties to be met, all of which add unnecessarily to the cost of house, and therefore make it harder for the owner to build.

When the house is done the owner's notes are converted into first and second mortgages which mean more discounting, commissions and difficulties, in which the contractor often shares unduly.

The Holyoke Way

The Holyoke plan is far simpler, more business-like and is said to be just as profitable to the bank in the long run. The only one who suffers is the Shylock mortgage broker.

The Holyoke plan requires a combination of savings bank and national or state bank business. The National Bank of Holyoke has a savings department, but in small towns where the national or state bank may have no savings department the same result could be accomplished by cooperation of two banks.

Here is the plan in a nutshell: The bank will make a construction loan to any approved building contractor if his client and his family have had $1000 or more on deposit in the savings department for the previous six months. The lot on which it is intended to build must be not less in size than 50x120 ft. or 60x100 ft., so as to give plenty of room for a garden. The house and land must not cost over $5000 with all necessary modern improvements. For a two-family house the deposit must be approximately $2000 and the total cost of building and land must not exceed $8000.

The money on deposit must be used to purchase the lot and go as far as possible toward construction. The location is subject to approval by the bank; and the house must be where it can be provided with sewer and water connections. All applicants must be American citizens.

For financing these building operations the National Bank uses $500,000 of its deposits. After the houses are completed the savings bank makes the owner a savings bank loan on a first mortgage security of 50 per cent of the actual construction cost and the lot cost. The difference between the amount represented by the first mortgage and the whole cost is made up by the cash capital of the owner and a sum advanced by the national bank to the contractor at 6 per cent interest, the same to be repaid to the bank in weekly or monthly installments by the owner. In other words, the bank acts as fiscal agent for both the contractor and the owner until this second mortgage is taken care of.

On the basis of a single house at $5000, the process is as follows. The home owner has $1000 of his own money that he will pay to the contractor to start the house. This insures his good intentions to go through with the deal. The bank will advance the remaining $4000 to the contractor as a construction loan to complete the house. When the house is finished a savings bank loan of $2500 will be negotiated. In addition there will be the original investment of $1000 by the owner, making a total of $3500. Then the Holyoke National will have an interest, always through the contractor, of $1500 in the property to be paid off in weekly or monthly payments by the owner.

There are no overhead charges, no costs, no fees, no strings at all to the proposition. There are no commissions for brokers and what is more important, there will be no mulcting of owner or contractor through the rather sharp but legitimate process of forcing excessive discounts on second mortgages.

There are no "jokers" in the offer; that building material prices must be such, or that wages must be this or that or nothing. It is for the owner himself to determine whether or not present comfort is worth more or less than anticipated drops in costs of construction—after all the only sane basis to proceed on.

The progressive banker who adopts this plan is creating business both for himself, his customers and the community. Except for the money paid for building materials to outside producers, it is obvious that the bank may so manipulate this business that it retains practically all the rest. Such a progressive banker would naturally get the deposits of the contractor and the building material dealers as well as the savings deposits of all the thrifty ones. All the money except that part paid to outside producers of building material would be spent over again in the locality, and thus eventually would find its way back to the bank.

The banker has then devised a way to keep money flowing in channels of legitimate trade, and it is on the flow of money that a bank harvests its profits.

Basis of Strike Settlements in Pittsburgh

SEVERAL OF THE BUILDING TRADES unions of Pittsburgh, Pa., have signed new agreements with the employers, after strikes which have lasted since April and May. The new agreements all embody eight cardinal principles as follows:

There shall be no restriction as to the amount of work a man shall perform during his working day.

There shall be no restriction of the use of any machinery or tools.

There shall be no restriction of the use of any raw or manufactured material except prison-made.

No person shall have the right to interfere with workmen during working hours.

The use of apprentices shall be encouraged.

The foreman shall be selected by and be the agent of the employer.

All workmen are at liberty to work for whomsoever they see fit.

All employers are at liberty to employ and discharge whomsoever they see fit.

All these agreements provide for time and one-half time for overtime on week days and double time for Saturday afternoon, Sunday and holidays, namely: Decoration Day, July Fourth, Thanksgiving, Christmas and Labor Day.

All jurisdictional disputes to be in accordance with the decisions of the National Board of Jurisdictional Awards.

In accordance with a recommendation made by the General Strike Committee, the agreements have all been made to expire on February 28, 1923.

Quantity Survey for Small Dutch Colonial House

SUPPLEMENTING the data and working drawings of the small Dutch Colonial house shown on page 16 of the October issue of NATIONAL BUILDER, the following information is supplied by Architect J. W. Northrup, Jr.:

The scale of wages at the time of construction was:

Bricklayers	$11.00 per day
Carpenters	8.50 per day
Painters	8.00 per day
Sheet Metal Workers	9.00 per day
Electricians	9.00 per day
Plumbers	10.00 per day
Cement Workers	11.00 per day
Common Labor	.40 per hr.

Quantity Survey

6 9"x18" C. L. ventilator grilles.
Excavation for footings, piers., etc.—22 cu. yds.
Concrete for foundation—18 cu. yds.
Forms for foundation—584 sq. ft.
Common brick for chimney and rough fireplace—4 M.
Earth fill for front porch, steps and sun porch—6 cu. yds.
4½" concrete slabs for front porch, steps and sun porch—17 sq. yds.
Tile floor for front entry, steps and sun porch—180 sq. ft.
Concrete threshold at side door—3½ lin. ft.
9x13 flue lining—23 lin. ft.
9x9 flue lining—12 lin. ft.
Thimble pieces included in above—1.
Mantel bar—1.
Fire brick for lining under fire and hearth—100.
Tile facing for mantel—6 sq. ft.
Face brick—8½ M.
Red rosin paper for floors—12 squares.
Waterproof building paper—14 squares.
Angle irons: 2 9' long; 5 3' ft. long; 3"x4"x⅜".

Lumber

1	6x8	24 Heart
1	4x6	18 Heart
6	4x6	16 Heart
1	4x6	14 Heart
65	2x10	16' No. 2
300	2x4	20' No. 2
408	2x4	18' No. 2
50	2x4	12' No. 2
25	2x6	24' No. 1
40	2x6	16' No. 2

1x10 No. 3 shiplath—9500 ft.
1x3 B & B pine flooring—950 ft.
5/16x2 sap edge oak—750 ft.
550 lin. ft. round edge base.
550 lin. ft. base shoe.
13 M 5 to 2 clear red cedar shingles.
1x4 No. 2 S2S—900 ft.
1x10 B & B—300 ft.
1x4—B & B—clg.—350 ft.
350 lin. ft. 4½" crown mold.
350 lin. ft. 3" crown mold.
600 lin. ft. B & B S4S y.p.—1x6.
350 lin. ft. 1x8—B & B S4S—y.p.
300 lin. ft. 1x12—B & B S4S—y.p.
90 lin. ft. 1¼x12 B & B—S4S—y.p.
50 lin. ft. 1¼x6 B&B—S4S—y.p.
50 lin. ft. ½x12 B&B—S4S—y.p.
6—1x10—clear cypress—S4S—12'.
4—1x10—16'—clear cypress—S4S.
7—window frames—10x12—12-lt., 1⅜" check rail.
1—jib sash frame—34x29 O.S.M.
2—window frames—10x12—12-lt., 1⅜" check rail.
1—twin frame 12x14—12-lt., 1⅜" check rail.
4—single frames 12x14—12-lt., 1⅜" check rail.
1—jib sash frame 34x29 O.S.M.
2—jib sash frame 40x41 O.S.M.
1—jib sash frame 28x41 O.S.M.
1—twin jib frame 40x33 O.S.M.
1—single jib frame 40x33 O.S.M.
5—windows 12x14—12-lt.
9—windows 10x12—12-lt.
2—jibs 34x29—6-lt.
2—jibs 40x33—6-lt.
2—jibs 40x41—6-lt.
1—jib 28x41—4-lt.
18½ sets weights and cords.
5—outside door frames—2'8"x6'8"
5—inside door frames—2'8"x6'8".
3—inside door frames—2'6"x6'8".
1—inside door frame—5'4"x6'8".
1—transom—2'8"x6'8"—14".
4—French doors 2'8"x6'8"x1⅜"—15-lt.; 3 wide.
1—plain astragal tongue.
6—doors 2'8"x6'8"x1⅜"; 1-panel fir.
3—doors 2'6"x6'8"x1⅜"; 1-panel fir.
1—door 2'8"x6'8"x1⅜"; 3-cross panel—1-lt. D.S.G.
1—transom 2'8"x14"—1-lt.
1—gable louvre 15"x30" (circle top).
2—gable louvres 21"x21" (quarter circle).
1—pr. French doors 5'0"x6'8".
1—med. cab.
Full length 16-mesh Pearl screens; 1", mortised for all outside openings.

Garage Lumber Not Included.

Mill Work

Hood over front door—1 unit.
Columns—2.
Pilasters—2.
Panel over door—1 unit.
Trim with round edge (cabinet heads)—416 lin ft.
Mullion casings—9 ft.
Window stools and aprons—175 lin. ft.
Cabinet heads—175 lin. ft.
Stop beads—110 lin. ft.
Head stops—60 lin. ft.
Plinth blocks—62.
Mantel in living room—1 unit.
Mantle in living room—1 unit.
Shelves in kitchen closet—2 units.
Shelves in linen closet, doors—4 units.
Seat in bedroom—1 unit.
Shelf and rod in 2 bedroom closets—2 units.
Glazed doors, shelves and cupboards in china cab—1 unit.
Picture moulding—276 lin. ft.
Built-in settles in breakfast alcove—2 units.
Table in alcove—1 unit.

Stairs and Steps to Kitchen

Oak treads about 3'8" long, moulded ends—3.
Pine treads about 3'8" long, closed ends—14.
Nosings for landing and top steps—2.
Risers 3'8" long—18.
Turned newel—1.
Stair rail and easement—1.

Attic Stairs

Treads—14.
Risers—15.

Canvas and Paper

Ceilings—150 sq. yds.
Walls—250 sq. yds.
Lincrusta 4'8" high in bath and kitchen.

Insert Sub-Bids for Other Trades

Hardware.
Setting hardware.
Painting.
Papering.
Plumbing.
Electric work.
Electric fixtures, include 6 electric radiators.
Sheet metal work.

Building Material Prices

Memoranda Submitted to the President's Conference on Unemployment by R. C. Marshall, Jr., General Manager Associated General Contractors of America.

GOVERNMENT index building material prices reached a level of 341 in 1920, while construction labor advanced to the index of approximately 230. Comprehensive figures are not available, but both of these are believed now to be in the neighborhood of 160, though union labor is higher. It should be remembered, however, in considering these index numbers, that prices were steadily increasing before the war at the rate of two and one-half per cent a year and would probably have landed without the war at what is now 120. The present level is therefore some 40 points above what we would choose to designate a normal. The index of finished construction as indicated by industrial buildings stood between 160 and 170 in July, and is now between 150 and 160. The index curve has stopped its descent and immediate deflation is apparently at an end.

It should be noted that wages have kept in step with the per capita increase of money in the United States. Whether this relation must necessarily continue is a mooted question, but as the present per capita wealth is some 60 per cent above that of 1914, it appears that a wage level of 160 as predicted over a year ago by at least one economist, is at a stabilizing point. In any event upon this index principally depends any great reduction of cost. Any saving that might be made by lower labor and materials cost will undoubtedly be insignificant compared with the expense of any system of charity or doles that might be necessitated by further postponement of work.

If construction is delayed until producers in the basic industries are driven out, recurrence of the situation of 1920 may be expected. The supply of material will be so low that prices may move rapidly upward when revival does take place. We shall doubtless be forced to look outside the field of actual labor and materials cost to find a means of bringing about the immediate reduction which will influence the demand for construction in the present emergency.

Biennial Census of Manufacturers

THE general schedule for the census of manufacturers of the United States for the year 1921 has practically been completed. The new United States census laws require that a census be taken every two years of the products of manufacturing industries in the United States. Heretofore this information was collected every five years, once with every complete ten-year census, and once in between.

The two-year census will make available to industry a great deal of useful information which has heretofore ben lacking. As eat present formulated, the plans for this census call for the compilation of information showing the number of persons engaged in all manufacturing employment. This would be shown for each month separately of the calendar year, thus giving a record of seasonal employment which should be available.

The census wil lalso show the total amount of wages paid and salaries paid, the number fo days the factories were in operation during the calendar year, and the number of hours normally worked by wage earners per shift, and per week. The actual quantity produced of the principle products of manufacturing industries will be shown together with the total value of all products and the cost of all materials used in the manufacture of those products. It is possible that the Census Bureau will secure not only the actual quantity of various products produced, but the normal production of the same products for the mills and factories operated throughout the year on their customary or normal basis.

This information when compiled will show the relation between the actual quantity produced, and the quantity that would have been produced had the factories been operating on full time. This will be the first time that figures have been compiled by the United States Government showing with reasonable accuracy the extent to which the producing capacity of various industries is actually used year by year. There have been various estimates, for instance, of the excess producing capacity of the lumber industry beyond the actual market requirements for lumber. The Bureau of the Census now proposes to secure the most accurate available information showing unused producing capacity of the various industries.

Use of Copper in New York Office Building

THE 22-STORY STOCK EXCHANGE BUILDING, now being erected at the corner of Wall and Broad Streets, will solve the "housing problem" for scores of brokerage firms. Immediately adjoining the Stock Exchange itself, this building is —with the offices of J. P. Morgan & Co., the Sub-Treasury and the 32-story Bankers Trust Company building—located at the very heart of the world's leading financial center. The building will be ready for occupancy by September 1, 1922.

The specifications provide generally for copper weighing 18 ounces to the square foot. Sheets are to be fastened with copper clips, and all nails and rivets are to be of copper.

The hanging gutters are of 20-ounce crimped copper. Soft copper boxes of the same weight metal are to be provided for the leader outlets and for the gutters.

Twenty-ounce copper leaders are to be held in position by means of copper straps secured to the stone work, and to be kept rigid by means of bronze anchors.

Leaders and leaders boxes are to be provided with globe-shaped wire baskets of one-eighth inch copper wire.

Copper flashings are to be set for all intersections of roof surfaces with skylight curbs and parapet walls.

Parapet walls adjacent to the walls of adjoining buildings are to have additional flashing of 18-inch strips of copper.

The sloping portions of the main roof and the roofs of fresh air intakes will be constructed of reinforced cinder concrete between steel framing, furred on the outside with wood battens, over which the copper ribs are to be formed. The roof will then be covered with 18-ounce copper. The joints are to be made on top of the battens and fastened to them by means of copper clips secured with copper nails.

Ventilators are to be constructed of 18-ounce copper and provided with one-half inch mesh copper screens set in brass frames.

Screens of heavy one-eighth crimped copper wire, woven with one-inch mesh, are to be set over the skylight over the machinery room and over the skylights in the main roof, the screens to be framed with one-inch brass channels.

Repairing a Broken Concrete Wall

ONE of our Canadian subscribers, W. B., of Gaspe, Que., asks for some pointers on repairing a broken concrete wall. He writes as follows: "I have charge of a job repairing a concrete foundation under a brick veneer building, which has cracked owing to settling. Parts of the foundation has to be taken out and a new foundation put in where it is broken. What I want to know is this: Would the old concrete, if broken up, be as good as stone to use in the new concrete for filling?—it is seven years old. And would the new work stick to the old where I shall have to join it, without using dowels? The old work had very little reinforcing in it, but was a fairly good mix of sand and gravel." The expert advise of the Portland Cement Association was sought on the points in question, and their answer was in part as follows: "In view of the fact that the concrete is of a good quality, it may be broken up and used as coarse aggregate in the new work, but new sand should be added to the mixture in the usual proportions. That is, the finer material in the broken concrete should be added to the mixture in the usual proportions. That is, the finer material in the broken concrete should be screened out. We would not recommend the using of such material in reinforced concrete construction, but it is permissible in ordinary masonry work of this sort. We understand the wall as originally built contained some reinforcements. This reinforcement should be allowed to project into the new concrete, thus helping to form a bond between the old and new work. Additional bond in the form of dowels will probably not be necessary, but it would be advisable to roughen the old surface and to cut small ledges into the vertical faces of the old work, thereby keying the new concrete to a certain extent. If the only purpose in making these repairs is that of stoppnig leakage, it may not be necessary to remove any part of the wall. This should be taken care of by applying a membrane waterproofing to the outside of the foundation wall, digging a trench around the building wide enough to permit a thorough cleaning of the wall before the waterproofing is applied. On pages 4 and 5 of our "Recommended Practice for Building Watertight Basements with Concrete," you will find complete information on the application of such a membrane."

Announcements and Publications

Geo. Issenhuth, Architect, Huron, S. D., announces his removal from 215½ to 222½ Dakota Avenue and larger office suites. Samples of material and catalogs are requested. Mr. Issenhuth also wishes to form a partnership with a high grade, experienced, professional worker.

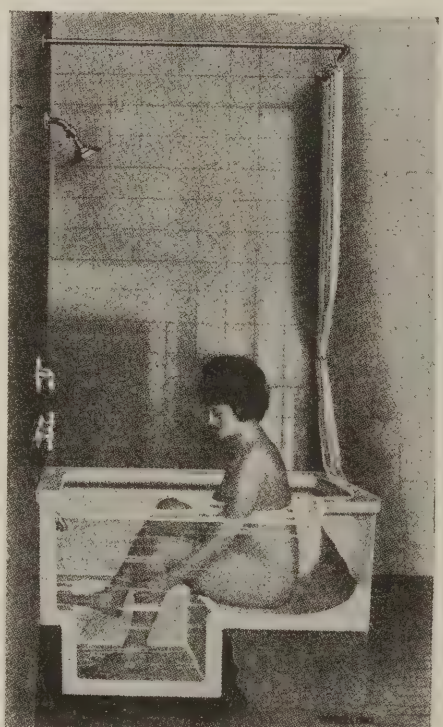
Service Bureau American Wood Preservers' Association announces its establishment with headquarters at 1146 Otis Building, 10 South La Salle Street, Chicago, Ill., with P. R. Hicks as secretary-manager. The aim of the service bureau is to be of direct service to all users of wood: lumbermen, engineers, contractors, architects, farmers, the wood preservation industry, and everyone interested in the conservation of our forest resources.

"Elementary Concrete Construction," Leon H. Baxter, supervisor of manual training, St. Johnsburg, Vt.; 101 pp.; 6x9; illustrated. Index. The Bruce Publishing Company, 129 Michigan Street, Milwaukee, Wisconsin. To quote the words of the author, "this book is to all intents and purposes a condensed textbook on those things which are necessary to follow, in order to make constructive work in concrete a success. The excessive cost of lumber, together with its scarcity, has brought home very convincingly the necessity of finding some material which should be as good or better, as a substitute. Concrete fulfills all the requirements of such a material. He who uses this medium builds for permanence and the many uses to which it may be put make it the ideal construction material." The first thirty pages are given over to a discussion of the origin of cement, and the fundamentals, very clearly and briefly stated, of concrete construction in general. The rest of the book is made up of problems in construction in graded order of difficulty. For example—horse block, flower boxes, concrete fence posts, lawn pedestals, concrete troughs, steps and porch construction, concrete walks, curb and gutter, feeding floor for hogs and cattle, manure pit, duck pond, hot bed, simple foundations, single concrete garage, details of wall and window construction, wall reinforcing, corner reinforcing. In the cases of each problem clear and comprehensive directions are given, supplemented with detail drawings and in many cases photographs. While the problems were designed for and executed by school boys from ten to fourteen years old, the book should prove exceedingly suggestive and helpful toward making possible the construction of useful items in concrete for farm and home without the need of expert service. The jobber in a small way would find it of interest.

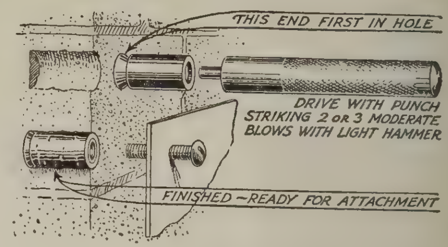
"Keith Plan Book of Two-Family Houses and Flats" is a 7½x10-inch booklet containing exterior photographs and sketch-plans for twenty different designs of duplex and two-family dwellings. The Keith plan-books for bungalows, two-story houses, and garages, are well known, and this companion book dealing exclusively with double houses will be welcomed by the many subscribers who have inquired for just such a collection. Published by the Keith Corporation, 200-1 Abbay Building, Minneapolis, Minn.; 35 cents a copy.

Kolesch & Co., 138 Fulton Street, New York, architects, engineers, and draftsmen's apparatus and supplies, submit a new catalog and net price list as of July 1, subject to change without notice.

A Combination Bath, Seat Bath, Foot Bath, Shower and Child's Bath, manufactured by the Wheeling Sanitary Manufacturing Co., Wheeling, W. Va., as the illustration herewith reproduced from the company's catalog shows, presents features that will commend it to the attention of builders and architects planning compact and efficient house conveniences. The dimensions of the bath are: Length outside, 44 inches; width outside, 30 inches; depth inside at seat, 15 inches; depth inside at outlet, 24 inches; foot bath, 18 by 16 and 9 deep.



Expansive Screw Anchors of a Most Practical Type are shown in an illustrated descriptive circular issued by the Ackerman-Johnson Co., manufacturers, 625 West Jackson Boulevard, Chicago, Ill. The anchor



Expansive Screw Anchor

is made up of two members, one of which is a threaded copper cone and the other a lead jacket. When a hole of an inch or less is made in the ordinary brick or concrete wall, the anchor is slipped in place and with a special punch as shown in the illustration, which engages only the rim of the lead jacket, a few blows drives the jacket upon the cone shaped threaded member, and swells the anchor to completely fill the hole, and the threaded member is ready to receive the screw of the fixture. It will be noted, of course, that every traction on the screw thereafter tends to pull the wedge member forward and thus tighten the anchor still further. The space required to make the anchor effective is unusually shallow about one inch or less. Where hollow tile or similar walls do not afford a backing for the anchor, an ingenius tool is used by which the threaded cone-shaped member is held in place by a screw on the end of the tool and a sleeve-piece in turn presses the lead jacket over the cone and completes the screw anchor without a jolt or jar. The screw anchors are made in various sizes for light and heavy work.

The Austin Machinery Corporation announces that the Canadian Austin Machinery, Ltd., of Woodstock, Ont., incorporated under the laws of Canada, will henceforth act as sole manufacturers and distributors in Canada of the complete Austin line of earth-moving and concrete-mixing equipment.

Rock Island No Streak Wall Registers is the title of a handsomely printed and elaborately illustrated catalog of the hot-air wall registers manufactured by the Rock Island Register Co., Rock Island, Ill. By the patented method employed these registers prevent walls from being streaked and saving decorating expense.

"Trade Expansion News" is the title of the house organ issued by the Star Expansion Bolt Co., 147-149 Cedar Street, New York, N. Y., and issued regularly to the company's customers. It is brightly written and filled with the latest data regarding the "Sebco Products" controlled by the concern.

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NATIONAL BUILDER

Volume 64 — Chicago, December, 1921 — Number 12

The Situation

THE most interesting phase of the present situation is the extraordinarly large volume of building work under way. Instead of falling off, as is usual for this time of year, the volume of building in October not only broke recent records for that month but is the highest for any month this year. Reports from all sections of the country show large housing projects actually started, or to be started before real winter sets in. These reports also show that the local newspapers have been a tremendous influence in driving home the impression that material prices are not due for any appreciable change for a long time to come; certainly radical reductions are not to be expected.

Stiffening Prices

Relatively, based on 1913 conditions, steel is the cheapest building commodity today. Lumber is next, cement next, and brick the highest. Yet one can not jump to the conclusion that cement and brick are too high and must come down. In the manufacture of both these materials the cost of coal is a very large item, and the cost of coal is very high and likely to remain high. Again, as regards cement, the present demand and consumption is nearly 25 per cent greater than the production. Shipments of portland cement in October were 12,114,000 bbls., while the production was only 10,506,000 bbls. The stocks of cement on hand at the mills have been steadily reduced from 12,600,000 bbls. in April to 5,348,000 bbls. on November 1. This is less than a half month's supply at the current rate of consumption.

Cement

Production of cement necessarily is retarded during the winter months owing to the difficulties of winter quarry operation and seasonal shutdowns for repairs and renewals. On the other hand there is every evidence that building construction will go forward this winter in greater volume than ever before. The law of supply and demand is probably going to prevent any further reductions in the price of cement and like materials.

Steel

In the case of steel, unemployment has been at a maximum and production at a minimum for several months. Radical reductions were therefore absolutely necessary to start business, and because of their immense war profits the steel companies had large surpluses to fall back on. This condition is not true for any of the other building material industries except lumber, and the constantly decreasing supply of lumber and the inaccessibility of new sources of supply will tend to prevent any further reductions here. In fact, there is some reason to believe both the prices of steel and of lumber will increase toward spring.

Prices and Wages Local Issues

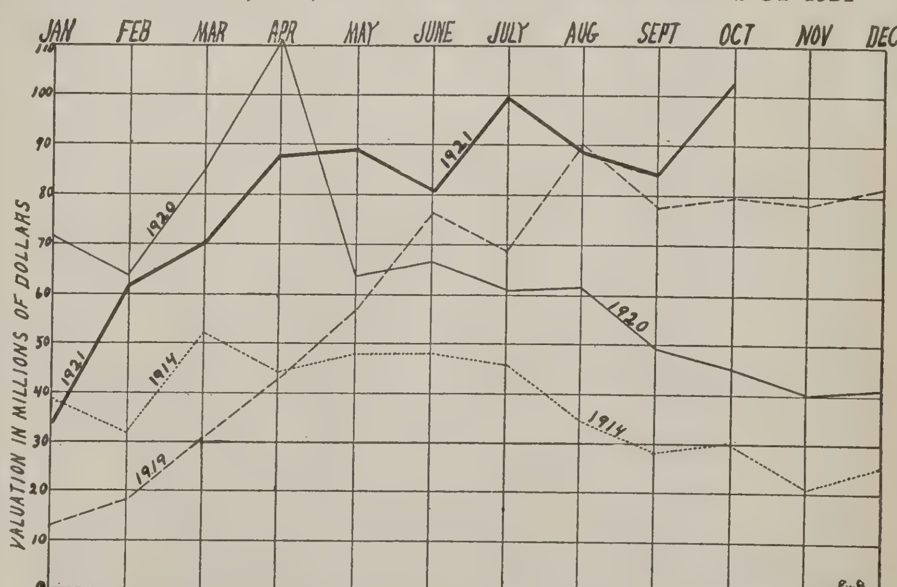
Prices and wages are being more and more looked upon as local issues. For example, there is more difference between the present price of brick in Buffalo and in Spokane than there is between the average present price and the average pre-war price. Like comparisons could be made with every commodity. The conclusion of course is that average prices and prices indices are only of very general value. Each community must determine for itself whether prices asked by local producers and dealers are fair and reasonable. If they are still unreasonably high, the only really successful way to bring them down—as demonstrated in a great many cases—is local publicity and the weight of public sentiment.

The Public Takes a Hand

The same applies to wage reductions. The famous Landis award in Chicago has been ignored by contractors and labor unions alike. The result is that the public itself has organized to bring about action. A committee of prominent and public-spirited citizens has been formed, representing every industry in the city, that has laid down the following rules of policy:

1. Those employers who continue their operations under the terms and conditions of the Landis award will be encouraged and, when necessary, protected in their operations.

VALUATION OF PERMITS BY MONTH IN FOURTEEN CITIES DURING 1914, 1919, 1920 AND FIRST TEN MONTHS OF 1921



The fourteen cities are Baltimore, Boston, Chicago, Cleveland, Detroit, Kansas City, Los Angeles, Minneapolis, New Orleans, New York (five boros), Philadelphia, Pittsburgh, San Francisco and Seattle. The total valuation of permits in these cities gives a representative picture of activity in the United States. Valuation of total permits issued in these cities by months during 1921 is as follows: January, $34,000,000; February, $62,000,000; March, $70,000,000; April, $87,000,000; May, $88,000,000; June, $81,000,000; July, $99,000,000; August, $88,000,000; September, $84,000,000; October, $103,900,000. The low month for the past three years was January, 1919, $13,000,000. The peak month was April, 1920, $113,000,000.

(Courtesy of the *American Contractor*)

2. Those unions which accept the terms and conditions of the Landis award, both in spirit and in fact, will be supported.

3. The sale and use of material going into building operations shall be free from arbitrary restrictions.

4. Contractors who refuse to operate under the Landis award deserve neither the encouragement nor the support of the public.

5. In those trades where the unions do not accept the terms and conditions of the Landis award work shall continue by workmen who are willing to work regardless of their union affiliations. These men will be protected and these trades will be permanently established on the basis of the open shop.

Now comes a test of strength to see whether any group or combination of groups in the building trades is bigger and stronger than the public.

The Pittsburgh Labor Fight

In Pittsburgh, where there has been a very bitter labor controversy, union men and non-union men continue to work side by side, although several of the trades are still theoretically on strike. The brick layers are still holding out for $1.30 per hour, although the contractors have increased their offer from $1.12½ to $1.20. Non-union plumbers are being sought in other cities.

Skilled Wage Worker No Better Off Than in 1913

With the tremendous volume of building work in prospect for 1922, and the experience in Chicago, Pittsburgh and other big cities, it does not look as though wages were likely to be cut to any extent for a long time. Tested by the cost-of-living index the average wage in the building trades is still no gain over 1913 conditions—the skilled wage earner is no better off. Here again variations in local rates are far in excess of general averages, now and pre-war; and the remedy is the same as for the prices of building materials.

Common Labor Relatively Higher Than Skilled Labor

The only one to profit permanently by the war wage increases, apparently, is the laborer. His wages, in most parts of the country, are still higher relatively than any other class of wage earner. With limited immigration and a revival of business generally, this wage is hardly likely to decrease. Only in the South, or some parts of it, with Negro labor at 15 cents per hour, is labor cheap.

Reduction in Building Costs to Arrive Slowly

It seems quite generally accepted, now, that any further decrease in the cost of construction, speaking in a general way, must come as a slow evolution, just as followed the Civil War and other abnormal periods of history. This does not mean that local prices and wages should not be looked into and their fairness determined by the local builders and the public. Only in this way can building, here, there and everywhere be revived.

"Open Price" Associations Legal

Since November 1 the United States Government has lost a very important suit against the American Linseed Co. for alleged violation of the Sherman anti-trust law, or for alleged price fixing and market manipulation. The effect of this decision is to legalize "open-price" associations of building material producers. Nearly every group of producers, and dealers, too, are in one or another of these associations, and exchange contract prices, price quotations, production statistics, etc. The court held that these things were not in themselves illegal, and actually commended them as stabilizing influences on business.

Approved by Secretary of Commerce Hoover

This view is also held by Secretary of Commerce Hoover, and many other broadgage business men. Unquestionably it means that prices of materials generally will never again be subject to the violent fluctuations of the past. The power of these organizations will undoubtedly be directed to maintaining a fairly constant level of price, rising and falling only gradually to meet economic conditions.

Competing Materials Equalize Prices

Such prices can never go out of bounds for any length of time because in the broad sense, they are all competing materials. For example, there is an enormous volume of railway construction work in prospect. For many railway structures there is not much choice between steel and reinforced concrete. If steel is too high, concrete will be selected. If cement is too high, steel will be used. The same applies to all building and to all materials. If gypsum plasters are relatively high, the builder may use lime or magnesite; if lime is too high he may use gypsum, etc. If the builders will organize, as they have in many communities already, they can more than play their end of the game.

Producers Working Toward "One-Price to All"

The now almost universal practice of building material producers to sell exclusively through dealers—largely because of the pressure of dealer organizations—is not, as sometimes, believed an unalloyed evil. If it is lived up to in the case of big buyers like the railways, the small buyer—the building contractor—is actually benefited, because hitherto the big buyer has bought at a low price, sometimes less than the cost of manufacture, and the small buyer naturally paid the difference. There is an increasing tendency on the part of building material producers to make one price to every buyer, big and little, and it is a tendency that should be cultivated.

Bricklaying May Be Successfully Done in Winter

By Geo. W. Repp

With Protection of Workmen and Proper Precautions There is No Reason Why Construction Work on Brick Buildings Should Cease in Freezing Weather

THE PROBLEMS attending bricklaying during the winter may be divided into two classes: first, those that have to do with the comfort of the workmen and, secondly, those that affect construction work itself.

The first group is the most important, as it is a well-known fact that a comfortable workman is more efficient than one who is not. If protected from the wind and cold, the men will work on much colder days, and the increased number of brick they will lay will more than compensate for the cost of their protection.

It is quite general among architects to specify that no brick shall be laid when the temperature is below 20 deg. Fahrenheit, or 12 deg. below freezing point, although brick can successfully be laid at lower temperatures if proper precautions are taken. Large building operations are rarely stopped when the temperature is between 20 deg. and freezing, and the methods employed on large work may be easily adapted to smaller jobs. Freezing weather, therefore, should not stop brick construction of any kind if the suggestions set down in this article are observed.

Wind Shelters

In the construction of foundation walls the men work from the inside of the excavation and are not affected by the wind. If it is too cold, a few salamanders in the cellar will make things comfortable. As the wall rises above grade, when the wind strikes them, they may be protected from the wind by an easily constructed shelter consisting of a tarpaulin over a framework of 2x4 in. scantlings erected a few feet behind them. Here also will be useful not only salamanders to warm the space between wall and shelter for the men, but to help along the drying and setting of the mortar. If a vessel of water is attached to the side of the salamanders where it will be hot, it will be found a great help in keeping the trowels warm and clean so that the mortar may be handled more easily.

When the first floor is in place the same tarpaulin shelter can then be moved to the floor of the house along the leeward wall and placed behind the workmen. A completed wall on one side of the building, provided the openings are closed up, will naturally make a fine shelter for the men at work on the other walls.

The use of a tarpaulin shelter is principally for protection from the wind, the worst element with which the men have to contend. On calm days it need not be used. As soon as any floor is in place, the openings of the story below may be temporarily closed and salamanders placed inside to dry out that portion.

Protection of Materials

This much for the protection of the men. As to materials, when the temperature falls below 32 deg., or there is a possibility of it doing so during the night, all materials, including water, should be heated thoroughly before being placed in the wall. If this is done, the mortar will take its initial set before it freezes and no damage result. If the mortar freezes before setting takes place, it loses its strength and results in a weakened wall. Sometimes the mortar freezes just on the surface of the joints, as rapidly as it is placed, so that the joints cannot be struck or otherwise finished. This does not hurt the strength of the wall in any way, and if the mortar thaws out within 24 hours, the joints may then be struck or repointed. It is the freezing of the wall throughout that must be guarded against and this is accomplished by the heating of the materials.

The face bricks should be dry in very cold weather and heated if possible by a salamander or two at the pile, and when carried to the scaffold piled around salamanders to keep them warm for the bricklayers. Common bricks may be heated by a wood fire built over or around the brick pile. Sand may be heated by piling it over a corrugated sheet metal culvert or steel pipe about 20 in. in diameter and about 10 ft. long, in the ends of which a wood fire is built. This simple and easy method will melt all frozen lumps in the material. On large work, where steam is available, a steam main with several branches open at the ends may be used under the sand in place of the wood and fire and the culvert.

Where city water pressure is available, the water may be heated in a coil attached to the main and large enough to have a fire built in the center, a very simple and efficient method which any plumber can easily install. Place a sheet-iron guard around the coil to conserve the heat. This equipment proves very satisfactory, as it warms the water as fast as it is drawn off through the hose. The entire installation may be found on the market at a comparatively small cost. Without such an arrangement the water may be heated in an ordinary iron kettle over a wood fire. Water should never be heated to the boiling point, as too high a temperature will injure the setting properties of the mortar. A temperature of about 165 deg. or the same as generally required for household uses is best.

Cement-lime mortar is the best for winter work. Lump lime is better because warmer than hydrated lime, but it must be thoroughly slaked and allowed to cool off before using. Never use hot lime freshly and incompletely slaked for the sake of its warmth, as it will continue to slake and disturb the mortar after it has commenced to set, and will decrease or ruin its strength.

Salt is sometimes used, in mixing mortar, to lower the freezing point, but its use should be dicouraged. It causes efflouresence on the face of the wall when the work dries out and it keeps the mortar damp for a longer period than it would be without it.

For salamanders the best fuel is coke. Wood makes too intense and irregular heat, besides giving off more or less smoke. Coal gives off a gas that is not pleasant, but coke is recommended as the cleanest fire, requires little care, and is almost negligible in cost.

Care of Walls in Freezing Weather

Regarding the care and construction of walls in freezing weather, it may be said: The footings should never be laid on frozen ground, so that if necessary, the ground should be thawed out by wood fires before placing the footing. It should then be protected from any frost which might work under it, by a banking of fresh manure which should be maintained until the building is closed in. As it is always desirable to backfill the foundation walls as soon as possible, this may be done after the wall has been waterproofed, provided the filling is loose and will pack well. If, however, it is frozen into lumps, it is best to leave the filling until later.

Walls laid in freezing weather should not be carried too high in one day. It is better to work around the entire building, a few feet in height at a time, rather than work on one side and carry the wall six or more feet high. Walls erected by the latter method have been known to get out of plumb from the effect of a freezing temperature on one side and the warmth of the sun on the other.

It is important to keep the wall backed up as rapidly as the face brick are laid. If not, the face brick, as in summer work, would be exposed on both sides with the possibility of the mortar freezing before being backed up. The backing when laid would then confine the frost to the middle of the wall. Brick veneer work should not be laid up in very cold weather. In fact, it is not necessary, as it can be placed in the spring without affecting the interior completion of the building.

The walls and scaffolds should be covered every night. The covering for the wall, such as tarpaulins or building paper, should be water tight to keep the top of the wall dry in case of a sudden thaw and rain, and should, of course, be such that water cannot run off onto the face of the wall. The scaffolds, if on the outside, should be protected to prevent dirty water splashing or running onto the face of the wall. After a snow storm, the snow should be cleaned away at once from all brick surface, sills, scaffolds, etc., so as to prevent water from running into the wall in case of melting.

If the above suggestions are followed, there is no reason why brickwork should not be continued through the average winter months. The extra work accomplished during the usually dull winter season is worth more to the contractor than the trouble he has taken or the additional cost of labor.

Winter Preparation for the Spring Rush

THE winter months afford concrete products manufacturers an opportunity to "stock up" with concrete building units, drain tile and other concrete products for the spring demand. Spring business usually comeh with a rush and unless manufacturers are able to fill all orders a portion of the trade is likely to go to competitors; dealers with large stocks of products can give quick delivery and naturally attract new customers. As in the case of the contractor's equipment, winter operations enable the concrete products manufacturer to lower production costs by keeping his factory and working force busy twelve months of the year. The manufacturer who increases production by spurts to meet seasonable demands must invest heavily in machinery, increasing his overhead costs proportionately, and he must also compete for labor during the busy season.

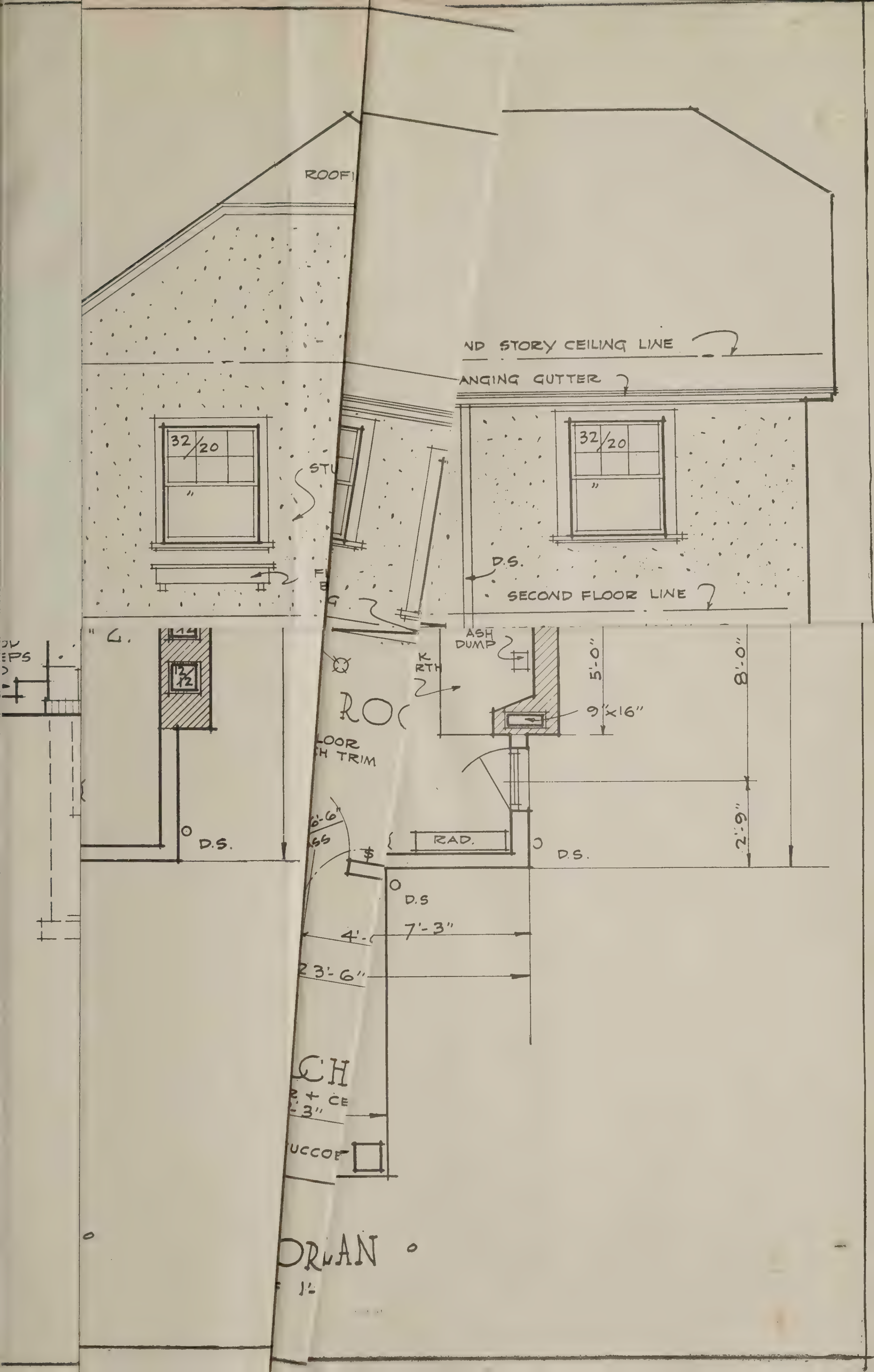
Change in Indianapolis Building Code

The city council recently passed an ordinance which made changes in the city building code, designed to remove burdensome restrictions and add to the fire-proofing of lower class buildings. It also classifies as nuisances such new buildings erected within 500 feet of dwellings. The city planning ordinance also passed, which requires the city building commissioner to refer reguests for permits for garages and filling stations to the planning commission for approval before issuing permits.

A Seven-Room Stucco House

CHAS. E. WHITE, JR., ARCHITECT

See Working Drawings in Detachable Insert, and Description on Opposite Page



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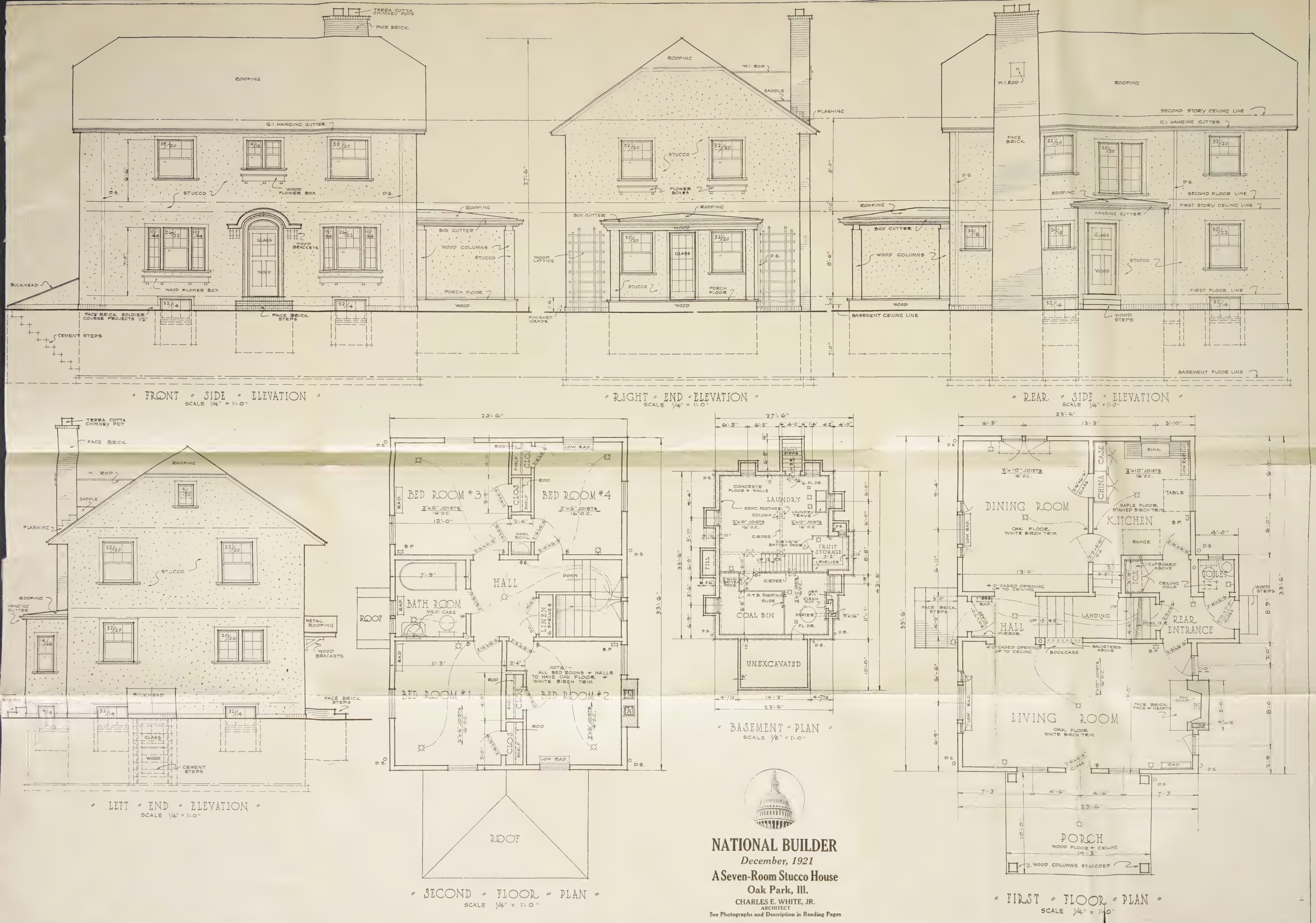


NATIONAL BUILDER

December, 1921

A Seven-Room Stucco House

Oak Park, Ill.

CHARLES E. WHITE, JR.
ARCHITECT

See Photographs and Description in Reading Pages

A Seven-Room Stucco House

Working Drawings of this House are Shown in the Detachable Insert in this Issue—Printed on Thin Paper from Which Blueprint Reproductions May be Made if Desired

If owners or clients could be brought to realize that the more or less stark, cold appearance of a new house is but a transient phase of home building, then much needless anxiety or unwarranted disapproval would be saved, thus making the builder's lot a less thankless one.

A lack of grass and foliage, coupled with a failure of imagination to supply these needed features, forms a handicap that few, if any, houses can overcome with good grace.

As evidenced by the photograph, the subject of this month's supplement, a house designed by Charles L. White, Jr., architect, of Chicago, suffers from just such a handicap. The imagination, however, is stimulated somewhat by the wood trellises and the flower boxes which give promise of future embellishment of vines and flowers.

This house also illustrates another reason why so many houses fail to satisfy first expectations. A mistaken idea of true economy, or else blindness to the value of contrast in adding to the interest of a house, has, in the present instance, led to the omission of the brick base course shown on the architect's drawings, also the brick chimney has been changed to stucco. Meddling of this sort is too often indulged in by the incompetent, resulting in a loss of character that is far out of proportion to the changes made.

Aside from the question of "looks," the omission of the brick base is in this case a structural error, in that the stucco is brought down over the foundation wall to the finished grade in an unbroken sheet, thus inviting capillary attraction to cause dampness to be drawn into the stucco for several feet above grade. It is safe to say that this surface will develop serious cracks with more or less disintegration within the first year. This will mean that stucco will be forever damned in the judgment of the owner, as well as suffering in the estimation of passers-by who chance to notice the defects. Thus a perfectly good material—when used with understanding—will be unjustly condemned, merely to satisfy an ignorant caprice.

The design of the house is almost severe in its plainness, but this will no doubt disappear when foliage is established. It seems that a better appearance would result if the porch columns were of wood instead of stucco, this being particularly true in view of the fact that the porch floor is of wood. Stucco is too closely akin to masonry to allow it to appear to be supported by wooden construction. It is instinctive in most of us to demand that the eye be satisfied with respect to structural requirements, even though we may fully understand that in modern construction the real structural features are usually hidden from view.

The iron railing adds to the privacy of the porch and has practical advantages where small children are concerned.

The wide reveal at the entrance adds immensely to the appearance of this feature, and has value in overcoming the "cardboardy" effect so often associated with stucco-on-frame construction.

The arrangement of the first floor plan is excellent. The entrance is at the side, opening into a very compact hall which contains a combination stair making it possible to reach the second story from the kitchen without passing through the front of the house. In fact, in view of the small size of the hall, the ease of circulation in this house is remarkable.

The rear entrance contains a toilet, and space for the refrigerator. It opens into the basement stair which runs under the main stair, and the entrance also leads to the kitchen at one side and the living room at the other. Note the cupboard above the refrigerator. Warm foods are cooled here before placing in the refrigerator, thus saving ice.

The living room has windows on three sides and a cased opening into the hall on the other. The main stair shows in the living room through a baluster filled opening in the wall. A bookcase is built into the wall beneath the balustrade. A fireplace at one end and a glazed door opening onto the porch complete this room.

A feature of the hall that should not be overlooked is the long mirror which forms a panel in the wall near the entrance door. Unusual conveniences such as this make an instant appeal to modern women and have particular value as the basis of selling points in houses that are built for sale.

Note the distinction given this room by using pattern sawed trim over the openings

A wide cased opening leads from the hall to the dining room, and at the opposite side of the latter are high casement windows with wall space below for a sideboard.

The kitchen is small, but has cross lighting and ventilation with apparently plenty of wall space for fittings and room to get around them. The built-in cabinet is divided into two sections, one of which opens into both the dining room and the kitchen, thus saving many steps.

The second story contains four bedrooms, all of which are small. Each bedroom, however, has cross lighting and ventilation and fairly large closets. The closets would be improved if fitted with double doors—wardrobe style—instead of single doors. The passage between bedrooms 3 and 4 is probably not worth the closet room which it displaces, even though it contains a lavatory which is no doubt found useful.

In view of the fact that there is considerable storage space in the attic, it seems that the stair should continue upward from the second floor. This could be done by changing the location of the linen closet, say placing it in the space at the end of the bath tub with a door from the hall. At somewhat more expense a built-in or recess tub could be used in such a scheme—another good selling point.

The basement is fully excavated except under the porches, and a bulkhead stair gives an outside entrance. A sheathed partition separates the boiler room and the fuel room from the remainder of the basement, and a vegetable cellar is provided at one end of the stair. The laundry contains a two-part tray and with ceiling receptacles for iron and washer. Plenty of space is left for a drying room.

The girder framing might perhaps be simplified by extending both girder systems entirely across the house, instead of stopping one of them about half way and changing its direction to run above the laundry, as at present. This would also do away with the column in the middle of the laundry—a very inconvenient location, not to speak of its possibilities as a cause of accidents.

A "Nelson" Bungalow, Indianapolis

WHILE the bungalow type house is no where near so popular in Indianapolis as the two-story colonial type, there is at least one contractor who has established a

A Nelson bungalow, Indianapolis

reputation as a bungalow builder. This is Wm. F. Nelson, one of whose houses is shown herewith.

Mr. Nelson, who has had many years' experience as a successful designer and builder of residences, considers this bungalow the last word in this type of house construction. It is brick veneer and was built by him to sell for around $16,000.

Even in this house the side-entrance, central-hall design, so very popular in this locality, was made use of. Another feature is the large amount of built-in equipment. This he has found aided greatly in selling the houses ready-made. The kitchen, particularly, has a number of attractive features including a cabinet housing the refrigerator, which makes the ice keep better, a plastered hood over the gas range—something not generally found except in hotel kitchens—a broom closet, a china closet and cupboard, and a breakfast room with table and benches.

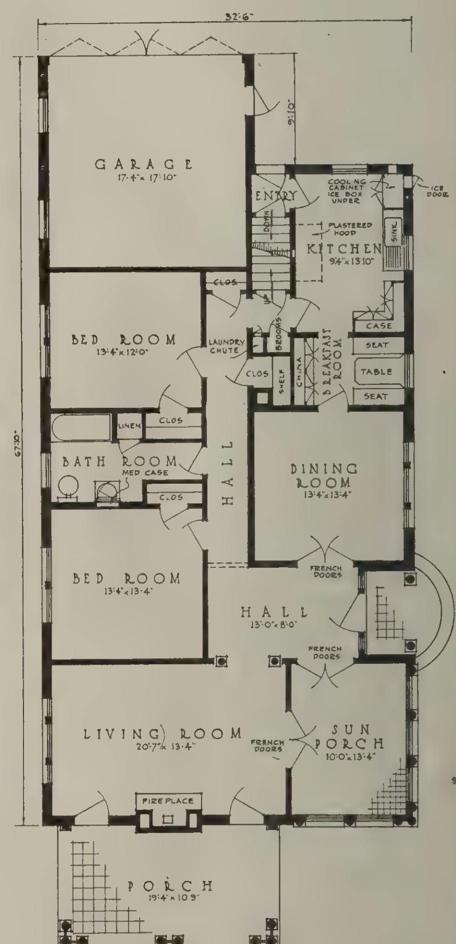
The building of the garage as part of the bungalow is rather unusual, the reason probably being to utilize a small city lot to the best advantage. It will be noticed that there is no communication between the tered from the laundry. Under the sun porch is a cinder fill, while the foundation, immediately under the entrance hall, is unexcavated.

house and the garage except through outside doors. This of course permits unbroken walls between the two structures. The garage entrance is in the rear with a driveway around the right-hand side of the gungalow.

The cellar has a very large laundry, walled off from the furnace room, into which the stairs lead. Adjoining the furnace room, in the rear right-hand corner of the building, is a large compartment or room exclusively for coal. A large storage room, separate from the rest of the cellar, is en-

There is one bedroom, an unfinished attic and a closet on the second floor. This bedroom has two dormer windows on opposite sides, at diagonal corners of the room. The third dormer lights the unfinished attic part. (There is but one dormer on the left-hand side of the house, centrally located, not shown.)

In this bungalow Mr. Nelson has tried to provide every possible convenience to



be found in the finest city apartment with the privacy of an individual home.

Repairing a Broken Concrete Wall

Referring to W. B's problem discussed on page 65 of the November, 1921, issue of NATIONAL BUILDER, a later report from him states that he was able to repair the basement along the lines suggested by the Portland Cement Association, without having to remove the concrete at all. He followed out the instructions found in "Recommended Practice for Building Water-Tight Basements with Concrete."

Don't Neglect the Extra Cost of Winter Concreting

By Harry R. Fitton

President, Builders' Construction Co., Indianapolis, Ind.

Can Be Done Satisfactorily With Proper Precautions and Equipment—But These Cost Money That Must Be Provided For in Your Estimates

THERE is always more or less hazard attached to concrete construction in winter weather; and such work should not be contracted for, or entered into, unless careful consideration is given to all unfavorable conditions that might arise.

Concreting the roof of a building in mid-winter

Our experience and observations might be of interest to new men just starting in the contracting business, or to smaller concerns who are striving to enlarge their activities.

We differ with some authorities as to the matter of lesser cost of concreting in winter weather. We have found without exception that our work, so far as the actual placing of concrete itself goes, stands us a net increase of from 5 to 10% over warm weather work. This should be obvious for various reasons. The danger of failure of the structure in freezing weather and the resultant loss of time, money and life should be uppermost in the minds of all conscientious and careful contractors, and provisions must be made to guard against that hazard. Such precautions, it goes without saying, are attended with some expense and cause delay and loss of time as well.

Let us take, for example, a concrete building four stories and basement, 100 ft. wide and 200 ft. long, with average story heights and columns set 20 ft. on centers each way. The approximate cost of the building itself, not including plumbing, heating, wiring, sprinkler system or elevators, is $130,000. Of that amount the sum of $44,000 is taken up by 2,880 cu. yds. of concrete, 80,000 sq. ft. of concrete top floor finish, 20,000 sq. ft. basement floor and 2,320 lin. ft. of concrete window sills. For winter work our estimator would add the sum equal to at least 5% to these figures—causing a penalty of $2,200 against the normal cost, which foots up to a total of $132,000. This penalty, or increase, or whatever name you care to give it, is absolutely there, and cannot be avoided. Contractors figuring work, who are in all probability liable to run into freezing weather, should not fool themselves in this regard.

The excess cost, in our opinion, is caused by the following reasons:

1. Labor is not as efficient, nor as careful and turnover is greater.
2. Artificial heating, of stone, sand and water.
3. Housing the building in canvas during construction.
4. Artificial heating of the building itself.
5. Protecting the finished work, after placing concrete.
6. The loss of time and increase in cost by not using a hoisting tower and apparatus.

The aggregates and water must be heated, and there are several methods available for this purpose. Steam coils run to the water tank from a portable boiler being the most positive and efficient means. The same boiler supplies steam to a run of coils laid under the pile of aggregates.

In order to hold the heat thus supplied, the water tank and pile should both be covered with canvas and both be in close proximity to the mixing machine. All form work must be cleaned just ahead of the barrows of concrete about to be dumped by means of a steam jet from the boiler. This removes all ice and snow, and contributes some heat to the form itself. The above precautions should place the concrete in the forms at about a temperature of 75 degrees F.—and should effect a nearly normal initial set and an early hardening of the mass.

Provision must also be made for maintaining a temperature well above the freezing point, for at least a continuous period of 48 hours, during the setting and hardening process. One scheme for this is to cover the finished work with straw and then canvas, and also apply coke salamanders adjacent to the forms. Another good method is to allow live steam to play around the form work. It is essential to remember that heat and moisture are the prime requisites to the proper hardening of concrete—heat to accelerate the setting and moisture to cause the chemical reaction when water is mixed with cement. Therefore, the water must be retained in its original form until the reaction is complete. Frozen water retards the reaction, and proper result is not obtained.

Watch for Frozen Concrete

Do not be content with the fact, that after four or five days the work *appears* to have hardened. Run a test to satisfy yourself, for this hard effect may be only FROZEN CONCRETE—the water may have resolved itself into frozen crystals—no reaction has taken place and there may be no bond between the reinforcing bars and the concrete. The proper method to determine this fact is to test each panel column or beam by the application of heat to the surface, either by an open flame or very hot water. If the concrete is frozen, the mass will become soft and disintegrate as the crystals melt. If in proper shape and not frozen, the concrete will show no effect from the heat.

Canvas must surround the entire story while the placing of the concrete is being carried on, hung well out from the building so that the outside columns and spandrels will get the benefit of the circulation of hot air, completely around them, from the coke salamanders burning in the building.

> **TEST FOR FROST**
>
> **To test concrete, if it is set or merely frozen, apply heat either by an open flame or very hot water to each column or beam. If the concrete is frozen, the mass will become soft and disintegrate as the water crystals melt. If in proper shape and not frozen, the concrete will show no effect from the heat.**

Too much caution can not be exercised in the removal of forms in cold weather to forestall a collapse. A good practice to follow after assurance is made doubly sure that there is no frozen concrete is leave the forms in place for a minimum time as follows:

Wall work—5 to 6 days.

Columns—5 to 6 days, providing girder shores are not displaced.

Slabs—14 days.

Beam and girder sides only—14 days.

Beam and girder bottoms and slabs over 10 in. deep—21 days.

Until all danger is passed, shores under girders and slabs should be replaced at frequent intervals.

Extra watchmen and workmen will be required during the night to keep the salamanders supplied, and in the early morning to start the steam supply to the water and aggregates so that the workmen arriving on the job will not be obliged to wait and lose time.

Such a method as outlined above is considered good practice and the expense, labor and thought given to such a process will reward the builder in every case, whereas a display of carelessness, negligence or ignorance makes it possible for all the above to go for naught in case of a building collapse. Such a collapse is such an inexcusable and deplorable condition that it should result in a concerted effort on the part of other builders to cause the contractor responsible to retire from the building game for the good of all concerned.

An Alternative of Concrete Construction

An alternative design is possible for a winter building operation and should prove attractive to any builder not equipped to carry on work as above outlined. This alternative is here presented for what it may be worth.

Concrete foundation—brick walls or piers on all four sides—heavy slow-burning type of roof—steel sash glazed with ⅛-in. factory ribbed glass—interior construction of cast-iron columns, supporting Bethlehem steel-girder beams—between girders tile and joint construction, covered with concrete.

When walls are up, roof on and windows glazed, it is an easy and safe matter to pour the floors in concrete. No danger of frost will arise if a few salamanders are placed throughout the closed building, one for every 300 ft. of space.

It is perfectly practical to design such a building as this with girder spans up to 30 ft. and slab spans to 20 ft. and develop any reasonable live floor load per square foot.

The work here illustrated shows a concrete roof for Fairbanks-Morse Co., of Indianapolis, being poured in mid-winter.

Roof work being open to the heavens, presents real problems, and is the hardest kind of concrete work to control in cold weather. In this particular case and time, the weather was moderating slightly, between 10 a. m. and 3:30 p. m. Advantage was taken of that time for placing the concrete. The mixture was heated, and every hour straw and canvas was applied over the finished portion of the roof, and with the aid of the heat arising from floor below, supplied by salamanders through roof ventilator openings, a flow of warm air was kept underneath the canvas. No part of the work was lost either by frost or collapse.

More About the New Solvent

G. A. G., of Pontiac, Michigan, writes us: "Could you tell me where I could get any further information in regard to the new solvent, Selenium Axychloride? The June, 1921, number of National Builder, page 35, contains a short article on above, but I am seeking further information." This inquiry was referred to Dr. Victor Lenher, Professor of Chemistry at the University of Wisconsin, who says in part: "Selenium oxy-chloride is being manufactured for the market by the firm of Baker and Adamson, Easton, Pennsylvania, from whom it can be obtained. You will find in the January number of the *Journal of the American Chemical Society* a scientific article on the properties of the substance."

Cold Weather Concreting the Key to Year 'Round Construction of All Kinds

By A. J. R. Curtis*

WHAT would you think of a railroad that stopped operating on the approach of cold weather?

What if you couldn't get a taxi on a cold night just because the operator, to serve you, would have to wear a warm coat and use alcohol in his radiator?

Either situation would ordinarily be characterized as intolerable. Yet our building operations, providing shelter, which is next in importance to our food and clothing, comes to an abrupt stop each year on the approach of cold weather—and thousands of workmen lay down their tools when the frost is on the pumpkin.

Measured by the side of the tremendous difficulties of winter railroad operation—involving enormous expense, exposure of the workers and great danger—the slight difficulties connected with winter building seem trifling indeed. And winter building is frequently a nicely paying proposition in more ways than one. A $75,000 reinforced concrete factory building in Chicago earned $3,125 in rental because of winter completion which would have been lost had completion been delayed until spring. This year, with much idle labor which is now a liability and a drain on community resources and with construction costs considerably reduced, the possible savings as a result of winter building should be greater than ever before.

*In charge of the "Concreting in Cold Weather" Service, Portland Cement Association.

Many Trades Forced Out

As we do things at present, thousands of men in 26 important and perhaps 50 indirect or unimportant lines are kept in enforced idleness during the winter months by the prevailing hesitancy to build in cold weather. The entire situation revolves around the question of placing concrete in cold weather, for most operations are affected very little by the seasons and the greater proportion may be carried on under at least partial protection. So economically, the pushing of winter concrete work is the master key to the situation so far as year 'round building is concerned. "Get in the concrete" and any ordinary construction job may be carried to completion in a hurry, practically regardless of the weather.

Fig. 1—In moderately cold weather, when the temperature may go below freezing for only a short time each night, ample protection against the cold is afforded by paper covered with straw or manure

Fig. 2—Covering a sidewalk for protection against both cold and mechanical injury. Although the concrete may be beyond danger of injury from frost after the first two or three days, it hardens rather slowly, and surfaces exposed to traffic are usually protected for three weeks or longer

Fig. 3—Interior floors and similar work are easily protected by heating the enclosure with salamanders or steam coils. It is only necessary to maintain a temperature a few degrees above freezing

Facts About Frozen Concrete

The most serious effect of freezing on concrete occurs where the concrete has frozen soon after it is placed and then thaws and freezes again successively (as might happen with a wide range of temperature between midday and midnight). Concrete that has been frozen once may, with proper protection thereafter, regain practically full strength, but usually gains at a very slow rate. The strength of concrete that thaws and freezes again is often utterly destroyed. If freezing only reaches the surface the latter is likely to scale or pit, due to the strong expansive action which accompanies the transformation of the mixing water into ice.

Fig. 4—This typical large reinforced concrete factory building was built by the Aberthaw Construction Co., Boston, for the United Shoe Machinery Co., Beverly, Mass., at temperatures often hovering around zero. Note the general use of tarpaulins to protect the concrete

How to Place Concrete in Cold Weather

To successfully handle winter concreting, simply place the concrete at a moderate temperature (as warm as economical) and protect the work during the following few days or until most of the water has disappeared and the greater portion of the strength has been acquired. In late fall and early winter when temperatures approach freezing point only a few hours each night, it is only necessary to cover up the work with heavy paper or canvas, but care must be taken to see that there is no ice in the gravel or stone. If a steam boiler or other convenient supply of hot water is available, considerable benefit may be derived from the use of hot mixing water. In this way the concrete may be deposited into the molds several degrees warmer than otherwise.

As the temperatures grow colder, the use of hot water is absolutely necessary and when below freezing weather prevails both mixing water and aggregates should be heated. In zero weather it may be advisable even to provide heat in the mixer drum. A job of concreting to be done in cold weather should always be laid out compactly so that the material will travel only the shortest possible distance from the piles to the mixer and from there into the forms.

Protecting Concrete in the Forms

1. All exposed surfaces may be covered with canvas, heavy building paper or the latter covered with manure.

2. In extreme cases the space between the concrete surfaces and the forms may be increased to make possible heating by steam coils, exhaust steam or salamanders.

3. Beware of splits, rips or other open spaces in the covering through which the cold wind may enter and freeze exposed portions. Give double protection to projecting portions of the work and corners. Do not place manure directly against newly deposited concrete.

4. Where advantageous, a job is sometimes completely enclosed in a tent or rough wooden structure. The expense of such protection must be justified by the speed of operations possible with this covering.

Heating Water

1. Use a steam boiler of convenient size if hot water cannot be obtained from some regular source.

2. If a steam boiler is not available but there is a running water supply, heat the water by running it through a coil of pipe placed in a firebox made of an old stack or pipe. Exhaust the hot water slowly at steaming temperature into a barrel.

3. Water is often heated in large kettles or tanks supported over open fires.

Heating Aggregates

1. Bank the materials over any improvised stove taking care not to mix up the various piles. The materials should be frequently raked over to insure even heating throughout. Old smoke stacks, boiler shell and metal pipe make convenient stoves. Metal slabs or plates placed on low masonry supports are sometimes used.

2. Where steam is available under moderate pressure piles of sand, gravel and stone may be heated by means of steam jets driven into the pile. These jets usually consist of 1-inch iron pipe with a row of perforations in the side, fitted with a pointed cap. When inserted with the perforations down, the steam is exhausted through the holes, thawing and heating areas surrounding the jet.

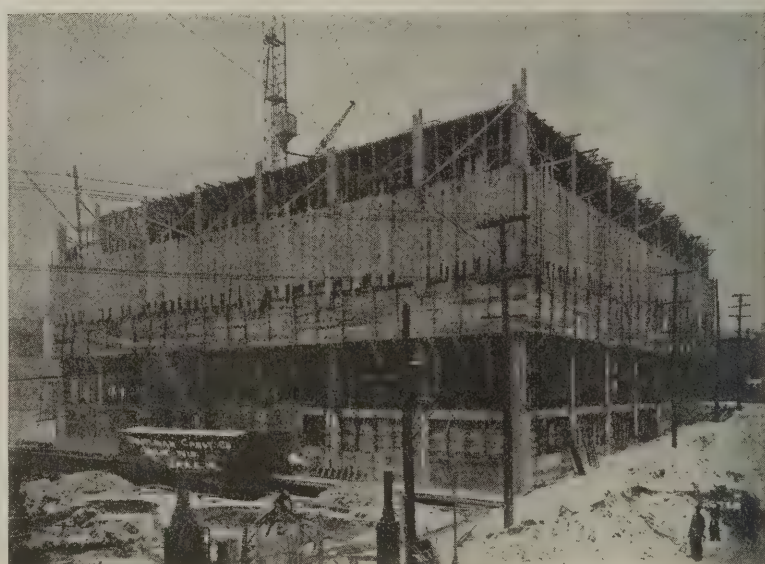


Fig. 5—Building erected by the Dahlman Construction Co., Milwaukee, Wis., for the Milwaukee Paper Box Co. Notice particularly the use of wooden housing to enclose the area where concrete is being placed. The housing moves up with the forms

Heat in the Mixer

1. Heat is most easily introduced into

the mixer drum by means of an oil burner similar to a blow torch. Large mixer openings are usually kept closed by equipping with "flaps."

2. Live steam provides an efficient method of heating the mixer drum. The steam nozzle may also be used to heat up the surface of the forms just prior to placing the concrete, to make sure that they contain no ice.

Fig. 6—An old steam boiler provides hot mixing water which is run into the barrel and dipped out as required in the mixer

Fig. 7—Locating the mixer and steam boiler side by side. There is a pipe connection from the latter to the former. The temperature was eight below zero when this picture was taken

Remove Forms Cautiously

1. Remember that concrete acquires strength very slowly in cold weather. Frozen concrete will sometimes "ring" when struck with a hammer. Pour hot water on the surface before testing for hardness.

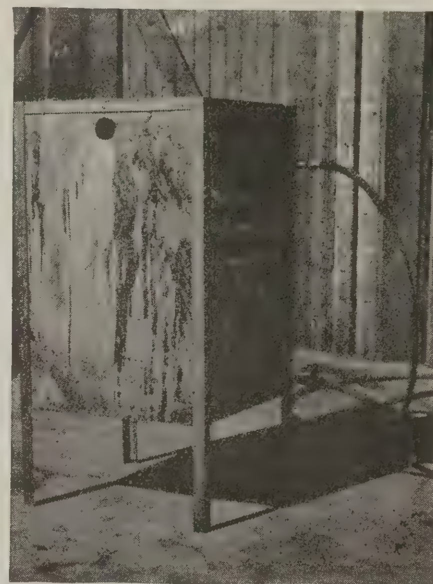


Fig. 8—A new type of charcoal heater which is used to heat enclosures and provides warm water as well. A water pan may be used as a humidifier if desired

2. Leave the forms up as long as conveniently possible. Don't be in a hurry to impose heavy loads on the concrete—better let the forms support the loads until all doubts are removed.

3. If forms must be removed while the concrete is still quite weak, handle the removal with care to avoid injury to the work.

Fig. 10—A coil of pipe placed over an improvised heater will provide hot mixing water where a running source of water is available

Fig. 9—An old stack, tank or pipe section makes the almost universal apparatus for heating the aggregates. A vertical stack is often constructed at one end

Concrete Block Easy to Lay Irrespective of Temperature

Experienced contractors are quite generally aware of the ease with which concrete block and building tile can be laid up during cold weather. Practically the only precaution observed in addition to ordinary summer routine is that of moderately heating the block and small quantities of sand

Fig. 11—Large kettles or tanks provide the common means of obtaining hot water on rural and small town concrete jobs. Sometimes the same fire is utilized to heat the aggregates

and water for mortar. The blocks are heated in a closed room without direct contact with the heater (to insure against discoloring them). When heated to 90 or 100 degrees F. and placed at 70 degrees F. the block ordinarily protects the warm mortar

Fig. 12—The material is piled over the heater and moved occasionally to secure as uniform a temperature as practicable throughout the pile

Fig. 13—Heating the aggregates with steam jets. Where steam under pressure is available this method, as described in the accompanying article, may be successfully used

until it has hardened. In temperatures below zero, the wall surfaces should be covered with canvas to assist in retaining the heat.

Thousands of men in these occupations and many others could be given steady work each year by going ahead with winter concreting—thus providing jobs all along the line.

1. Architects and draftsmen
2. Architectural iron workers
3. Brick workers
4. Carpenters
5. Cement finishers
6. Cement workers
7. Electricians
8. Engineers
9. Excavators
10. Glass workers
11. Glazers
12. Lathers
13. Lumbermen
14. Masons
15. Painters
16. Plasterers
17. Plumbers
18. Roofers
19. Sand and gravel workers
20. Sheet metal workers
21. Stair builders
22. Steamfitters
23. Structural steel workers
24. Teamsters
25. Terra cotta workers
26. Tile setters

Crusty Comment on Cold Weather Concreting

"The average concrete man would feel pretty mad if he bought a calendar and found the months from November to March missing. Yet he would create a parallel situation in a business way by closing up shop all winter."—H. H. Allison, Salina, Kans.

"How many industries outside of the construction field could make any money on a seven months a year basis? Winter concreting is the answer."—J. K. Harridge, Chicago, Ill.

Concrete Products Manufacture in Cold Weather

MOST concrete products plants can be put in condition for cold weather work at slight cost. Weather tight buildings in which the temperature can be kept above 50 degrees, storage bins for aggregates and curing rooms or chambers where the products can be properly hardened (preferably at temperatures above 60 degrees) are the essentials in equipping a plant for continuous year 'round operation.

Two methods of curing products are recommended: with steam exhausted at low pressure, or with water sprayed from fine nozzles. The chambers usually used for steam curing are parallel, long, low, narrow chambers. They are best built of concrete and made moisture-tight, designed to drain the condensation off walls and ceiling, not allowing it to drip on the products. These tunnels are made wide enough to accommodate one or more parallel rows of cars and preferably under 60 feet in length. The ceiling is kept low to conserve heat. In the well designed curing chamber there should be just sufficient room for the products, with no waste space.

During freezing weather, concrete products should be kept in steam chambers for

48 hours. Therefore, enough chamber space is needed to hold two days' output of the plant. Steam is brought into the curing chambers through 1½-inch steam pipes immersed in water troughs running the full length of the room. The steam pipes contain ⅛-inch orifices, 6 inches apart, turned downward in the trough so that the steam will have to pass through the water before coming in contact with the products. The ends of the pipes are closed so that all the steam is exhausted through the small holes. Live steam should not be allowed to come in direct contact with green products as it tends to dry them out.

While the curing rooms are being filled, the temperature in them should be kept approximately the same as in the plant so that the products will not be subjected to a sudden change of temperature. In any case the difference in temperature in the curing room and products should not be more than 35 degrees at the time the products are brought into the chamber. When full the temperature of the chamber is raised gradually until at the end of six hours it should be between 120 and 130 degrees. At the end of 49 hours products may be taken out of the curing room and stored in the yard, no further treatment being required.

A 16-hp. boiler will furnish enough steam for a block output of 1,000 per day cured for 48 hours. A plant making 2,000 block per day will need a 32-hp. boiler—smaller or larger plants can be figured in this proportion. A steam pressure in the boiler between 25 and 50 pounds is the usual requirement, with a reducing valve in the main steam line so that steam can be supplied to the perforated pipes in the tunnels at about five pounds' pressure.

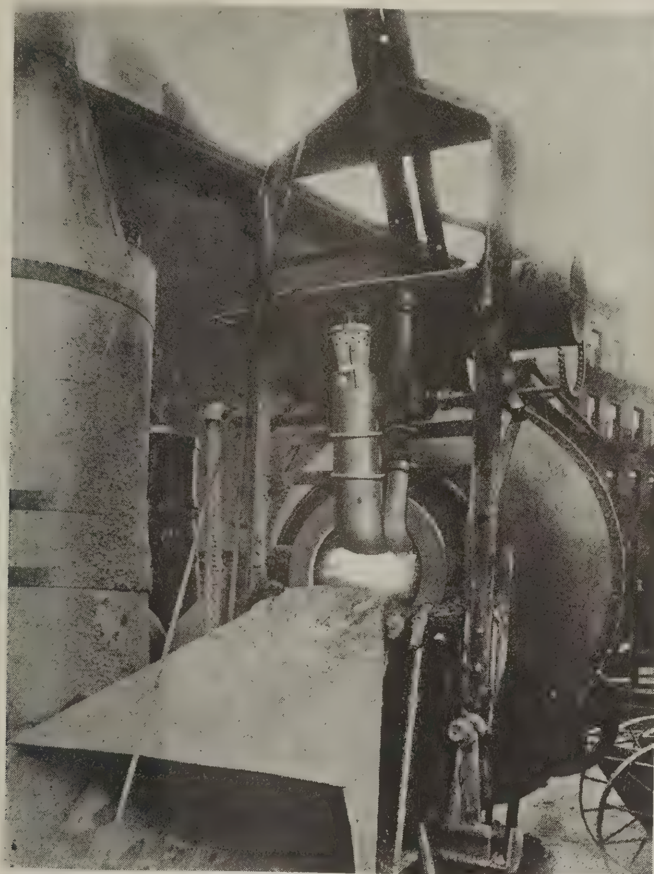


Fig. 14—An oil-burning torch for heating the mixer drum. The mixing process has a tendency to cool the concrete which is overcome by this apparatus or by exhausting steam in the drum

When the water spray method is used the products are placed in tightly closed curing rooms heated by steam coils, heaters or other handy means where the temperature is never allowed to go below 60 degrees F. A temperature between 70 and 90 degrees is preferable. A spray of warm water is turned on and a dense fog created, care being taken not to injure the green concrete at the start. In freezing weather the products should remain in these conditions for six days, using the spray sufficiently to keep the atmosphere continuously saturated.

Lime Kills Smells

A FEW lumps of quicklime in metal containers placed in a bunkhouse will go a long way toward keeping the rooms fresh and wholesome.

Concrete Block Construction Easy to Handle in Cold Weather

MANY alert contractors have already discovered the comparative ease with which concrete block construction may proceed during cold weather. Practically the only addition to ordinary summer routine is the necessity to moderately heat block, and relatively small quantities of sand and water for the mortar. The block are best heated in a closed room without direct contact with the heater (to insure against discoloring the surfaces). Block heated to 90 to 100 degrees F. and placed at 70 degrees F. will ordinarily protect the mortar until hard, if the latter is mixed with warm materials, and applied at a temperature of 70 to 80 degrees. Under extreme conditions with weather below zero, the wall surfaces should be covered to assist in retaining heat. If considered necessary, heat may be applied by means of a salamander or steam, for the first 12 hours.

Concrete block construction is favored for winter work not only because the operations are simple and economical, but very largely for the reason that concrete block walls acquire their full strength very rapidly and may be expected to carry practically full load 24 to 48 hours after laying. The advantages of an immediately available type of cold weather construction, for the emergency industrial building, replacement of the dwelling destroyed by fire or any one of a score of other purposes requiring permanent buildings for immediate service, can hardly be over-estimated.

Trenching in Frozen Ground By Use of Lime

IT IS sometimes difficult to dig a trench through frozen ground, and yet there may not be enough scrap lumber around to warrant its use as kindling to thaw out the ground. Quicklime may be used to excellent advantage for this purpose. Break the lumps up to about 2-in. size, or even a bit smaller, and spread them in a 4 to 6-in. layer over the section of ground to be worked. Cover this layer of lime with straw or old boards and then slake the lime, being careful not to use too much water. The heat given off by the slaking lime will thaw the ground remarkably well, and the troublesome smoke and sparks of a wood fire will be avoided. This same method may be used for thawing frozen gas and water lines.—R. P. Brown, National Lime Association.

Hints on Cold-Weather Concreting

By J. A. Stalfort*

THE use of salt, chloride of lime, glycerine, alcohol and other chemicals has often been advocated as a precaution against freezing. The writer for various reasons has never permitted their use on work over which he has general supervision and authority. Salt has many objectionable features. If used in reinforced concrete there is every danger of it seriously corroding the reinforcing steel. It also forms what is commonly termed efflorescence on the exterior concrete surfaces, which is anything but pleasing in appearance.

One building which the writer remembers in particular in which salt was used as an anti-freezing precaution looked as though it had been whitewashed by amateurs. It is also impossible to use salt safely with temperatures below 23 deg. F. This is due to the fact that a solution of more than 10 per cent of salt is injurious to the resulting strength of the concrete and a 10 per cent solution will only protect against freezing to 23 deg. F. Another objectionable feature is the retarding of the setting of the concrete when salt is used. Calcium chloride besides having the same objectionable features as salt increases the cost of the concrete considerably. Alcohol and glycerine and other chemicals are generally prohibitive on account of their cost.

There are several methods in general use for heating the sand and stone or gravel, depending generally on the size of the work. On very small work a fire is placed under steel plates supported on concrete or brick pedestals and the sand and gravel thrown over these plates and heated. On work where a maximum of 100 cu. yds. are placed per day, the writer usually uses discarded smoke stacks or other sheet-iron cylinders about 15 in. to 20 in. in diameter and from 3 to 20 ft. in length. These stacks are placed horizontally on the ground and sand and gravel piled over same.

A wood fire is kept up inside the stack and the sand and gravel soon becomes very warm. As the heated material is wheeled from one end of the stack to the concrete mixer it is replenished against the stack from the stock pile. The stack should be sufficiently strong to carry the weight of the material over it and precaution must be taken to prevent it from collapsing when heated.

Minneapolis, Minn., has real winters. This job is in Minneapolis—'nuff said

On larger work where the yardage is considerably over 100 cu. yd. per day a steam-heating plant is installed. A steam boiler is placed at a convenient location, and a steam main run under ground, if possible, in the direction of the sand and gravel piles.

Branch lines are then run immediately under the piles of sand and gravel and controlled by valves so that the steam may be cut off wherever desired. The pipe lines directly under the material piles are per-

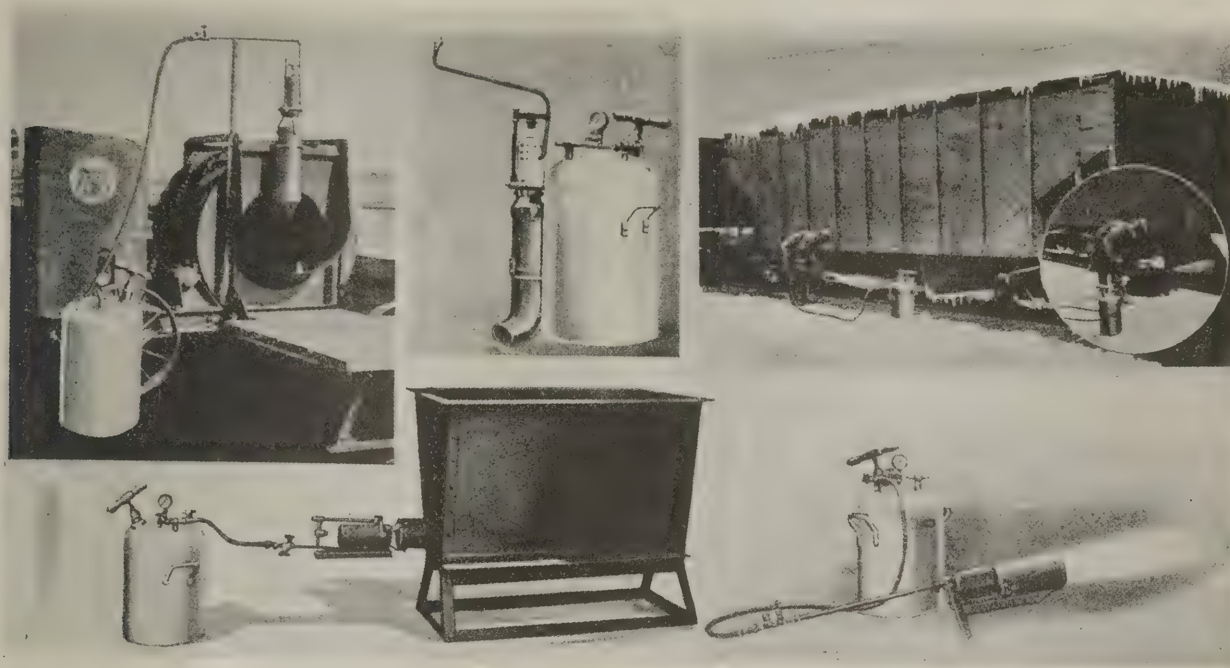
*From an article published in the Monthly Journal of the Engineers Club of Baltimore, Md.

forated with numerous small holes on the lower side and the end of the branch lines plugged up. The steam soon has the material warmed up and danger from frost and lumps of frozen material is soon eliminated.

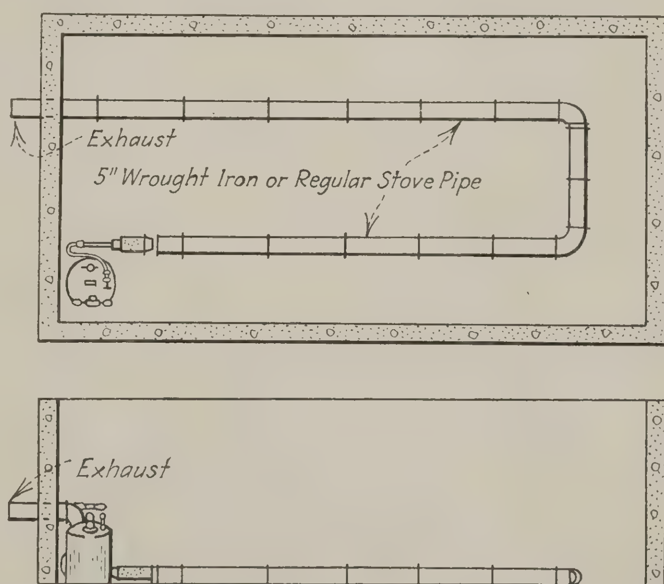
When convenient it is well to cover the piles of sand and gravel with tarpaulins in order to retain all the heat possible. It is also necessary to continue the plant in operation both day and night, as otherwise a marked drop in temperature may freeze the piles solid over night, and considerable time may be lost the following day before the material is in proper condition for use. If the sand and gravel is stored in bins from which it is taken by gravity or otherwise to the mixer, steam coils may be placed around the inside walls of the bins and the bins covered with tarpaulins.

The heating of the water is generally a simple matter, especially if a steam hoist or steam mixer is in use on the job. Live steam when turned into the water barrel or water tank on the mixer will soon heat the water to 150 deg. F., which is the most desirable temperature for mixing the water. A steam line may be run from the boiler on the hoist engine direct to the water barrel or tank and so regulated by a valve that the temperature of the water remains almost constant until used. If the cold is not too severe, and much water is not used at regular intervals, the exhaust steam may be turned into the water barrel and probably furnish all the heat required. On very small work some simple method may be devised for heating the water and even if it is necessary to resort to heating it on a cook stove it should be done, as it is important that the mixing water be warm.

After the sand, gravel and water have been properly heated, due precaution should then be taken to prevent the warmth from leaving the concrete immediately after being placed. First of all the forms should be warmed before the concrete is placed and all ice and frost should be removed from both forms and reinforcing steel. This is generally done by running live steam through a steam hose from the boiler and applying a jet of steam directly against the forms and steel. Tarpaulins, wood enclosures, straw, salamanders, steam and many other articles may then be used advantageously to properly house and cover in the concrete after it is once in place and to keep it warm for 24 to 26 hours. The method of housing or covering in the work depends entirely on the nature of the construction, and the selection should be based on the minimum cost for the service required, using as a slogan "Safety First."



Contractor's Winter-Weather Aids—Kerosene or coal-oil heaters are in effective use. The upper left-hand view shows a torch-heater connected to a concrete mixer. A detailed view of the vaporizer and torch is in the upper center. At the right is shown a two-hopper car being thawed out by one of the hand heaters shown in the view beneath. At the lower left is a heater applied to heating aggregates. Applied to lengths of pipe, stove-pipe, etc., the pipes may be carried along brick floors in shops and around sections of buildings in course of construction



Details indicating method of using torches. The pipes may be twisted up, around or along in any direction. The exhaust need not be carried outside the building, as shown. The lower diagram is a suggestion for heating shop floors in winter

On building construction work the openings immediately below the floor being poured should be well closed in with tarpaulins or heavy wagon covers. Coke, hard coal or oil burning salamanders should then be placed beneath the forms, one to about every 400 sq. ft. If natural gas is obtainable the floor may be piped and a jet of natural gas used instead of the salamanders. If the work is being done with temperatures at zero and below, steam lines should be used unsparingly, close up under the forms. With temperatures ranging from 35 deg. F. to 30 deg. F. no protective covering need be applied over the exposed concrete surface where the finished floor surface is to be placed afterwards, as the heat beneath will serve to keep the concrete warm through the early stages of hardening.

When the temperature ranges from 30 deg. F. to 20 deg. F. the exposed surface should be covered with building paper or canvas and over this 6 in. to 8 in. of straw. More adequate means of protection must be used for all temperatures below 20 deg. F. The water on some recent important rush work which was being done with temperatures generally ranging from zero to 12 deg. F. covered the exposed surface with tarpaulins supported on trusses about 12 in. above the concrete. Holes about 12 in. square were left in the concrete slab directly over the salamanders below, and the heat from the salamanders kept the air between the tarpaulins and concrete warm and prevented freezing.

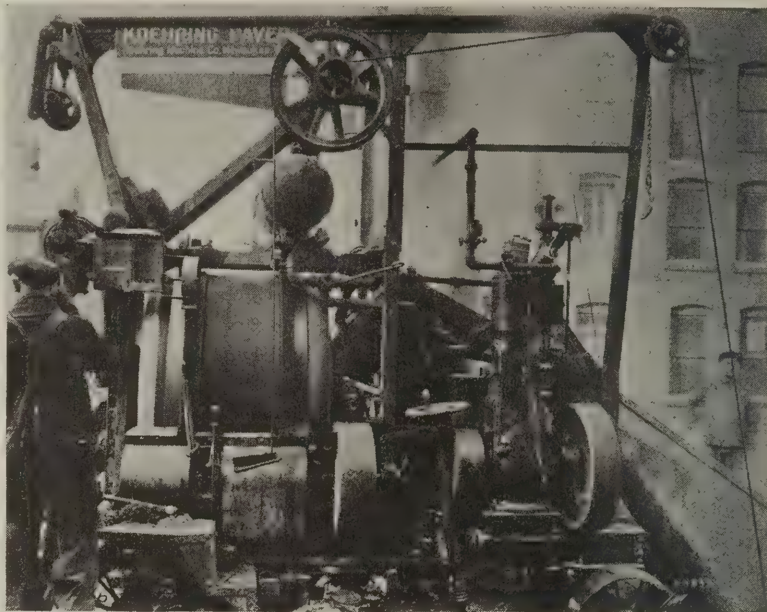
Mass work does not generally require the same protection as thin floor slabs, sidewalks or floors, and as a rule the wood forms and a covering of straw over the exposed surface is all that is necessary. In extreme cold weather, however, the wood forms should also be encased with straw or other like material. Foundation work likewise is as a rule very easily protected by a covering of straw over the exposed surface, as the earth and wood forms generally protect the balance of the mass.

Manure as a protective covering should be avoided and if used at all should not be placed directly against the fresh concrete surface. Many otherwise good jobs have been ruined by its use, for it spoils the appearance of the work by staining it and chemically reacts on the concrete, causing it to disintegrate.

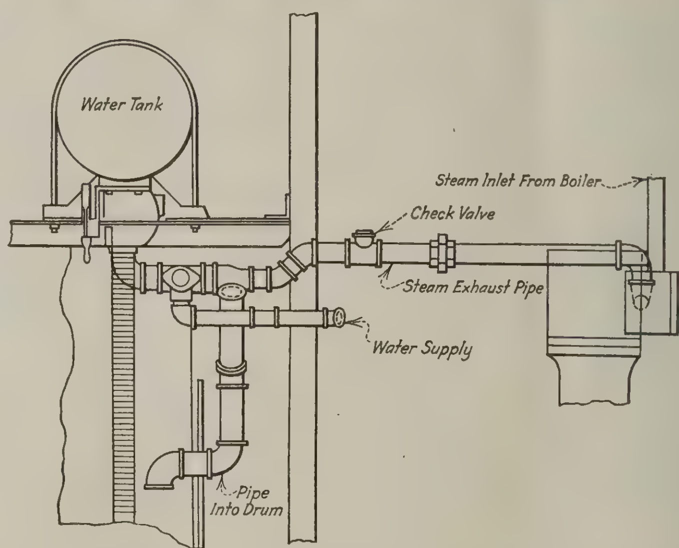
Waste Steam for Heating Concrete Mixer

A MILWAUKEE contractor making concrete conduits in the winter of 1920-21 developed the device illustrated herewith in order to use the exhaust steam from a steam-engine driven concrete mixer to heat the drum. The contractor is Joseph Dean of the Dean Construction Co. and the device is described for the NATIONAL BUILDER by W. J. Koehring of the Koehring Machine Co.

In the pipe between the engine and water pipe a check valve was placed to prevent the water from backing up into the engine steam chest as shown on the attached photograph and sketch.



Heating a cement mixer with waste steam



Detail of application of waste steam to heating a concrete mixer

Live steam was used occasionally to accelerate the draft in the boiler.

The exhaust from the engine, by means of this change was introduced into the mixing drum through the water pipe, continuing even when the three-way valve was open. In this case the exhaust steam, of course, entered with the water.

Twelve cubic feet of frozen chunky aggregate was put into the mixing drum per batch. The outside temperature was ten above zero. They averaged a minute per batch.

When the temperature of the mixed concrete was tested the results were as follows: The first wheelbarrows discharged averaged 55 degrees. The third wheelbarrow averaged 60 to 65 degrees and the last wheelbarrow averaged 70 degrees Fahrenheit.

The fireman said he did not have any trouble keeping up steam. The boiler was not insulated. A cold northwest breeze struck the boiler, which of course, radiated some of the heat.

Pointers on Salamanders

SALAMANDERS for temporarily heating buildings under construction are so simple in design and operation that there is not much to be said about them. Nevertheless there are salamanders and salamanders, so that the following pointers on what a manufacturer of salamanders considers essential features of a really good one are interesting.

"In the fire place a salamander should be built of sufficiently heavy material to withstand a red heat twenty-four hours of the day and should be equipped with an ash tray of sufficient size to eliminate the possibility of any hot coals dropping onto the floor of the building, especially so if that floor is of wood. The salamander should further be equipped with a cast-iron grate, a dumping grate and shaker, that the fire may be kept burning during the night as well as the day, simply by shaking down the fire and putting on more coal or coke as one would do with an ordinary stove or furnace.

"If a salamander is not equipped with a dumping grate, it becomes necessary, about every twelve hours at the outside, to remove the salamander to the outside and dump the fire out by turning it upside down and then building a new fire. This is because a considerable quantity of ashes will accumulate in twelve hours' time and kill the draft so that it is impossible to keep a good fire going. With the dumping grate, however, it is not necessary to do this as the ashes, when you shake the grate, fall into the ash tray below from which they can be removed with a small shovel and placed in an ash receptacle.

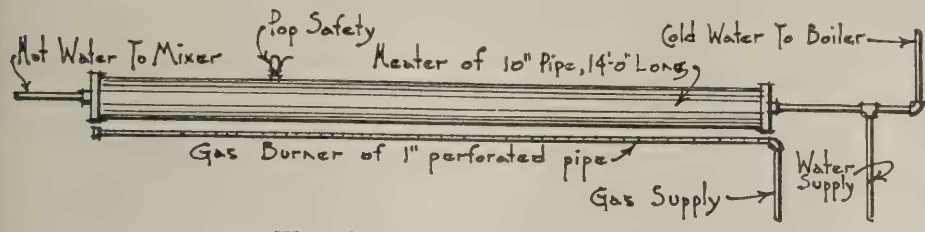
"It is sometimes necessary or desirable, of course, to remove the salamander from one part of the room to another part of the room or from one part to another part of the building, and consequently the body of a salamander should have an 1½- or 2-in. hole through it, near the top, one on each side, so that a long piece of pipe or rod may be inserted and then two men can pick the salamander up and carry it wherever they desire, without disturbing the fire.

"Wherever it is convenient to do so, salamanders should be equipped with tops and a stove pipe running through an opening in the building in order to take from the room the smoke and gases arising from the fire. This only applies, however, to a building in which the sash and glass have been installed before the salamanders are used. If the sash openings in the building are only covered with cheese cloth, as they very often are, it is hardly necessary to use a top and stove pipe on the salamander because this cloth is sufficiently porous to allow the gases and smoke to leave the room. As a salamander only smokes when the fire is first started, it is sometimes advisable to start it outside of the building and then after the smoke dies down, it can be carried in."

A Water Heater

A TYPE of water-heater devised by a subscriber to NATIONAL BUILDER and described in the September, 1920, issue may fittingly be recalled to the attention of readers. The subscriber says he has used this type to furnish plenty of hot water on jobs where he was running two shifts—a day and a night force. This heater does not require any tanks elevated in the air to supply the pressure to supply the water to the mixer, as the city pressure forces the water to any height desired.

It consists of a 10-inch casing about 14 feet long, reducing the ends to 1 inch to receive 1-inch pipes. One of these pipes is attached to the city pressure and fills the heater with cold water. The pipe at the other end delivers the hot water after it leaves the heater. A gas burner made of 1-inch pipe with holes drilled four inches apart is run under the full length of the heater.



Water heater devised by a contractor

Use of Lime in Cold Weather

By R. P. Brown

WHEN slaking quicklime in cold weather, the water should be warmed, at least. Warm water will speed up the slaking operation materially, allowing the action to proceed normally. This will speed up the work, and will well repay the additional labor entailed.

The slaking process gives off considerable heat, which is necessary and should be conserved. It is a good practice to cover the lime bed with a layer of sand which is not frozen, for this will act as a blanket and retain the heat, but it is a dangerous practice to cover a pile of quicklime that is being slaked with a layer of frozen sand. The heat used in thawing the sand is stolen from the lime, and the result is granular paste.

For small house construction lime mortar is sufficiently strong to carry all loads likely to be imposed. The brickwork, however, should be protected during freezing weather. If the wall does freeze before the mortar is thoroughly hard and remains frozen till spring, no serious damage will be done, although alternate freezing and thawing may cause serious damage. Care should be taken at all times, and where the loads are high, as in office buildings, etc., a lime-cement mortar should be used, in order that the mortar may set before it has a chance to freeze. All work should be protected as much as possible.

Lime Aids Workability of Mortar in Cold Weather

When a man's hands get cold and stiff the work slows down, particularly if the mortar works stiff and harsh. If some lime has been added to cement mortar, the essential quality of fatness is obtained, which aids materially in spreading the mortar. If the water and sand have been warmed, the mortar will set before freezing. The lime will retard the set somewhat, but this may be an advantage, as it is easier to keep the bricklayers supplied with mortar. This delay is not of any great consequence, but the increase in workability of the mortar is of great importance.

Another point worth remembering is that the brick should not be wet during cold weather. The suction of a dry brick is likely to rob a straight cement mortar of some of the water necessary for its set. This is not the case to so great an extent with lime, or lime-cement mortar. The lime in the mortar will cause it to stick to the brick, enabling the mechanic to handle buttered brick much more easily and to place them more accurately.

Plastering

Plastering in cold weather is subject to the same difficulties that must be met in other branches of construction. Lime plaster, however, is entirely suitable for cold weather work if a reasonable degree of care is exercised. Of course, any frozen lumps of sand should be thawed before incorporating them in the plaster. Frozen sand, particularly, should never be added to the lime before the slaking is complete. Care should be taken with any kind of plaster to see that it is dry, and not merely hard, or frozen, before a second coat is applied. Inasmuch as all plasters dry at practically the same rate, there are no special precautions necessary when using lime plaster. Fresh plaster should never be applied to a frozen base. The condition of the base may be tested by brushing on a little water. If this does not freeze it is safe to proceed.

Exterior openings in the room being plastered should be closed either by glazing or by cloth stretched across the openings. It is essential, however, that free circulation of air be maintained so that the plaster will dry. The use of salamanders or stoves with the flues piped to the open air will speed up the work both by making working conditions better and by hastening the drying action. Plaster work in connection with the remodeling of old buildings may well be done during winter, for it is entirely practical and free from danger, and serves to extend the working season. Exterior lime stucco work, however, should not be attempted when the temperature is likely to remain below the freezing point for any length of time.

Hydrated Lime in Concrete

Hydrated lime is of especial value in concrete placed during cold weather because of its property of increasing the workability of the concrete.

The use of an excess of water to make the concrete flow freely down the chutes and into the forms is objectionable at all times and should be particularly avoided in cold weather. The excess water seriously reduces the strength of the concrete at any time, and in cold weather increases the chances of freezing. Hydrated lime imparts the necessary workability to the mass without the addition of this excess water, and thus eliminates to a large extent a serious drawback to cold weather concreting. It does not do away with the necessity of heating the aggregates, nor of protecting the work after the concrete is placed, but it does reduce one of the grave dangers confronting the builder.

Roofing Contracts for Winter Business--By John Lind

Remarkable Growth of the Prepared Roofing Industry and the Feasibility of Using it in Winter Work Point to Big Possibilities for the Live-Wire Contractor

THE 1921 RECORD in the construction industry is one that many wish never to see again and 1921 is dying without a sigh on their part. However, the biggest month asphalt shingles and roll roofing ever had in their eventful career was in September, 1921, when they crossed the goal line with 3,003,000 squares, the first time they ever crossed the 3,000,000 line. This is enough roofing shipped in one month to cover 150,000 ordinary residences if all applied to that one purpose, yet the government figures for 1920 estimate less than 100,000 as the number of houses built in that entire year.

Mottled wide space shingles with thatched effect

Few would contend that 1921 has seen as many houses built as 1920. Nevertheless, the patent roofing industry has been operating in 1921 at the rate so far of 82.5% of the business in the same period in 1920 and has shipped thus far over 20,000,000 squares. Apparently the patent roofing manufacturers have not hidden behind the ever-ready alibi of business depression. This seems impossible and the figures appear contradictory. What has become of this tremendous volume of asphalt shingles and roll roofing?

New construction in 1921 has fallen far below the 1920 volume and the drop has been estimated as being somewhere between 50 per cent and 60 per cent. A very evident explanation for the tremendous volume of roofing shipments is to be found therefore in the large amount of re-roofing, repair and replacement work. Literally hundreds of thousands of old roofs have been made new by laying the asphalt shingles and roll roofing over the old roofs. Homes in the $75,000 class as well as humble cottages have had the asphalt shingles put over the old roofs. Such jobs are not of recent origin either, because such work was done in the Chicago district ten years ago.

Selling Arguments for the Roofing Contractor

In the Chicago district alone, approximately 200,000 old roofs have been made new with asphalt roofing without removing the old roofs. This practice has therefore passed the experimental stage. The wooden shingles underneath form a particularly good insulator making the roof cooler in summer and warmer in winter. Even when an old roof leaks it is probably 90 per cent good though it is difficult to locate exactly where the leaks are and this 90 per cent should be saved.

The asphalt roof is fire-resistive and hence the fire danger from the outside is

Red slate surfaced shingles were used on the roof and green slate surfaced shingles on the sides reduced to a minimum. In case of fire from the inside, the wooden shingles are covered with a blanket which will smother the flames rather than promote them so that there are many cases on record where an asphalt roof has fallen and smothered a fire.

Certain common-sense directions must naturally be followed in laying asphalt roofing over old roofing. Any projecting material, such as a curling shingle, must be nailed down and the surface underneath made smooth. Valleys and gutters should be laid first. As a rule asphalt shingles should not be laid over 4 or 4½ in. to the weather. Only zinc coated nails as specified by the manufacturers' association should be used.

Asphalt shingles are used in all types of dwellings—from the poor man's cottage to the rich man's mansion

Roofing as Winter Work

There are many sombre old roofs that can be made new in the winter. A small amount of snow on a wooden shingle roof or ice in the valleys should not delay the application of asphalt shingles.

The roof boards underneath a wooden shingle roof are open and often separated three or four inches. This allows for considerable evaporation and the wooden shingle will dry out from underneath.

Contractors on roofing jobs should not fail to carry accident and casualty insurance. Many roofers have graduated from the carpenter's bench while others have had little, if any, previous experience with a hammer. With due care, however, the accident hazzard is not a great deal more than in any other season.

In covering the ridges and laying the valley the roofing is likely to crack if cold and it should be kept in a warm basement or heated a little before application. Asphalt shingles will also crack when cold, if bent, but as they are generally laid on a flat surface, it is not necessary to warm them except when they are to be bent. Some report that they have laid asphalt shingle roofs in zero weather and that such roofs are as good as any.

A Waste Product and By-Product

The prepared roofing industry has made use of the chemist, and has written an interesting page in industrial history. Prepared roofing is a waste product and by-product. Rags are the beginning of the process. The manufacturing process is simple. The rags are made into felt, the felt is saturated with asphalt and the saturated felt is covered or not according to taste and demand with crushed slate or stone in various attractive shades. The crushed slate is a sage green or gray green, red shading from tile and brick down to a deep red and a blue black as well.

Plastering During Winter Months

By Virgil G. Marani

WHEN ready to commence plastering during the winter months the problem of frozen sand confronts the builder, and is quite important, since it takes time and labor to thaw out frozen materials prior to use. The maintenance of the desired temperature of the sand mixed into the plaster (on the job) is a continuous and perplexing problem during the entire plastering operation and the continuance of freezing weather.

The heat generated during the setting process of gypsum plasters permits their use under weather conditions usually regarded as unfavorable. Considering what has been stated with reference to frozen sand, there are few plastering materials better suited to these adverse conditions than gypsum wood-fibered plaster, because this plaster is delivered on the job from the mill or warehouse ready for application, after being mixed with water, without the admixture of sand.

The advantages claimed for gypsum wood-fibered plasters include the following: Only the addition of water needed to prepare it for application. The damage possible to any plaster by the use of frozen sand, poor sand, or too much sand is avoided. Since sand is not required this plaster is especially suited to winter operations. Since 80 per cent of the material in the plaster is calcined gypsum, and it is manufactured to be used without sand, the heat conductivity and fire-resisting properties of this plaster, are better than for any other commonly used plasters.

In the accepted practice for mixing this plaster, the use of a tight mixing box, about 3½ ft. wide and 7 ft. long, is recommended. Mixing is done as follows: Raise one end of the mixing box about 4 in. Put water in lower end of box, then put the gypsum wood-fibered plaster in the upper end. Hoe the plaster gradually into the water and allow it to soak for about ten minutes without further hoeing. After this period of soaking mix thoroughly to the required consistency for application.

The standard requirements, for gypsum wood-fibered plaster, according to the American Society for Testing Materials, are as follows:

Definition. Gypsum wood fibered plaster is a gypsum plaster in which wood fiber is used as an aggregate.

Composition. Gypsum wood fibered plaster shall contain not less than 80 per cent by weight of calcined gypsum, and not less than 1 per cent by weight of wood fiber made from a non-staining wood. The remainder may consist of materials to control the working quality and setting time.

Time of Setting. Gypsum wood fibered plaster shall set in not less than 1½ nor more than 8 hours.

Tensile Strength. Gypsum wood fibered plaster shall have a tensile strength of not less than 125 lb. per square inch.

Attention is drawn to the high tensile value obtained by the use of this material.

To a limited degree, the same statements recommending the use of gypsum wood-fibred plaster can be used with reference to gypsum ready-sanded plasters since in these plasters a suitable character of sand is mixed in the proper proportions (at the mill) and is shipped to the warehouse or job ready for application after being mixed with water.

The sand, in the gypsum ready-sanded plaster, will of course take up part of the heat generated during the setting period, and, for this reason, in extremes of frost better results are more likely when using gypsum wood-fibered plaster. However both of these gypsum plasters are extensively used during winter operations for the reason stated. Also, since much of the water used in mixing enters into chemical form with the calcined material in changing it to its re-hydrated form, there remains less water in the plastered surface to be got rid of by evaporation, or to freeze.

Magnesite Stucco Can't Freeze

A Cement Not Mixed with Water but with the Same Character of a Chloride Solution Used in Automobile Radiators—What Magnesite Is—Its Use for Stucco, Interior Plaster and Building Tile

THOSE who regard magnesite as exclusively a stucco material will find this article an eye opener. Now that some of the problems of its manufacture are being successfully solved, it bids fair to find a surprisingly large field of usefulness in the building industry.—The Editors.

MAGNESITE in its natural form is an extremely hard white rock containing approximately forty to forty-five per cent of magnesium carbonate and fifty per cent of carbon dioxide (a gas). Almost invariably it is found in rough mountainous country and is usually deposited in large stringers or veins interlayed in serpentine. The principal sources of supply have been Greece, Austria, Venezuela, and America.

The more important uses to which magnesite is put are for refractories, exterior stucco, interior plaster, floor surfacings, floor tile, partition tile, insulation, drug and chemical, the manufacture of paper, rubber tires, etc.

An old home before being over-coated with magnesite stucco

Growth of the American Industry

Probably ninety-five per cent of the magnesite used for plastic or building purposes is now produced in California, in which state unlimited reserves of the finest ore are in the process of intensive development. Increase in the production and consumption of magnesite in the United States in the past few years is almost without precedent. Government records disclose that from a total of approximately 10,000 tons produced in 1914, something in excess of 320,000 tons were mined and shipped in 1920, an increase of 3,000 per cent in six years.

Magnesite is obtained by mining in much the same manner as coal, gold, silver or any other valuable mineral; long underground tunnels and shafts, sometimes nearly one-half mile in length, are driven to effect its removal. In its raw or crude state it is not usable for plastic or building purposes, or, in fact, for anything except certain chemical purposes. It must be sorted and blended to secure the desired grades of ore, after which it is crushed and screened to reduce it to the specific size at which it may be most adequately treated.

The same home after being over-coated with magnesite stucco

Preparation of Calcined Magnesite

After it is sized, it is then passed through large rotary or revolving furnaces, or kilns, this type of calciner having been found best suited to maintain the most accurate control and uniformity of product. During this roasting operation the ore is exposed to intense heat at a carefully adjusted temperature, while the time required for passage of the ore through the kilns is rigidly maintained in accordance with definitely approved standards.

After the ore has been roasted or calcined, the resultant product is then conveyed to crushing and grinding mills where it is pulverized to an exceedingly fine powder, eighty per cent of which must pass through a two-hundred mesh screen and it is then packed in bags for transportation to the place at which it is to be made into stucco, plaster, tile, etc.

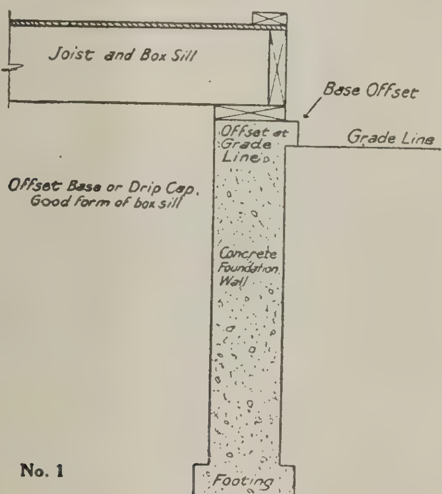
Due to the achievement of greatly improved standards of quality under heat controlled methods of burning that are now being practiced in the production of California magnesite, the correctly made domestic magnesites have been definitely proven to be infinitely superior to any foreign product.

Previous to 1914 the manufacturers of magnesite materials were entirely dependent on Europe for all supplies of cal-

Winter work in magnesite stucco

Wintry and exposed enough for any one—magnesite stucco

cined magnesite and magnesium chloride. Undeniably, the splendid progress and almost unequalled increase in the uses and consumption of magnesite products pay high tribute to the initiative and resourcefulness of American magnesite producers who have succeeded in creating new standards of uniformity and quality. The founding of dependable domestic supplies of high grade magnesium chloride has also proven a factor of marked assistance to the growth of this industry.



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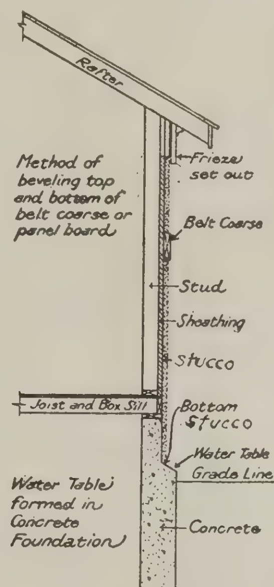

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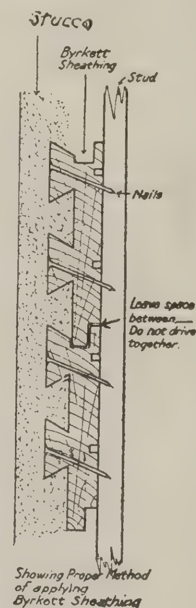

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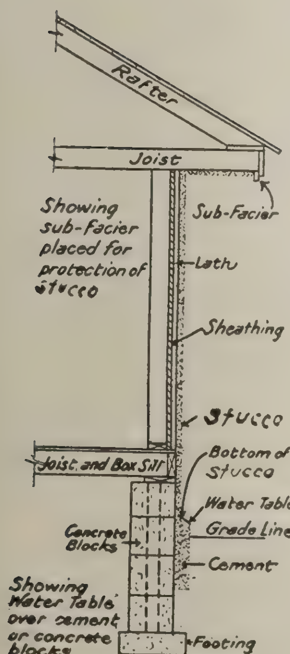

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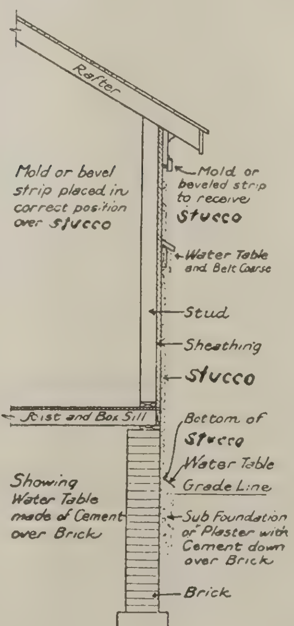

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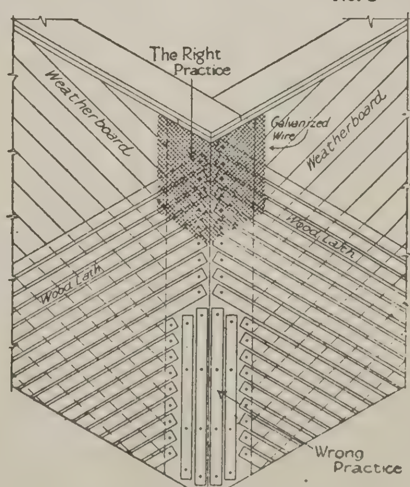

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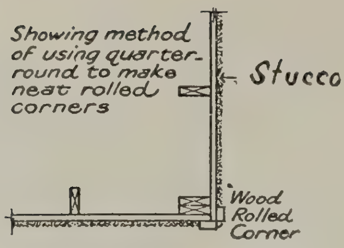
Showing right and wrong practice in preparing angles for stucco



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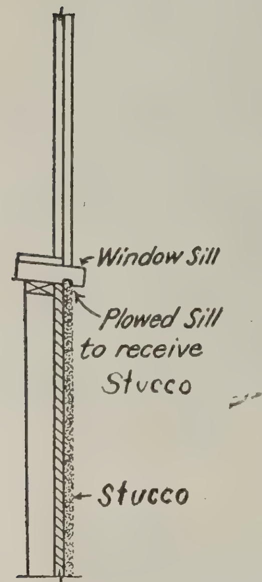
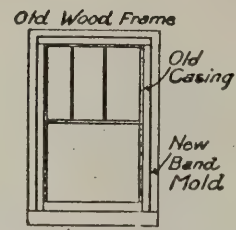


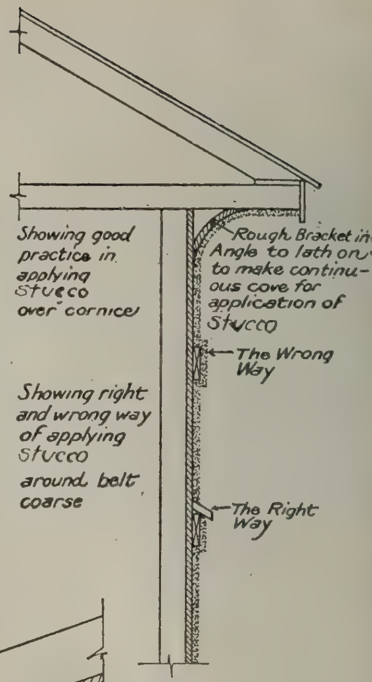
Showing method of plowed groove to receive stucco

No. 8



Showing construction of casing without extensions recommended for new buildings

No. 11



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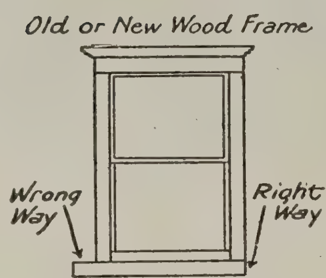
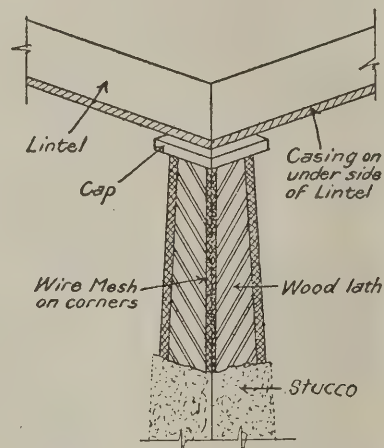


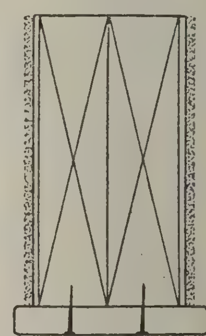
Showing right and wrong method of sill construction

No. 12



Showing cap on porch column to form water table and wire covering for corners.

No. 15



Showing cross section of Porch Lintel with casing on under side

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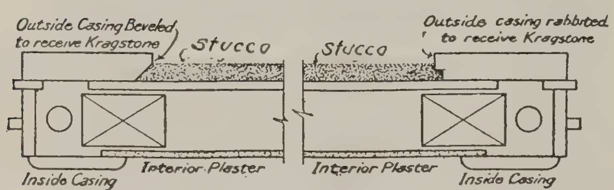


Two Methods of setting out casings so that stucco will key in back

No. 10 No. 9

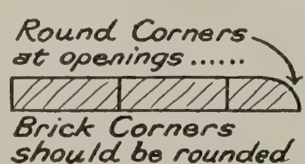
Use in Stucco

As it has been proven that a correctly made magnesite, one having good strength, being highly resistant to water and continuously uniform in quality, is absolutely essential to both durability and serviceability of plastic products, extreme care should be exercised to ascertain that plaster stucco and similar products are only procured from concerns whose business record entitles them to the full confidence of the building public.

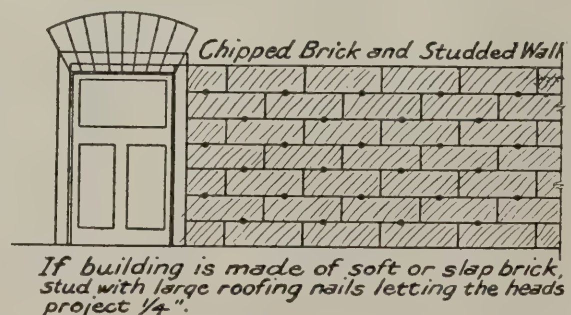
At present, more plastic magnesite is consumed in the production of exterior stucco than for other construction purposes, although the adoption of magnesite plasters not only is making very rapid progress, but it bids fair to assume the lead in utilization of plastic magnesite at no distant future date.

One of the distinctive features of magnesite stucco and plasters is that they *absolutely will not freeze* or suffer the slightest injury even if freshly applied in zero weather. Nor does the application of either oxychloride stucco or plaster require the services of an expert. Any plasterer competent to do good honest work can successfully apply magnesite products, it is claimed.

Both new exterior and interior construction may proceed throughout the winter months with the full knowledge that damage to the work or loss to the contractor on account of the cold may be entirely eliminated. Furthermore, because of the peculiar adaptability of stucco for remodeling and over-coating old buildings of all types without moving it or disturbing the occupants, it will be realized that the millions of homes and buildings already constructed provide a field of potential possibilities for the contractor to promote winter work.



No. 16

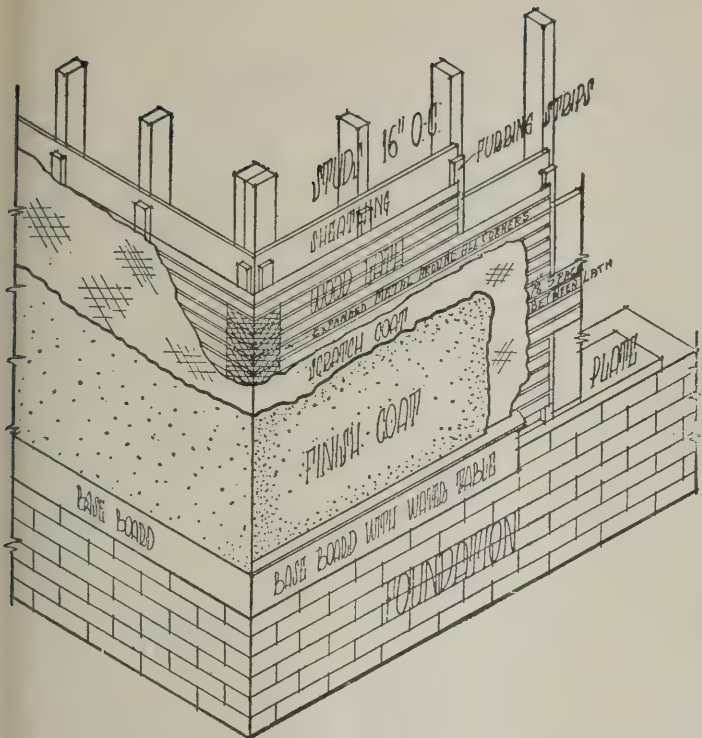


If building is made of soft or slap brick, stud with large roofing nails letting the heads project ¼".

No. 17

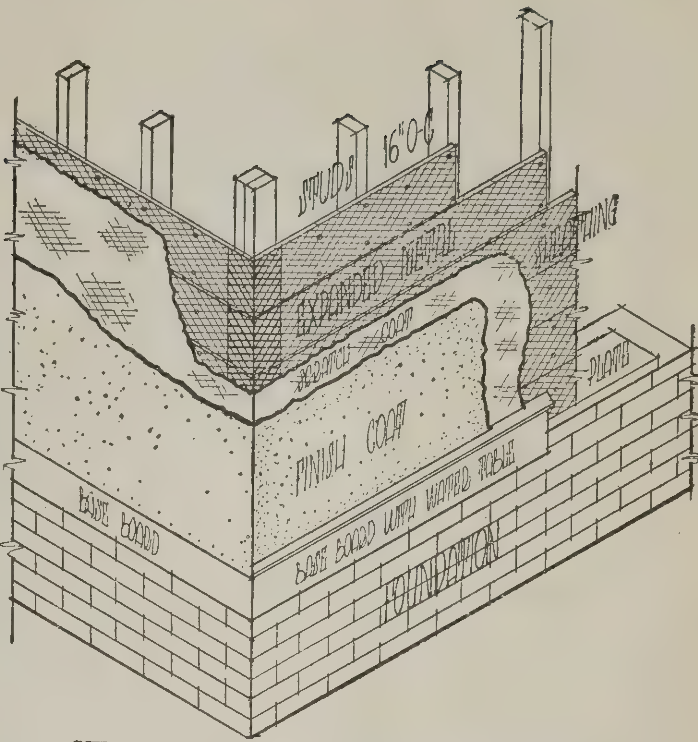
Magnesite for Interior Plaster

Magnesite interior plaster is unique in the line of plastic products. It is claimed to be tough, exceedingly light in weight, and possesses a tensile strength of upwards of 600 lbs. per square inch. The manufacturers claim that steam or water leaks through roofs or broken pipes do not damage this material. It is claimed to possess great flexibility, to be practically free from cracking, and not to break when struck hard knocks by furniture, doors, or household cleaning implements. It is high in fire



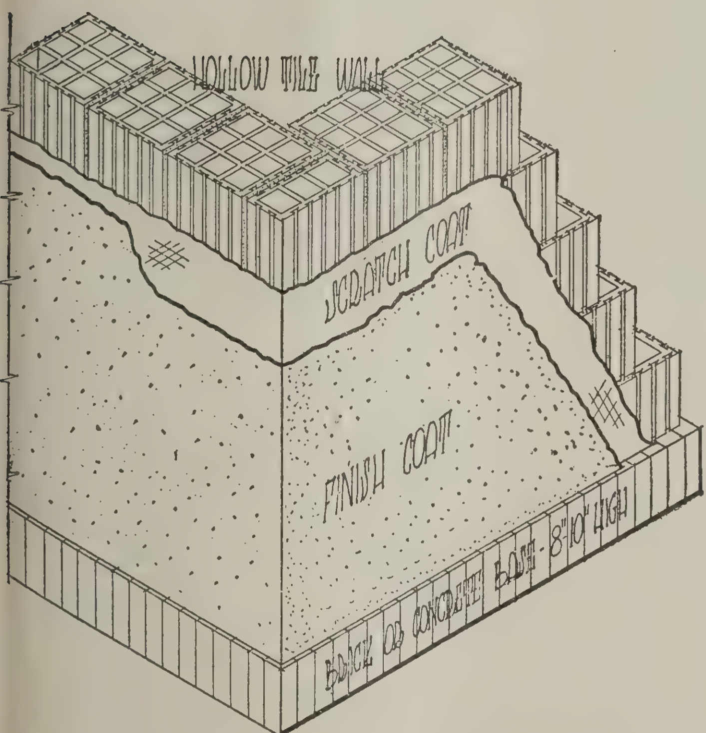
STUCCO—As applied over Wood Lath and Furring

FIGURE No. 1



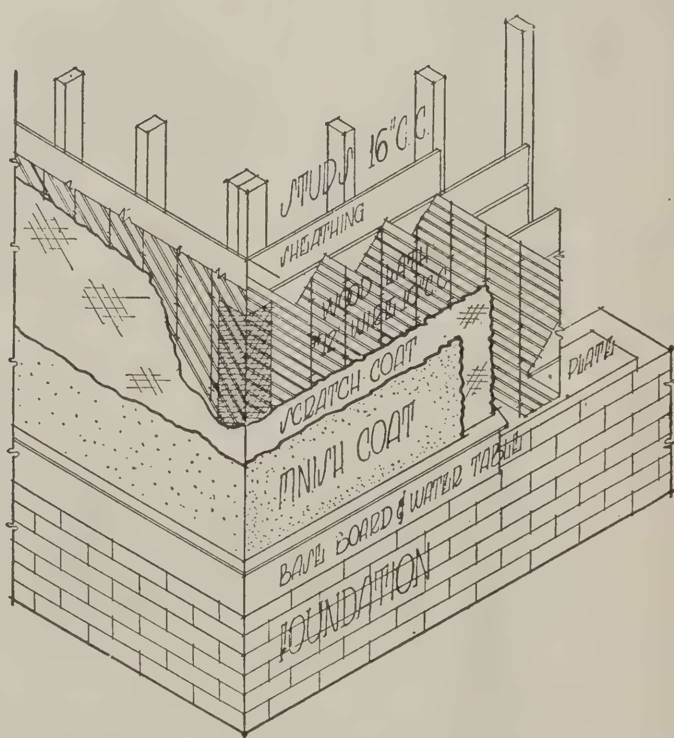
STUCCO—As applied over Expanded Metal and Sheathing

FIGURE No. 2



STUCCO—As applied to Hollow Tile Walls

FIGURE No. 3



STUCCO—As applied over Wood Lath direct on Sheathing, with No. 12 Gauge Wire placed vertically every 10"

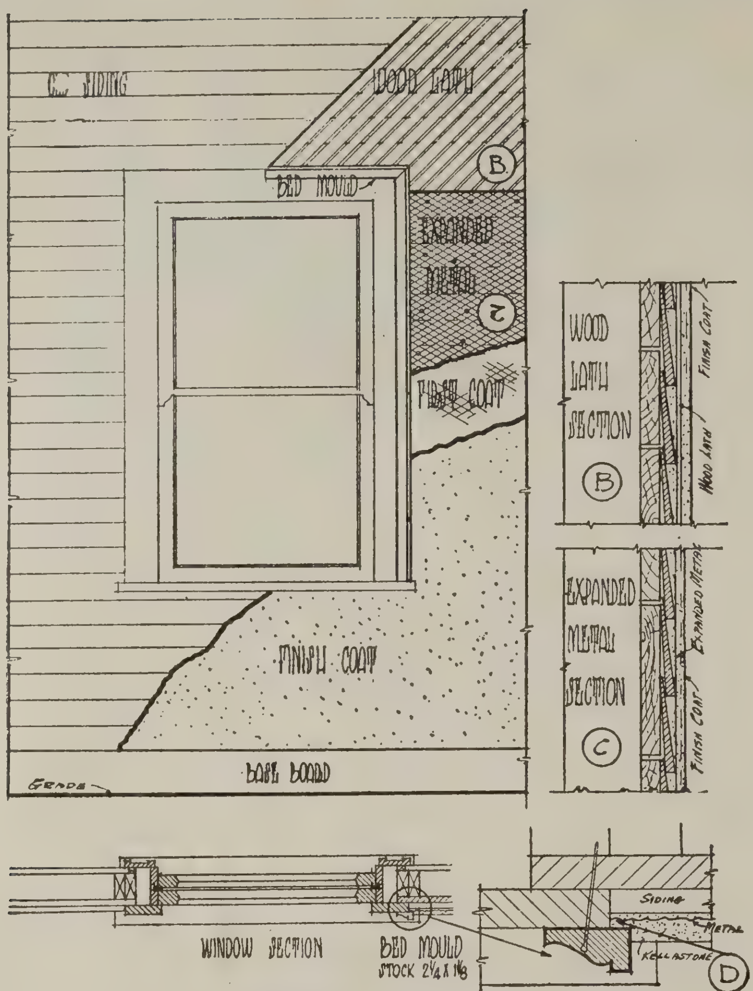
FIGURE No. 4

resistance; also in properties of insulation against heat, cold and sound, and it may be applied without protection of salamanders or other heat apparatus. Therefore, this plaster receives a high rating for winter construction purposes.

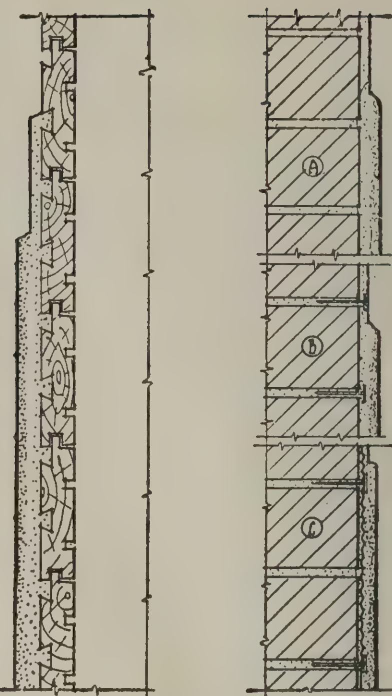
For plastering of bath rooms, kitchens, wainscoting and service wear, such as depots, schools, factories, etc., magnesite plaster is particularly well adapted.

For Tile Partitions

Magnesite partition tile weighs about one-third as much as burned clay tile, and is 50 per cent lighter than various gypsum plaster tiles, according to magnesite manufacturers. Magnesite tile, when layed up in oxychloride mortar, makes an absolutely fireproof partition. While magnesite tile



KE STUCCO —As applied over old Siding by two distinct methods
FIGURE No. 5



STUCCO

As applied over Byrkett Lath   As applied over Brick Work

A—Direct   B—Bonded by large-headed nails.
C—On Expanded Metal, secured by nails

FIGURE No. 6

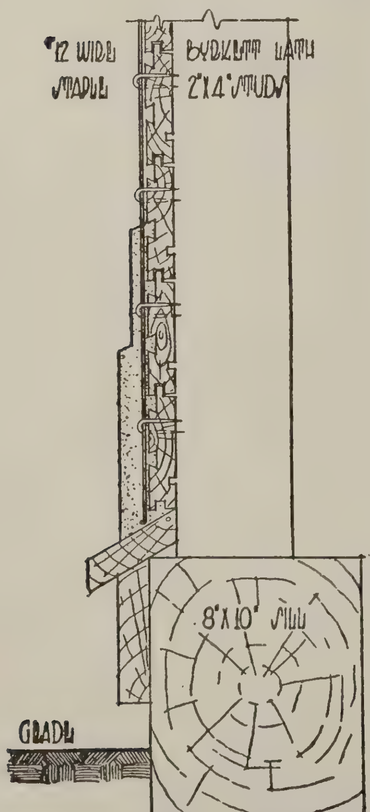


FIG. No. 7—SECTION

STUCCO

As applied over Byrkett Lath, with No. 12 Gauge Wire 10" C.C.

FIGURE No. 7

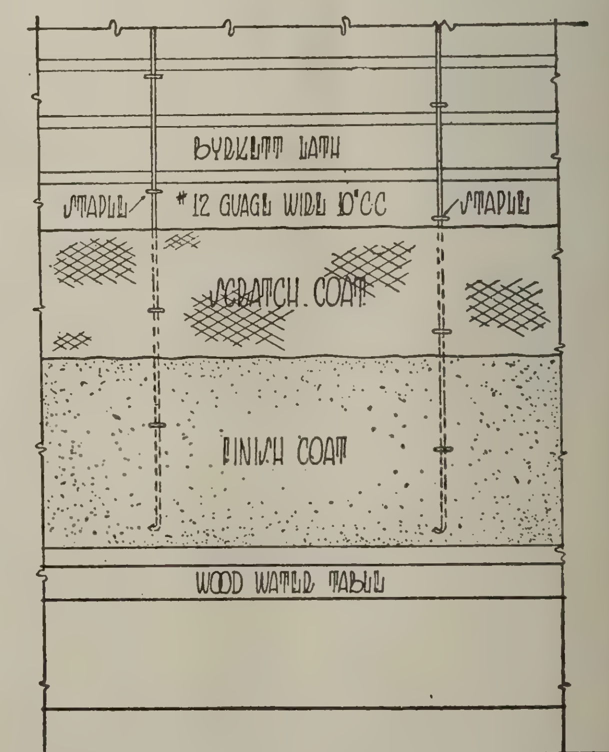


FIG.7—ELEVATION

partitions are substantially lighter than other fireproof partitions, they also are highest in resistance to breaking strain tests.

It is because magnesite building products may be used for so many different winter construction purposes that information indicating what magnesite is, where it is found, how it is recovered and how made usable, is both interesting and instructive.

Winter Painting

By A. H. Burt

Is it Advisable to Attempt Exterior Painting in Winter? What Should Be Watched in Interior Finishing During Winter Months? This Article Answers These Questions

IN THE PAST, building was looked upon as more or less of a seasonable activity. The general mode was to proceed with the foundation work in the spring as soon as the frost was out of the ground, and endeavor to complete the building before snow flew. If the building was not completed, operations were suspended awaiting warm weather.

In late years, it might almost be said that the building industry has come to know no seasons. The majority of work proceeds through the winter instead of awaiting the coming of spring. Many people are now quite as willing to proceed with their operations in the early fall as in the spring, especially in residence construction, so that by the time winter sets in the building is enclosed, and work can go forward without interruption.

This is the spirit of modern times. Due to the situation in the building industry today, when there is an enormous demand for housing facilities of every type, and a great mass of building tradesmen available for employment, the development of winter working methods in the building field is indeed a most fortunate thing.

Exterior Painting in the Winter

Regardless of the many obstacles which had to be met and overcome in winter building, there are some problems which still are not solved, in fact, some of them may never be solved. One of these is the problem of exterior painting during the cold months.

Exterior painting in the winter is a hazardous procedure at the best, on account of the fact that below a certain temperature linseed oil and other oils, which have come into popularity in paint making, do not dry satisfactorily. Where a paint does not dry normally, the life and the service of that paint is greatly impaired, and almost anything in the way of unsatisfactory results may be expected where paint is applied under adverse conditions.

Generally speaking, the following "don'ts" can be followed with wisdom by anyone contemplating exterior painting, regardless of the season of the year.

Don't paint in frosty weather when there is a chance of frost being on the surface to be painted.

Don't paint when the temperature is below 40 deg. F. Best results are secured when the temperature is between 60 and 70 deg. F.

Don't paint during or immediately following a rain storm. Allow the surface to dry out thoroughly before proceeding with painting operations.

Don't paint during the scorching hot weather in the summer.

Interior walls should be thoroughly dry before painting

This country of ours is so large, and so many different kinds of climatic conditions are found in the various sections during the winter months, that it is impossible to set forth any definite recommendations for winter painting operations for the country as a whole, but in those sections in the northern part of the country where snow can usually be expected in November to be present until the advent of spring, winter exterior painting is not to be recommended. There is no question about the fact that this is many times attempted, but seldom if ever are satisfactory results secured.

As was stated before, oil paints show a non-drying tendency in cold weather, and the average painter usually makes it a practice to add quantities of driers to paints thus used, to make them dry under the adverse conditions. This literally burns the life out of the paint, even though it may hasten the drying, and by summer the inadvisability of this method is soon apparent from the appearance and the condition of the paint.

In the case of new buildings which are not ready for paint until winter, the best method is to prime the surfaces with a thin priming coat of white lead, linseed oil and turpentine. This will take care of the preservation of the surfaces until favorable weather in the spring permits applying the finishing coats. Where this method of procedure is followed, the most satisfactory results can be expected.

In the southern and extreme western sections of the country, where a rainy season is experienced during the winter months, instead of the sharp cold weather of the north, the same procedure as recommended for the north, is advisable, because even though the temperature permits, there is the risk that a rain storm may come up during the painting operations. Rain storms are responsible for many unsatisfactory jobs of painting.

Where paint is applied over a damp surface or during a rain storm, blistering and peeling of the paint invariably results when the warm summer sun returns to throw its scorching rays upon the surface, and turn the moisture into vapor. The expanding of the vapor causes the film to rise in various sections and results in blistering and peeling.

There is one type of exterior finishing, however, which can be attempted safely during the winter months, and this is staining of exterior wooden surfaces, including shingles, with preservative shingle stains made of creosote oil. No difficulty will be experienced in securing a satisfactory finish with this type of material, and where it is necessary to secure a finished effect on exterior work in the winter, consideration of this method is recommended in place of taking a chance of securing passable results with paint.

Exterior staining work can be safely done in the winter

Interior Painting and Finishing During Winter Months

The painting and finishing of interior surfaces during the winter months is not fraught with the difficulties which are to be faced in the exterior painting, providing, of course, that the heating equipment has been installed in the building and is in operation. Regardless of how cold the weather is outside, if a temperature of from 60 to 75 deg. F. can be maintained on the inside, the best of results can be secured.

The thing that should be watched most carefully in the interior finishing, is the varnishing. Varnish, when drying, is extremely sensitive to drafts and changes in temperature. Where drafts strike varnish during the process of drying, the usual result is "pitting" of the varnish, or in other words, the varnish film appears to be full of fine pin pricks. Drafts sometimes result in the varnish "flatting" also.

When proceeding with the varnishing of an interior surface during cold weather, care should be taken to insure the fact that the varnish is approximately of room temperature. Under no circumstances should varnish be stored on the job in a cold place, but should be kept as warm as possible, otherwise it will become "chilled." When a varnish is chilled, the oil congeals, and if the varnish were to be used in this condition, the varnish film would appear to be full of specks and sand. Where a varnish becomes chilled, it should be brought into a warm room which is to be finished, and allowed to stand until it has reached room temperature. This procedure will cause the warmth to return to normal condition.

Where it is not possible to bring the temperature of the interior of the building to the point where satisfactory results with varnish are reasonably assured, the use of prepared wax is recommended, either for the floors or standing wood trim. Prepared wax is not sensitive to cold and drafts as is varnish and there is never a chance of unsatisfactory results in drying.

In the case of the standing trim, the use of one coat of spirit stain, one coat of thin pure shellac and two coats of prepared wax is recommended. No difficulty will be experienced with the drying of the spirit stain or shellac even though the temperature may be below 50 deg. F. The two coats of prepared wax should both be applied with soft cloths and rubbed to a hard, glossy finish with a brush approximating the stiffness of a shoe brush.

Floors which are to be finished with prepared wax should first be coated with a *thin* coat of pure shellac, unless the wood should be oak or of other open-grain variety, in which case the pores of the wood will first be filled with a paste filler. Care should be taken that the filler is given sufficient time to dry out thoroughly before coating with the shellac. Two coats of prepared wax should be applied as soon as the shellac is dry. A weighted floor brush is recommended for polishing, first polishing with the grain of the wood, and then across the grain.

The rest of the interior painting and finishing is a simple problem, as no difficulties will be experienced if an even moderate temperature is maintained where the work is being done. Of course, where walls are to be painted, care should be taken that sufficient time has been allowed for them to dry out thoroughly, and even then it is well, where using a flat wall finish, to use a mixture of 50% paint and 50% varnish mixing size in the coat of paint, and also a small amount of mixing size in the second coat, in order to seal the plaster surface and prevent any moisture, which still may be present, from staining the paint.

Diamonds for Glass Cutting

In a lecture delivered by Dr. Morris Travers in the rooms of the Royal Society of Arts, London, and reported in *The Pottery Gazette and Glass Trade Review,* the speaker began with a reference to the question of diamond cutting. Very few people, he said, were aware of the fact that the cutting with the diamond was not done on the point. A perfect diamond should be a solid figure with six cutting edges. It was the edge of the diamond with which the cutting was done, not the point. As the diamond was set in the piece of metal, it was embedded so that an edge was the part with which the cutting could conveniently be done. If the glass was made to bear on the point, the diamond would merely scratch the glass, but when the edge was brought over, the scratching noise of the diamond ceased, and it began to sing, a sign that the cutting was taking place. When one edge of the diamond was worn down, a second could be taken, and even a third, and sometimes a fourth edge. One never got to the sixth edge, because things in nature were not so perfect, mechanically, as they should be.—*The Glass Industry.*

Photographic Building Records

By V. L. Sherman

SEVEN photographs of varied character came to hand recently which seem worth discussion. They are not commercial photographs, are no better and no worse than the average, but each is part of a record. It is quite in order to keep photographic records or "scrap-books." Let me recite the instances of an architect who kept a motley collection of pictures to help in smoothing out the difficulties of those who could not imagine from blue-prints; and of the contractor who, generally designing his own houses, used to enlarge a photograph of the location and sketch in from the proposed plans. He had a knack at scale perspective and thus saved himself more than one blunder in the appearance of his houses. There was another contractor who built for selling. He would take photographs of each of the houses at different stages and these would be used to promote

Fig. 1—Mullioned window-framing

Fig. 4—More work for the steam shovel

Fig. 2—Partition studding caught between joists

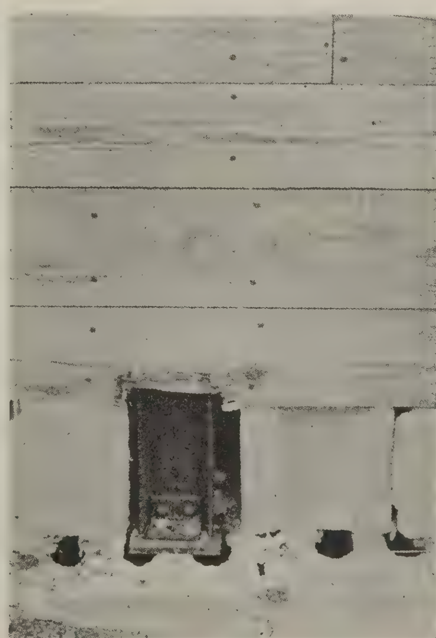


Fig. 3—Unlucky construction

Fig. 5—Entire collapse

the sale with anyone having the least suspicion of its construction. His reputation was perfect with those who knew him, but most of his buyers were strangers to him and to his agents.

This collection of mine contains illustrations of how to do it, and of how not to do it. Figures 1 and 2 fall under the first head. Whoever built the house which shows the mullioned window-frame was not satisfied with up-edged two-by-fours or a two-by-four truss for the wall plate. Over that span he used two two-by-tens. The builder was generous with his timber, and so was the tinner, by the looks of the joist in the upper right-hand corner of the picture.

The second picture, Fig. 2, shows the

Fig. 6—Shoring on opposite wall?

method of carrying the second floor partition studding between joists. This makes for a pretty strong section of beam below the wall, and if well built should carry the load better. If the tinner comes up from below with another riser maybe they can prevail on him to cut the upper edge of the joist and not disturb the floor too much.

The next exhibit shows an upright beam bearing on the inner member of a concrete block. If the construction is not meant to be temporary, and apparently it is not, a long sermon could be written about it. Let's pass it with the suggestion that it will be temporary, after all, and look at the next three.

These show the results of depending and impending too much upon weakened foundation walls. The sender of these writes that "an exceptionally heavy rain storm *contributed* to the undermining of the foundation of the two-story brick building just back of the steam shovel," (we can't see the building, but we can see what is left of it) "resulting in the complete collapse on the edge of a partially excavated basement. In order to *prevent a like occurrence* on the opposite side of the excavation the contractor resorted to shoring."

I should like to present the picture of the policeman whose bravery and instinct lead him to chase the occupants out when he saw the plate glass shatter on the sidewalk. A few minutes later the bricks had reached their angle of repose.

Cold Weather Does Not Bother This Builder

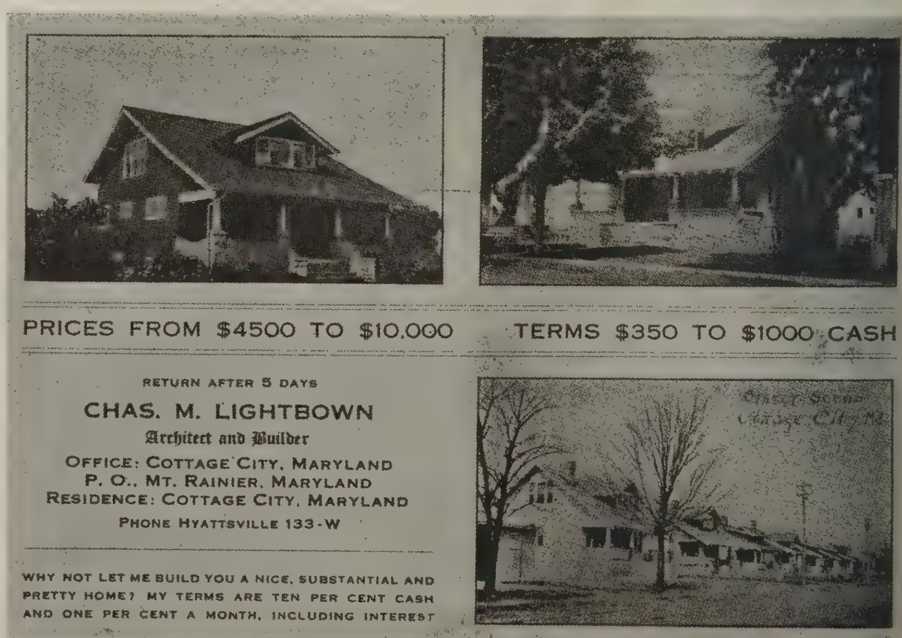
CHARLES M. LIGHTBOWN, Cottage City, Md., is an architect and builder in a Washington, D. C., suburb. Even the envelopes he uses shows he has enterprise. He writes NATIONAL BUILDER about the practicability of winter work as follows:

"I carry the same force through the winter months, that works for me throughout the balance of the year. At present I have taken half of my force from regular building and have them getting in five foundations for houses to work on during the winter months. We will get these houses under roof and closed in ready for plastering as the weather permits. The plastering will be mixed in the cellars, of each house; furnaces will be set up and a ton of coal placed in each cellar. Firewood from our saw mill will be used instead of coal until the thermometer registers about twenty-five above; when we will begin to use coal. The entire inside of the houses will be completed ready for occupancy, during the winter months. The men will work on the inside only when the weather is too bad for exterior work.

"I am ordering a few loads of fresh manure, which will be spread over the concrete walk and road work, first covering the work with black waterproof paper. This manure can be used throughout the winter. From about eleven in the morning until four in the afternoon on the moderate days, the paper and manure should be laid back to allow the sun and air to get to the work, covering the concrete again at night.

"By heating the gravel I think it safe to do any form concrete work, when the thermometer is registering between twenty-five and thirty-five. By heating the water, gravel and sand, I believe it safe to do form concrete work when the thermometer is registering down to fifteen.

"Does winter time work pay the builder? It does. When April the fifteenth rolls around, you have tenants moving into your houses or you are turning over your contract job to the owner and receiving the balance due you and are ready to start the new work. How about the fellow who waited? He is starting in on work similar to that you have finished while you are starting more new work; and he will never catch you. The secret of the success of this United States is, go ahead winter or summer, sunshine or rain—no waiting."



Printed on his business envelope

Fundamentals of Accounting

No. 2--By G. W. Hafner

Audits, Systems, Federal Tax Service, Industrial Engineering

To Accurately Record and Vividly Portray All Transformations of Cash is the Purpose of Accounting

ALL BUSINESS transactions of whatever kind consist, essentially, in transforming cash into salable goods, or services, and then transforming salable goods or services into cash. This is the sum and substance of all business.

To begin with a certain amount of cash on hand is in the possession of the business. This cash is expended in the purchase of whatever merchandise or labor it has been decided to deal in. This merchandise or labor is sold and cash is received in return.

If the business has been successful in disposing of its goods or services, the cash received from them will cover the original purchase outlay, plus an increase of the total sum involved, which will be profit.

It is evident that there are two transformations in these transactions of purchase and sale. First, cash is transformed into merchandise or labor expended; second, merchandise and labor are transformed into cash.

But no business is quite so simple and easy to handle as this may signify. Another element must be taken into consideration. In addition to the merchandise which is stocked, or other men's labor in a merchandising sense, cash is also expended for things which cannot be sold—for expenses. In other words, it costs money to do business.

Expenses are the natural and inevitable concomitant of every business. They are co-existent, contemporary with the business itself. Rent, insurance, taxes, depreciation, postage, stationery, certain wages, salaries, and what not, go hand in hand with the conduct of any commercial enterprise.

This means that an element of complexity has been introduced into the transformation of cash. It means that only a part of the total amount of cash is available for the purchase of merchandise and labor. It means that part of it must be expended for rent, for letterheads, for billheads, for stamps, for any one and all of the things which no customer will buy, and yet which are necessary to the proper conduct of the business.

Hence, when merchandise or service is sold, a price must be secured large enough to cover, not alone the cost of the goods or service themselves, but also the cost of all these necessary, essential, indispensable expenses.

Books of Accounts

It is evident, therefore, that the main interest of the business is always centered in the condition of its cash, which, in the language of business, is known as "Capital." Consequently, the necessity for accounting arises, in order that the condition of cash may be determined at any time.

Bookkeeping is the means by and through which the conditions of cash, or capital, may be determined at any time

Accounting is an interpretation of the results of bookkeeping.

And in the application of methods to the data of business, a well-defined scientific technique has been developed. This technique when resolved into its simplest elements finds expression in three forms of records. These are:

1—Books of original entry.

2—Journals.

3—Ledgers.

Whatever may be the many contrivances and devices employed in collecting and classifying data and co-ordinating it, while adapting the technique of accounting to the needs of the individual business, they all relate themselves directly to these elementary principles.

And if the necessary forms and methods are accurately used, the information secured is so complete and scientifically accurate that an error in a single entry among a thousand, or a mistake of a cent among transactions amounting to millions of dollars, will throw the whole machinery of accounting control into confusion till the error is located and adjusted.

Books of original entry serve as a means of recording the transformations of business transactions, such as the following:

(A) *Cash into salable goods and expenses.*

(B) *Salable goods into sales on credit.*

(C) *Sales on credit into cash received.*

Journals, in modern accounting practice, are generally combined with books of original entry, and as the various transactions are summarized in them, serve to indicate their destination, thus:

(A) *Cash received: charged to the bank and credited to individual or firm paying it.*

(B) *Cash paid out: charged to individual or firm from whom purchase was made, and credited to the bank.*

(C) *Sales: charged to individual making purchase and credited to sales account.*

Ledger accounts may be viewed as two columns of figures, as illustrated by the cash account. The entires to the left hand column sum up all the cash put into the bank, or into the cash box or till. The entries to the right hand column constitute all the cash taken out of the bank or till. If both columns are added, and the total of one column is subtracted from the total of the other column, the difference between them will obviously represent the cash still on hand, whether that be in the bank, or in the till, or in both.

Real Accounts

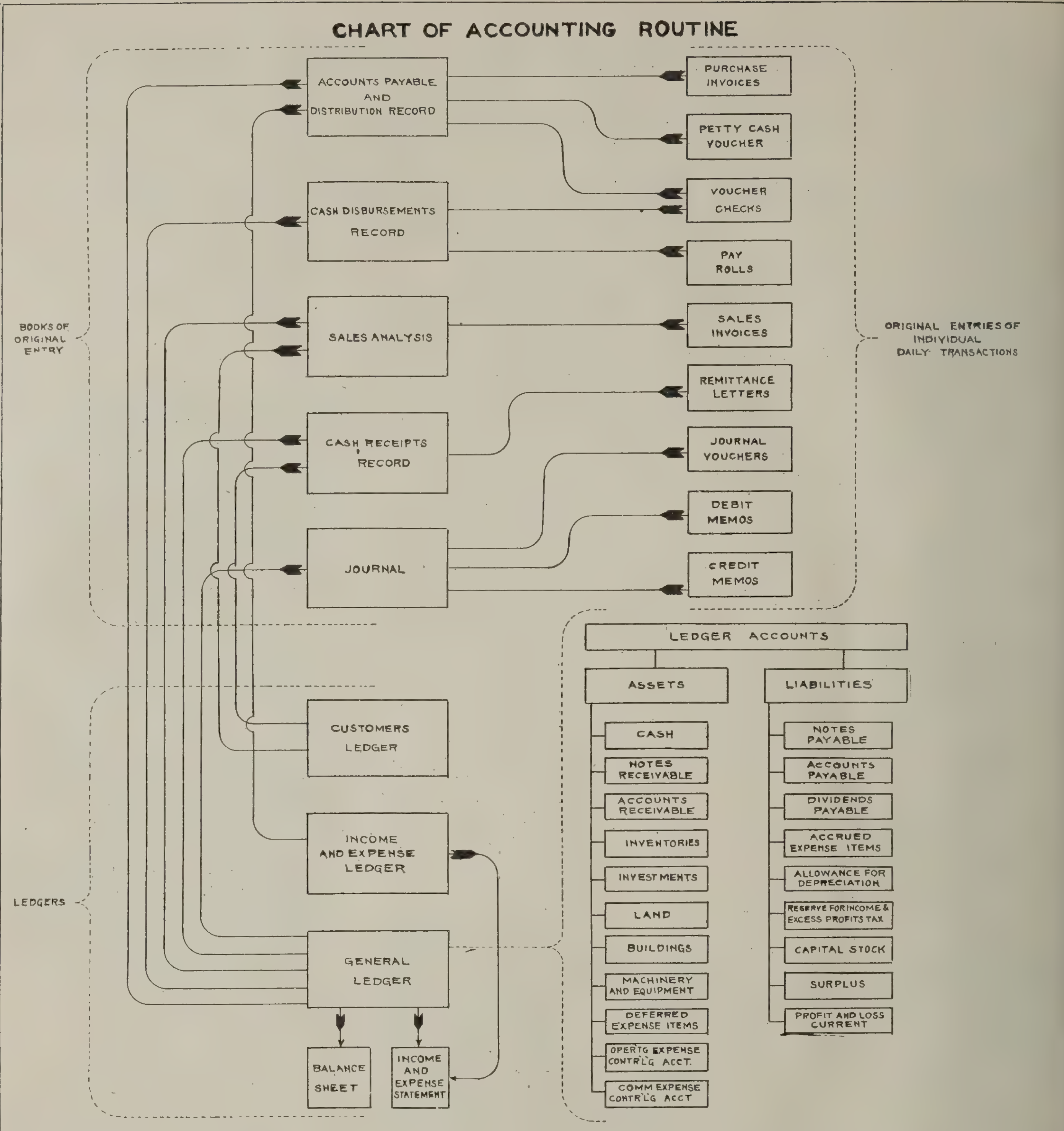
This cash account is what is termed a *real account.* It represents actual, substantial, tangible property—property in our possession which we can see and handle. Land, buildings, equipment or goods of all kinds are also *real accounts.* Any balance that remains in any of these accounts must of necessity always appear on one side, because it is impossible to have taken out more than was originally put in.

But ledger accounts do not always represent tangible assets or property. The reason for this lies in the very nature of double entry bookkeeping, which demands that every transaction be entered twice, in order to show both sides of the transformation involved. In other words, "what it was" and "what it is" must both be represented in ledger accounts.

Cash Transformations

In order that this may be illustrated, let us assume that a certain business starts out with an investment of $10,000. It is necessary to make a permanent financial record of this fact. In order to accomplish that, a bookkeeping entry is made, which charges the $10,000 to "Cash" account, and credits a like amount to individual "Investment" accounts, if the business is a sole proprietorship or a co-partnership, or to "Capital Stock" account if a corporation. What we have, then is a debit balance of $10,000 in cash in one ledger account and a corresponding credit item of capital in another ledger account.

From this, it is at once evident that whatever transformations we affect in the form



HAFNER METHODS

FIGURE ONE
THE FUNCTIONS OF DOUBLE ENTRY BOOKS ARE TO PRODUCE A PERMANENT RECORD, AND TO FOCUS ALL TRANSACTIONS INTO A FINAL BALANCE SHEET AND PROFIT AND LOSS STATEMENT
THE ARROWS SHOW HOW THIS IS ACCOMPLISHED

of cash, the balance of these must always balance with the entry of capital until we have either made a profit—an addition to capital, or a loss—a diminishment of capital.

When materials are purchased, the transformation of cash must be recorded in both its aspects; that is to say, "Merchandise" must be charged with the amount we have paid or will have to pay for it, and "Cash" must be credited with the amount paid, whether that be immediately or some time later on, depending, certainly, upon whether purchase was made for cash or on credit.

Assuming that $5,000 was spent for materials and that the entries were made covering this transaction, we would have three accounts in our ledger; that is, one with "Capital" showing a credit balance of $10,000 and one each with "Cash" and "Merchandise" with debit balances of $5,000.

In the first instance, the debit entry of $10,000 in our cash account balanced the credit entry in capital account. In the second instance, the debit entries in both cash and merchandise accounts balanced the entry in capital account as before. The reason for this is because the fundamental principle underlying double-entry bookkeeping is to maintain a balance between proprietorship on the one hand and goods or property on the other.

Nominal Accounts

Up to this point the balance between capital or proprietorship, and assets or property has not been affected. True, the form of our property has been changed, since part of our cash was used to purchase goods; but the total of our two property accounts, represented by cash and merchandise, equals capital account, or the initial $10,000 invested in the business.

Let us now extend our bookkeeping procedure to represent a condition where cash is paid out, not alone for merchandise, but also for certain expenses. In addition to the use of cash in the purchase of goods to the value of $5,000, it has been found necessary to make further expenditures of cash, which, let us say, are represented by the following

Salaries	$300
Wages	200
Rent	150
Light and heat	50
Depreciation	45
Stationery	60
Postage	30
Total	$835

All these transformations of cash having been recorded, we have set up on the ledger seven new accounts; *i. e.*, salaries, $300; wages, $200; rent, $150; light and heat, $50; depreciation, $45; stationery, $60; postage, $30.

This being done, we are confronted immediately with the question as to whether the total of the assets still equals the capital. It does not. Our cash is now reduced to a balance of $4,165 and our merchandise being worth $5,000, the total value of our assets is $9,165 only. It is obvious that none of these last seven accounts represents anything in our possession. We have paid out our money for all of them, but we have nothing tangible remaining. They do not represent anything real. They do not represent property. Hence, they are known as **nominal accounts.**

Sales and Expenses

Now, since accounts with expenses do not represent anything real and tangible, our balance between property on the one hand and capital on the other is disturbed. The reason for this apparent discrepancy is that, as yet, we have sold nothing. Expenses have been incurred for doing business, but our business has consisted so far only in buying. In order to round out the entire procedure we must introduce the element of sales.

Let us assume, therefore, that we sold a quantity of merchandise and received cash in return to the value of $2,500, and that these goods which were sold represented a cost to us of $1,250. It is evident that a gross profit of $1,250 has been earned. (By gross profit is meant a profit from which the expenses of doing business have not been deducted. By reducing the gross profit by the amount of such expenses, as will be seen, the property accounts are finally brought into balance with capital.)

Bookkeeping Procedure for Sales Transactions

The sale of merchandise involves an entirely new element in our transactions. Heretofore all our transformations have been equal. It develops now that we have sold $1,250 worth of merchandise and have received $1,250 in return. Hence, we are faced with the necessity of entering each item from two aspects; that is to say, in two values.

The sale is entered, in the first place, from the viewpoint of its cost to us; in the second place, it is entered from the viewpoint of its selling price. Each of these entries must be charged and credited to ledger accounts.

First, the sales are charged to "Sales" account, *at their cost to us,* the corresponding credit being made to "Merchandise" account.

Secondly, the sales are charged to the customer or customers, *at their selling price,* "Sales" account being credited with a like amount.

Thirdly, as the money is received from the customer, "Cash" account is charged, and the individual or firm making payment is credited.

We have now passed through, in our bookkeeping arrangement, a complete cycle of transactions, and should be in a position to prepare a balance sheet and profit and loss statement thus:

BALANCE SHEET

Assets

Cash on hand	$ 6,665
Merchandise on hand	3,750
Total assets	$10,415

Liabilities

Capital	$10,000
Profit and loss (surplus)	415
Total liabilities	$10,415

PROFIT AND LOSS STATEMENT

Sales		$2,500
Less: Cost of goods sold		1,250
Gross profits		$1,250
Expenses—		
Salaries	$300	
Wages	200	
Rent	150	
Light and heat	50	
Depreciation	45	
Stationery	60	
Postage	30	
		835
Net profit		$ 415

It is evident that, in a business of any size and importance, the simple mechanism thus far developed for keeping track of the results of buying and selling would require supplementing, in order to adequately take care of peculiar conditions within the particular industry.

Hence, the purpose of subsequent articles in this series will be to fully develop a complete accounting and cost finding plan, based on the fundamentals outlined herein, which will be specially adapted to the use of the building construction industry—a system of record keeping literally built for contractors and builders.

(*To be continued*)

Construction Industry on the Map*

WE are a small bunch of men whose business is construction. We are officers, directors and members of a national association named the Associated General Contractors of America, which is working in the interest of construction, also, of course, in the interest of its members.

The Associated General Contractors of America has a big name, representing, as it does, one of the greatest and most important of essential industries. We are "carrying a message to Garcia" at the command of one whose commands always are either an appeal to patriotism or an appeal to service to humanity—Herbert Hoover, Secretary of Commerce.

We shall take advantage of the opportunity to get as far as possible in personal contact with our brothers in industry, and we shall also take advantage of the opportunities afforded of taking the public into our confidence.

The association will work in the public interest just as much as it will work in the interest of its members. It will, in co-operation with architectural and engineering societies, bring about a standardization of building codes—in this and many other ways, it will be instrumental in eliminating waste in construction—eliminating waste cheapens construction—cheapening construction increases construction—increasing construction makes more work for constructors, and there you have it in brief.

Just two other things that I wish particularly to emphasize: First, our association is in no way directly or indirectly a price-fixing one. It couldn't be if it would be, and it shouldn't be if it could be; and lastly, from the time of Caesar to the present, construction has been one of the greatest and most important of essential industries, and yet, not until now, has construction, broadly speaking, had a seat in the nation's business council; not until now has construction had a place on the nation's business map. That it has that seat and that place now, you and I must thank the Associated General Contractors of America.

*Remarks made by W. O. Winston, president of the A. G. C., at a meeting called to consider the relationship of construction to unemployment at Omaha, Neb., October 20, 1921.

Questions, Answers, Kinks and Discussions--V. L. Sherman, Editor

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your Whils to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

Beg Your Pardon

IN the November number a photograph of a Veterans' Bureau student in Baltimore carried the name of Mr. H. J. Betty, Chief, Co-operation Division, U. S. Veterans' Bureau. This was a mistake on our part, to which we call your attention.

Frame Structure

WE hope the reader will excuse the transgression and digression in the following:

The first article in "Kinks" for the October issue was submitted in good faith by a builder from the South who believed that the ordinary method of corner bracing for frame structures could be improved by reversing the thrust. To do this he inverted the corner braces. The idea was not absolutely novel, but it was considered new enough to raise at least a few objections or to call for argument.

The indifference shown to this presentation put me in mind of the lack of interest shown during a building boom in a small town as to character of house framing. This small town ran through a lively rate of work last spring and summer. The business was not through one man or firm, but was spread wide enough to make competition. Selling prices made the builders cut the costs, and a few houses were partially constructed carrying a stucco base in place of sheathing. This base was rather light stuff and generally carried stucco. In a few instances it carried clapboards. No one paid any attention to the matter until a competitor called a banker's attention to it. On inspection loans were refused on these houses. The builder thereupon apparently proved to the bank that the base was stronger than sheathing for bracing, possibly because it cost a little more. But that did not stop his competitors, and the village fathers finally named a committee to draw a building ordinance.

This ordinance, drawn by one of their own number, an architect, and a builder of high repute, was an excellent piece of work. While it encouraged the young fellow of small capital, the man of moderate means, and made them welcome in a town where rented houses are scarce as hens' teeth, it made some nice distinctions as to how houses should be built. And it threw that stucco base into the discard so far as its sheeting qualities were concerned.

The point is that without competition perhaps no argument would have been raised.

Now let's hark back to that corner brace. One letter comes from [illegible]. J. S.: "There are three forms of framing; full-framing, half-framing and balloon-framing. Most houses nowadays are a combination of the last two. They are not as heavy as the old timers, but they are steady and strong enough if not too large. We used to use stone foundations and anchor bolts. Now that concrete blocks have come in we leave out the anchor bolts because we figure that any wind strong enough to lift the house would break the upper foundation anyway.

"A few nights ago a wind storm woke me. While I was closing the windows it

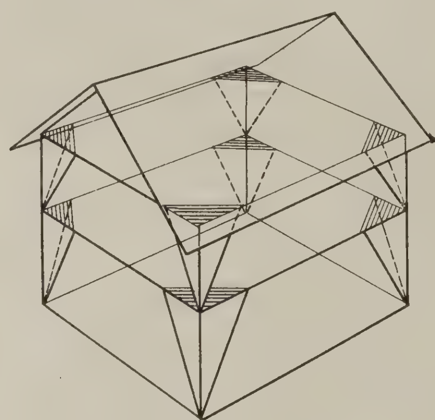


Fig. 1

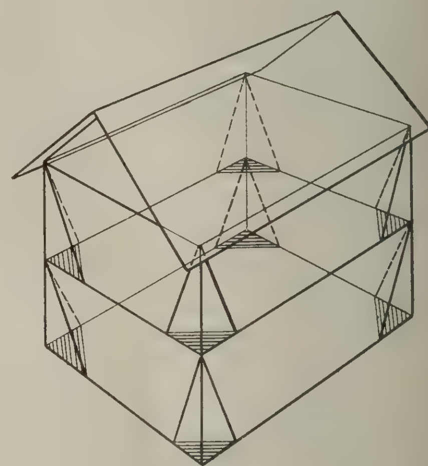


Fig. 2

Notice the construction of near side of barn

blew like the very dickens, and I could feel the wind hit and suck around the house which is in an exposed position. It did not last long enough to do any damage, but the next evening I took down my Kidder to look up wind pressures. I found that a velocity of eighty miles an hour gave a pressure of 25.6 pounds to the square foot. (I know eighty miles an hour is rare, but I have seen it blow that hard for six or seven hours at a stretch.) That gave a pressure of about ten tons if the wind struck broadside. Then I figured the weight of the house above the bed-plate to be about seventeen tons. If the house were well built so that it would act as a unit in resisting wind pressure everything was safe enough from damage.

"Then I thought about your subscriber from Georgia, and I made a couple of perspective sketches, not like yours, of his way and the usual way of corner framing. Don't know but he is some right after all. Taking all sides together in the upper figure (Fig. 1), wouldn't the framing be more of a unit than in the lower figure (Fig. 2)? The weight of the house alone makes a stronger connection between the studding and the bed-plate and it seems to me his method makes the framing stiffer above, where the leverage of the wind is greater. Remember, I'm not talking about one corner alone, or about a cyclone that would blow any frame structure to matchwood, but about enough resistance being put into a house to prevent strain."

We pass this letter on to you with the statement that like those who "pay more attention to the health of their live stock than to the health of their children," some pay a great deal more attention to barn-framing than others do to house-framing.

Finding Lengths of Jack and Hip Rafters

L. F., of Omeonta, N. Y., writes: "I submit the enclosed sketch (Fig. 3) and

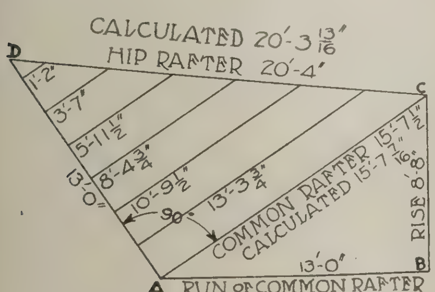
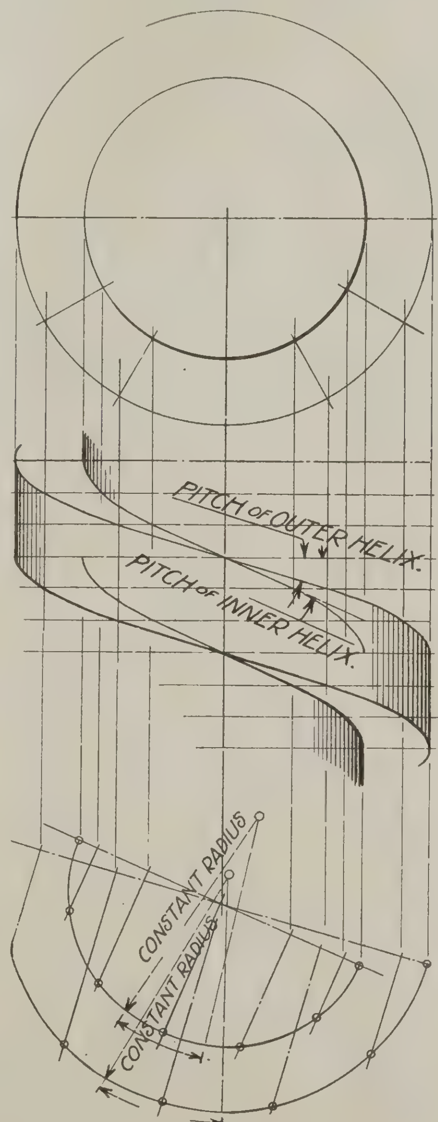


Fig. 3

explanation as a kink for finding lengths of jack and valley rafters. The sketch is easily drawn on a piece of wallboard; a convenient scale to use is 1 inch to 1 foot. Draw the line *AB* to represent the run of the common rafter, equal to one-half the width of the building. Then draw *BC* equal to the rise of the common rafter. *AC* gives the common rafter. Now draw *AD* at right angles to *AC* and equal in length to *AB* or the run of the common rafter. Connect *C* and *D*. This gives the length of the hip rafter. Draw lines parallel to *AC*, or the common rafter, at whatever spacing required. These lines represent the jack rafters and can be scaled to get the respective lengths. The completed diagram, *A-C-D-A*, is a review of the roof normal to the slope."

Helical Chute

F. K. requests information concerning a helical or spiral chute. "I know that a true helical surface is known to be a warped surface, i. e., a surface which cannot embody a flat plane. But they are constructed of sheet metal without much misshape, possibly on the same principle that a square thread is cut in a lathe."



Figs 4 and 5

The screw conveyor and the helical chute comprise surfaces which are warped. In making these surfaces some firms roll the outer edge and some stretch the metal, but perhaps this will answer the purpose.

Figure 4 shows the chute as it would appear. You will note that the angle of the inner and outer walls in crossing the axis effect different angles or pitches. You will also note, from the plan view, that the inner and outer walls are spirals on cylinders of different diameters. We suggest laying out the cylinders as near full size as practicable, sectioning them at the angles shown on the helices, and developing about twenty degrees of the resultant ellipse. See Fig. 5. Find the nearest radii that will fall from the same center, that is, locate a center that will cover both ellipses over this short distance, and use these radii in laying out the sections of the upper and lower walls.

The side walls, inner and outer, are cut to size with normal or oblique ends. Rectangular sheets will probably cause difficulty in hooking up. Joints should be broken.

The greater the ratio between the two diameters the more difficult will be the work. If you approach the axis of the helix you cannot do the work without warping the surfaces in some way. In connection with square threads it might be said that they are not true surfaces and that the screw and nut need some leeway to be made to fit properly.

Water-Tight Window Sills

H. F. C., a contractor and builder of Wye Mills, Maryland, writes: "I find your *Questions and Answers* very interesting,

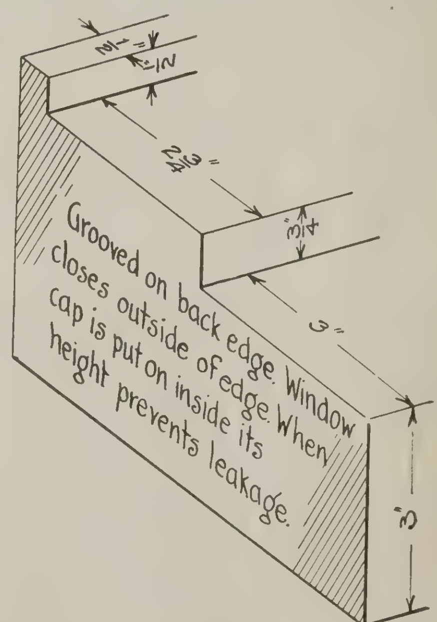


Fig. 6

and thought perhaps the item of a window sill that will not leak might interest some of the readers of National Builder. I have had a good deal of trouble with windows leaking between the main sill and the sub-sill, and in order to overcome this I am now having all my sill and sub-sill made in one piece. (See Fig. 6). I also have it grooved, so that when the window is down the upper edge of the sill on the inside of the window is one-half inch above the bottom of the window, which makes it absolutely water-tight."

For Cutting Rubberoid Roofing

Use a scratch awl and a straight edge instead of a knife on all kinds of roll roofing. It works fine.—S. E. Thomas, Alamogardo, New Mexico.

Commendation for W. L. C.'s Form for Setting Grounds

"Was interested in W. L. C's article on the ground setter, page 58, of the November issue," writes an Ohio subscriber. "We always use such a form, made for a standard jamb 5¼ inches, with a plumb bob on it. It is always ready and easily used, giving perfect results."

Constructing a Box Stair

A. G. Y., of Ogunquit, Maine, sends in the following kink (Fig. 7) which he de-

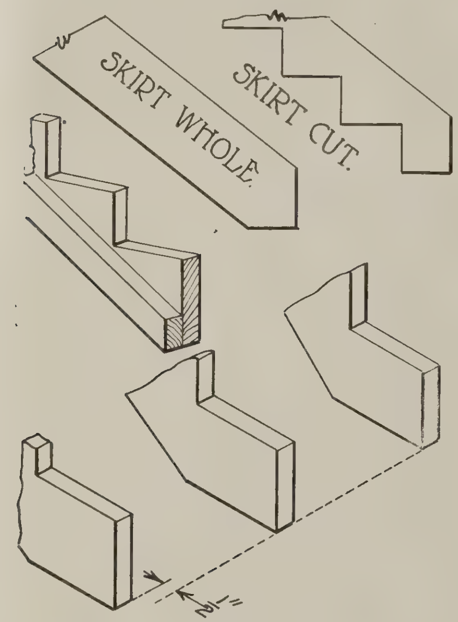


Fig. 7

scribes as a quick way of putting up a box stair: "I cut my carriages and hold them from the wall 2 inches. The laths and plaster take one, and the skirt board goes in whole without cutting. This saves a man the trouble of getting the stairs almost done and having one of the small picked corners break off and make a patched-up job.

"On an open stairway I always hold my wall carriage back so that a half-inch wedge dropped in back of my riser will make it fit tight. This also gives the workman a better show to see what he is doing."

Fitting Hardware

F. O. M., Edenton, N. C., sends us the following kink, Fig. 8: "If, when a mechanic fits a lock to a door and starts to

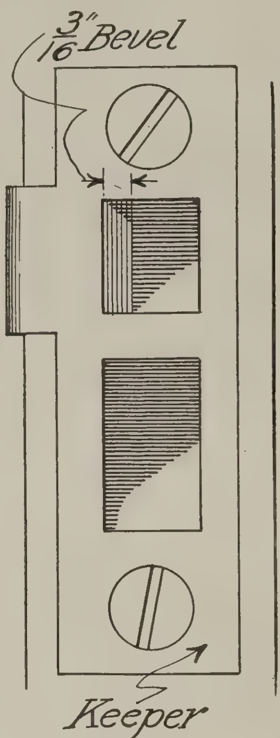


Fig. 8

put the keeper on, instead of cutting out a hole where the two bolts go in he should cut the hole with a 3/16-inch bevel from the front to the back. The thumb bolt will then go in against the wood, making it a tight hole and a noiseless door."

Estimating Shingles

S. E. T., of Alamogardo, New Mexico, writes: "In answer to R. D. of New York, who wants to know how to estimate shingles (see the August, 1921, National Builder, page 45), I use the following rule: Take the entire length of rafter in inches and divide by the number of inches exposed to the weather. This will give the number of courses of shingles required for one side, to which add one for the double course at the bottom. Then take the length of the roof in feet and multiply by *three,* the number of shingles per foot, and you have the number of shingles per course. Multiply this by the number of courses and you have the number of shingles required for one side, which, doubled, will give the entire amount required for the roof. For example: Length of rafter, 11 feet equals 132 inches; divided by 4½ (number of inches shown to the weather) equals 29⅓ or thirty courses. Add one for the double course, and we have 31 courses. Length of roof, 22 feet; multiplied by 3 (number of shingles to the foot) gives 66 shingles per course. Multiply 66 by 31, the number of courses for one side, and you have 2,046 shingles needed for one side of the roof."

Rafter Jig

"Mixing the crafts," might well be the heading for this kink. M. J. S. writes: "My younger brother, a tool maker's apprentice, was more or less idle last spring. He loafed around one of my jobs, watching the work, and remarked that there seemed to be a good deal of marking and sawing of rafters. The work was pretty full of hips, jacks, etc., particularly jacks. He asked me if I could use a jig and I told him I didn't dance. He laughed at me but came around that evening with a sketch and together we worked out this arrangement. (Fig. 8.)

"You mark the length of the rafter, put it into the mitre box under the strap iron and up to the mark. Then you take a

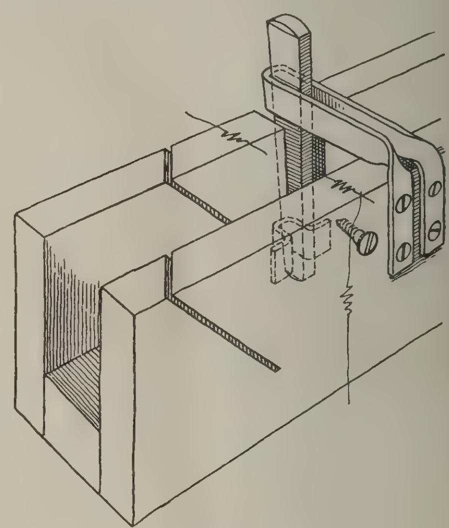


Fig. 9

cotter pin (he picked out an old one with a taper of ½" per foot), and slip it into the two straps back of the rafter and hit it a light clip. This forces the 2"x6" against a couple of filed down screws set on each side of the strap and these and the cotter-pin hold the piece well enough to saw without any trouble. He made me one each for ½ pitch, ⅓ pitch and ¼ pitch, for which I paid him. Then, I suppose, he changed from 'jigs' to 'jazz.' However, they are light enough to be handled readily, and have saved some time. It doesn't hurt to keep a couple of extra cotters handy."

Cold Weather Construction on Farm Buildings

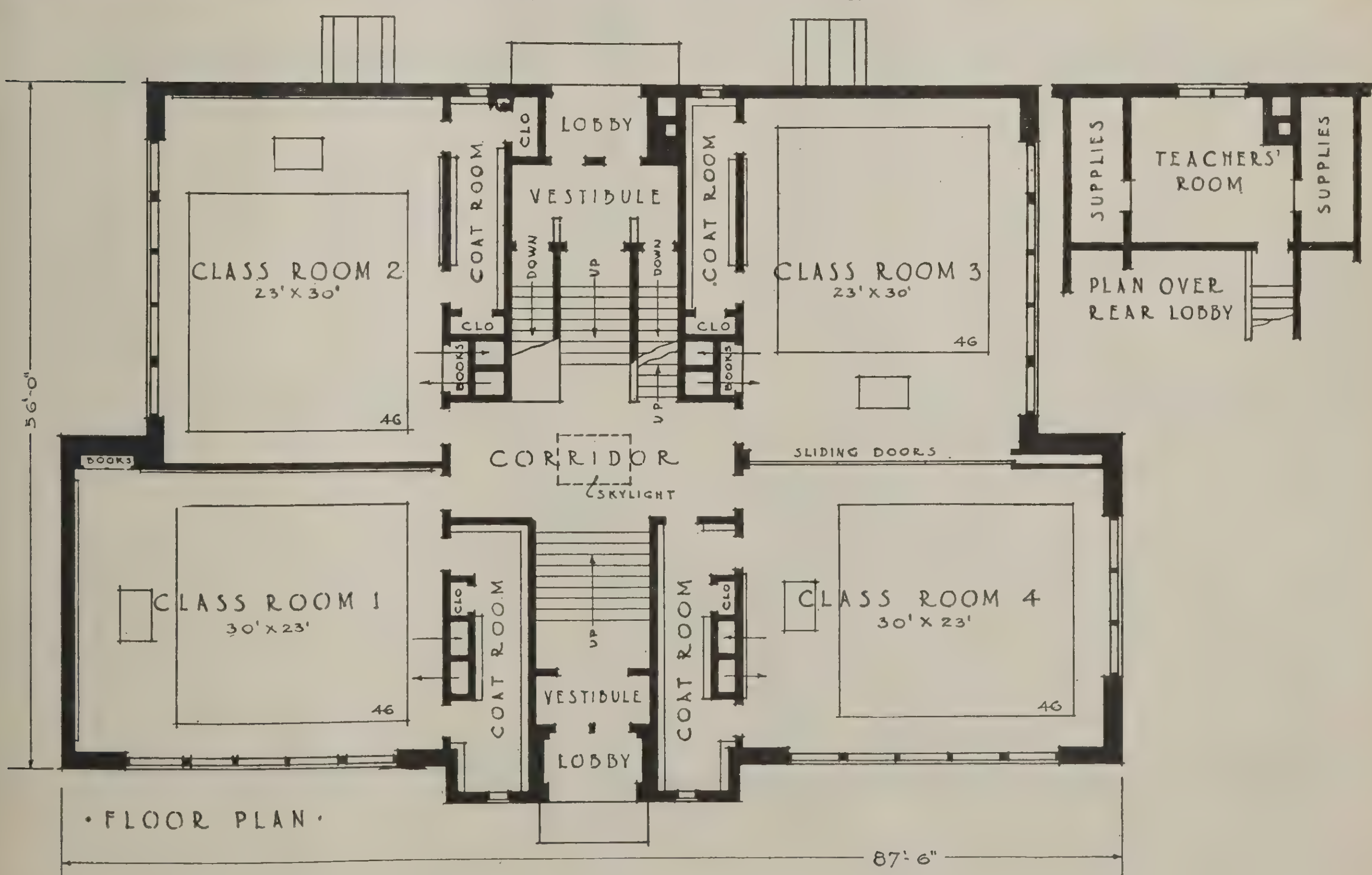
A WIDE variety of concrete work can be done on the farm during winter months. Fence posts, water and feed troughs and many other improvements can be made under cover at temperatures high enough to be comfortable for the workmen and secure against freezing, according to engineers of the Portland Cement Association.

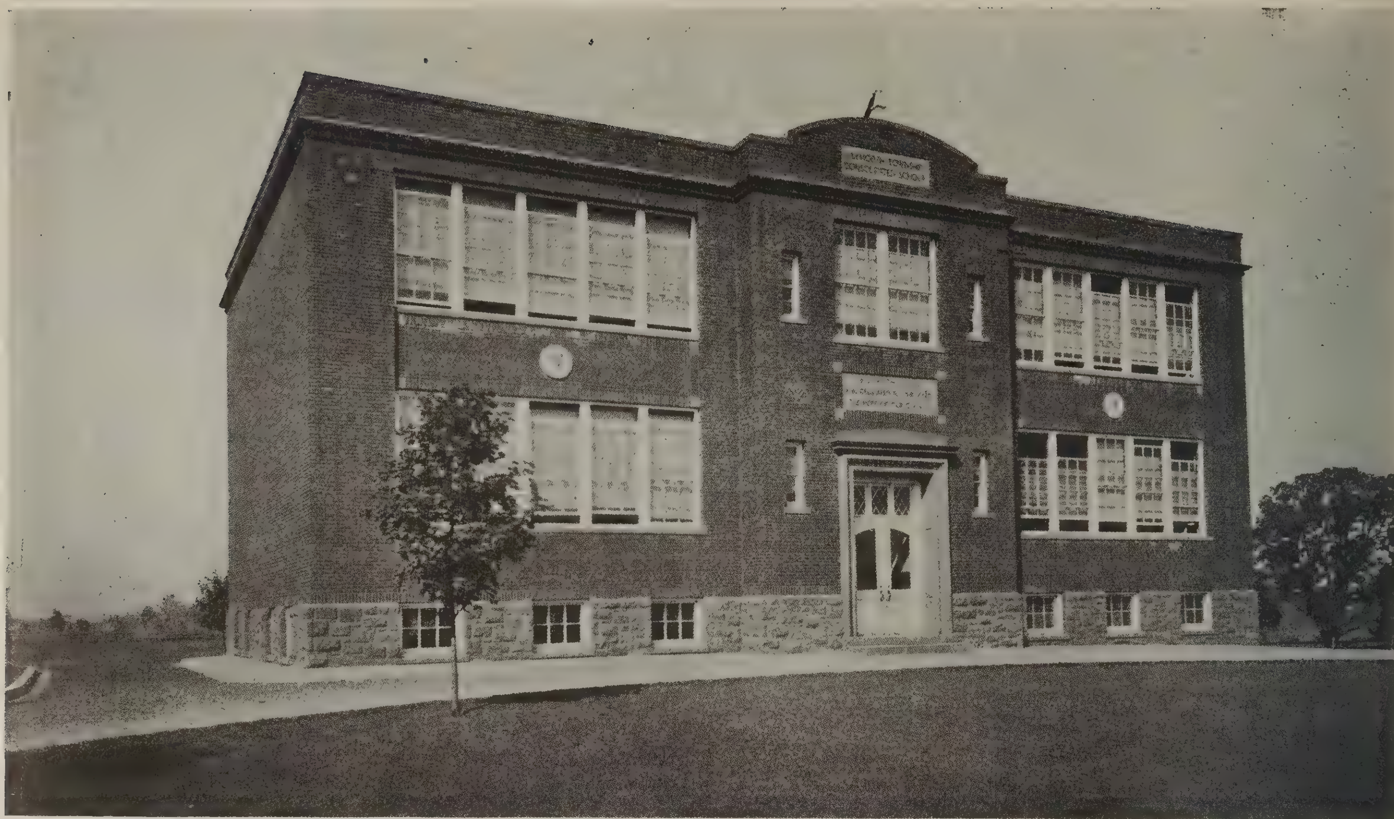
Two Modern Rural School Buildings

THE two rural school buildings, elevations and floor plans of which are shown herewith, were designed and planned by C. E. Schermerhorn and Watson K. Phillips, associated architects, Philadelphia, Pa., whose work in other departments has been shown in these pages.

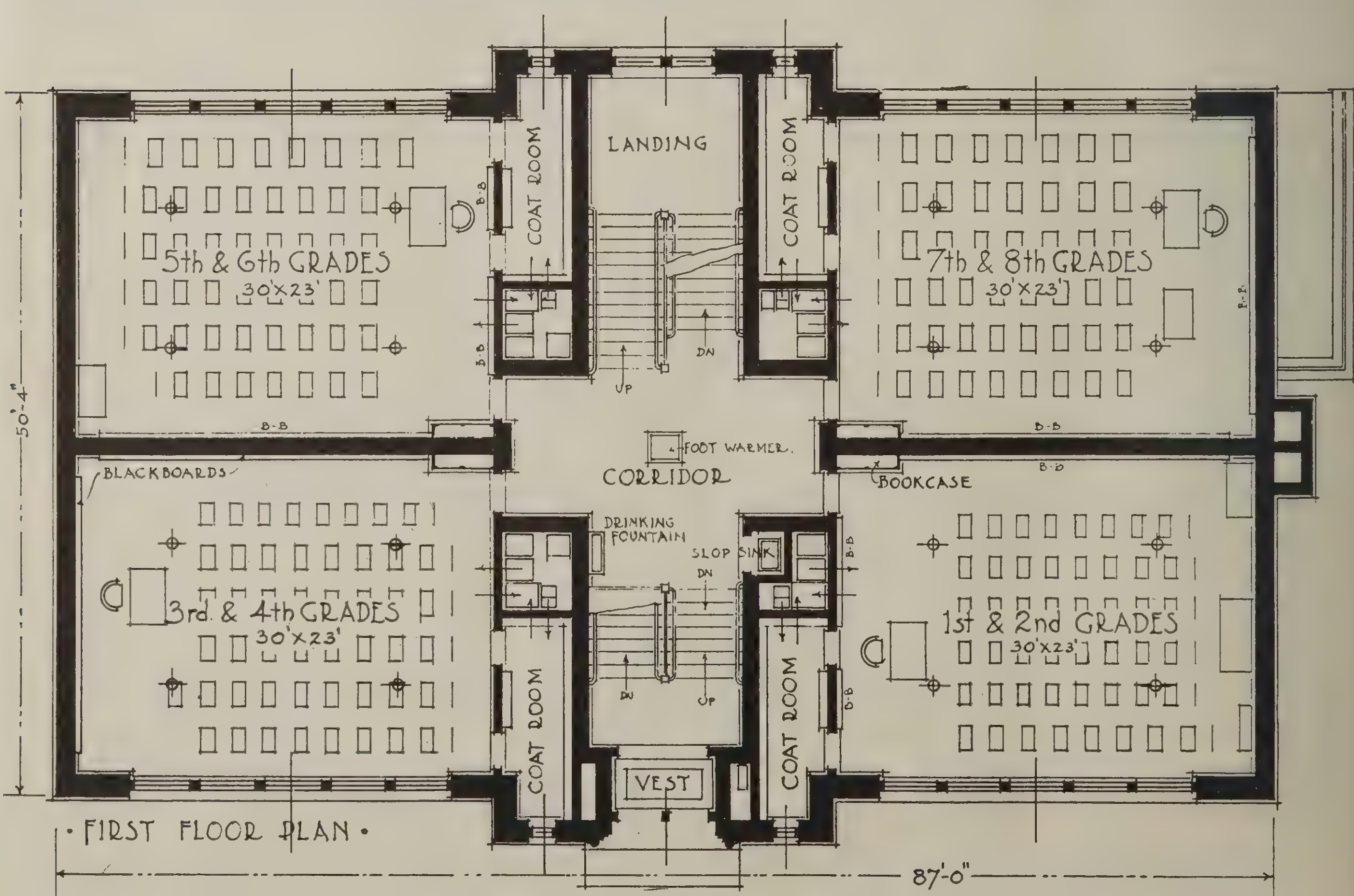
The Henry K. Boyer School was erected near Evansburg, for the school district of Lower Providence Township, Montgomery County, Pennsylvania, and is a one-story building so arranged that additions may be

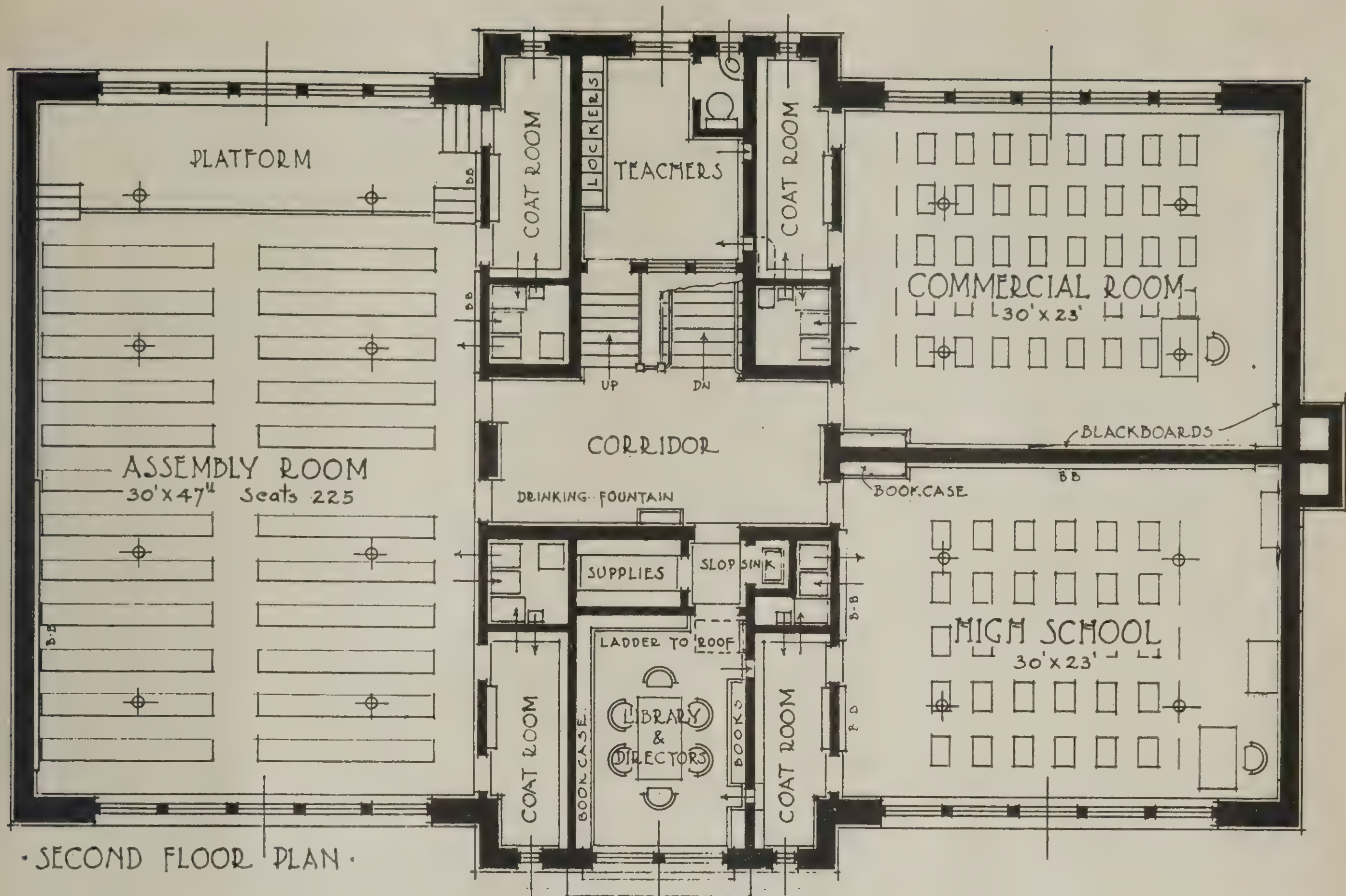
Henry K. Boyer School, Evansburg, Pa.



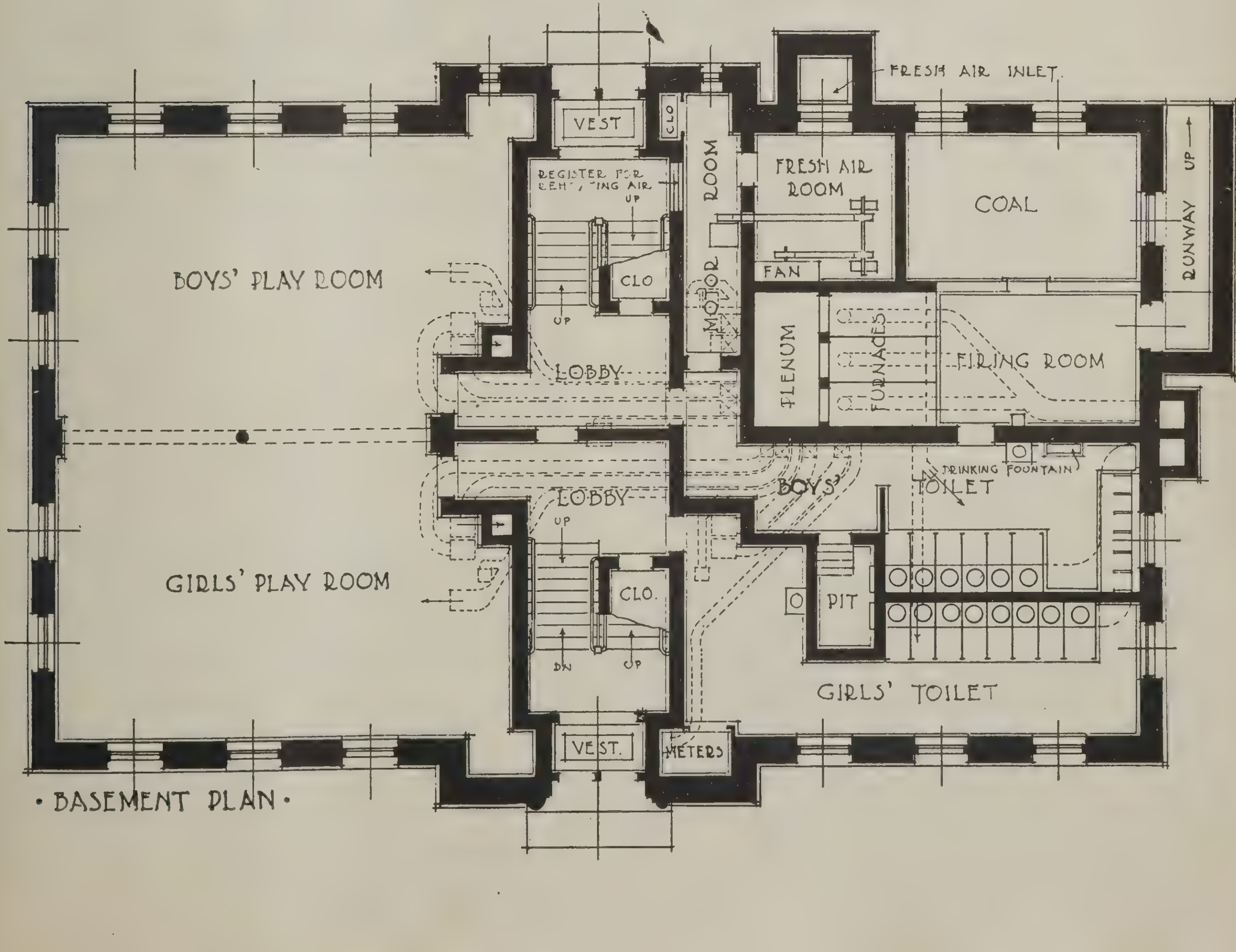


Plymouth Township Consolidated School, Plymouth Meeting, Pa.





·SECOND FLOOR PLAN·



·BASEMENT PLAN·

made to the rear from time to time as the increase of pupils may require. As will be noted by the plans there are four class rooms, each of which will accommodate forty-six pupils and each has a separate coat room, a teachers' closet and a bookcase. A teachers' room is also located over the rear lobby. Two of the class rooms are fitted with sliding doors with Richards-Wilcox flush door equipment in order that they may be used for community meetings, opening exercises, etc. The exterior walls are of hollow tile with Oriental stucco finish on the outside. The front portion of the roof is of green slate and the rear portion is covered with Barrett slagroof. An indirect steam gravity system is used for heating and ventilating. Outside toilets are in use at present, but an inside equipment will be installed in the basement later. Reversible windows are used throughout and have proved very satisfactory.

The Plymouth Township Consolidated School was erected at Plymouth Meeting, Montgomery County, Pennsylvania, to replace five one-story district schools which were scattered throughout the township. In each of these little schools the teacher was endeavoring to instruct from eight to ten grades, with indifferent success. Results were so unsatisfactory that the board of directors determined to consolidate the schools into one building. A three-acre plot was purchased, and the eight-room building here illustrated was erected.

This schoolhouse is so designed that four-room additions may be made at either end of the building as future exigencies may require. Hummelstown brownstone is used for the foundation walls and cutstone trimmings, while shale brick is used for the face work. The outside of the foundation wall is damp-proofed with Hydronon.

The roof is covered with a Barrett slag roof. Merchants Old Method tin is used for the flashings, etc., while the main cornice and wall coping are formed of Toncan metal crimped, painted, and sanded to match the cutstone work. Hard wall plaster is used on the interior, with sand-finished side walls and white coated ceilings.

The stairways are constructed of steel channel stringers, posts, and railings, and slate treads. Glen-gery "Harvard" stretchers face the corridor walls to a height of 5 feet. The floors of the corridors are of reinforced concrete covered with battleship linoleum, which renders them noiseless and easily kept clean. The class room floors are of maple, while Oregon fir is used for the interior finish. Slate blackboards are provided on two walls of all class rooms. Above them and at the rear of each class room are burlap panels for the display of pupils' work. Each class room is 23 x 30 feet, or large enough to accommodate forty-six pupils, and has a coat room attached. A bookcase is also supplied each room.

The teachers' rest room, with a locker in it for each teacher in the building, is situated over the rear landing. On the second floor front is the library, which is also used for the directors' room. A large supply room also is on this floor. Slop sinks and drinking fountains are installed on each floor.

As no sewage line was available and cesspools would have been impracticable, an incinerating toilet system was installed. This has proved to be entirely satisfactory.

A fan furnace system of warm air heating was put in, the fan of which is operated by a 3-h.p. motor. The air in the building is rotated over night and week-ends, the rotating air register being closed just before school is called, and the fresh air window opened.

Standard Pipes as Columns or Struts

BY W. F. SCHAPHORST*

How to Be Sure That They Are Strong Enough

STANDARD pipes often come in handy for use as columns or struts or for use as "push members" in transmitting forces. This is because a pipe is strong both in tension and compression. Due to its circular form it is ideal for resisting compressive forces.

However, when it comes to "figuring columns" it often takes considerable time digging around in handbooks, etc., and as a result the use of a pipe is avoided. Or, a pipe much too large or too small is used, chosen entirely by "guess." The pipe that is too small may fail and be the cause of disaster. It is always best, of course, to be on the safe side, but at the same time one should practice economy.

To assist those who may have occasion to use standard pipes in this way and to make it as easy as possible for them, I have developed the following simple table and rules:

Size of Pipes Inches	Column A Maximum Lenth Inches	Column B	Column C
1/8	14.5	826.4	0.07
1/4	19.4	617.3	0.12
3/8	25.	480.8	0.17
1/2	31.3	383.1	0.25
3/4	40.	300.3	0.33
1	50.6	237.5	0.50
1 1/4	64.7	185.5	0.67
1 1/2	75.	160.5	0.80
2	94.7	126.9	1.07
2 1/2	114	105.3	1.71
3	139	86.21	2.24
3 1/2	161	74.63	2.68
4	181	66.23	3.18
4 1/2	202	59.52	3.68
5	226	53.19	4.32

1. Knowing the load that is to be carried and the length of pipe needed, make a "guess" as to the size of pipe. Column A in the tables will help in making the guess as it gives the maximum length of pipe that may be used. Thus, never use a 1/8-inch pipe, as an important column, longer than 14.5 inches. Never use a 3-inch pipe, as an important column, longer than 139 inches, etc.

2. Multiply the length of the pipe in inches by the corresponding figure in Column B of the table. This product should never be greater than 12,000. If it is greater than 12,000 it means that you have guessed a pipe that is too small. After getting the right size,

3. Subtract the product from 19,000. If the difference is equal to or less than 13,000 use it, in (4). If the difference is more than 13,000 use 13,000 in (4).

4. Multiply by the figure in Column C corresponding with the pipe size.

The result is the number of pounds that the pipe will carry as a column, strut, or "push member." If the result is less than the load to be carried, try again, using the next larger pipe size, and so on until the proper and most economical size is selected.

For example, it is desired to support a load of 10,000 pounds at a height of 84 inches. What size of pipe should be used? Following the rules we do this:

1. "Guessing" the size of pipe, Column A shows that 84 in. falls between 1 1/2-inch and 2-inch pipe. We will therefore try a 2-inch pipe.

2. 84×126.9=10.650. This is less than 12,000 and we will therefore continue.

3. 19,000—10,650=8,350. This is less than 13,000 and we may therefore use it in (4). If the difference were 18,350 we would have to use 13,000 in (4).

4. 8,350×1.07=8,950 pounds.

Since 8,950 pounds is less than 10,000 pounds a 2-inch pipe is too small. We will therefore recalculate, this time trying a 2 1/2-inch pipe.

2. 84×105.3=8,850
3. 19,000—8,850=10,150
4. 10,150×1.71=17,370 pounds.

This shows that a 2 1/2-inch pipe would be amply safe to hold up 10,000 pounds. It shows that a 2 1/2-inch pipe is capable of holding almost twice as much as a 2-inch pipe at a height of 84 inches. The small difference in pipe sizes and the great difference in strength indicates the necessity of careful computation and the danger involved in guess-work.

*From "The Excavating Engineer" for November, 1921.

Stone Masonry in School Construction -- By John Y. Dunlop

Stone Masonry Having Been Carried to a High Degree of Effectiveness in England, the Practices Followed in School Construction as Here Described and Illustrated Will Be Found Both Interesting and Suggestive to American Builders

ENGLAND in its eager search for a material for the exterior walls of schools to express that permanency of design and economy in upkeep has strongly favored stone, and thus the English stone cutters and builders have been able to get sufficient practice in securing variation in laying and experience in the differences in pointing, which add so much to the satisfaction of working in stone.

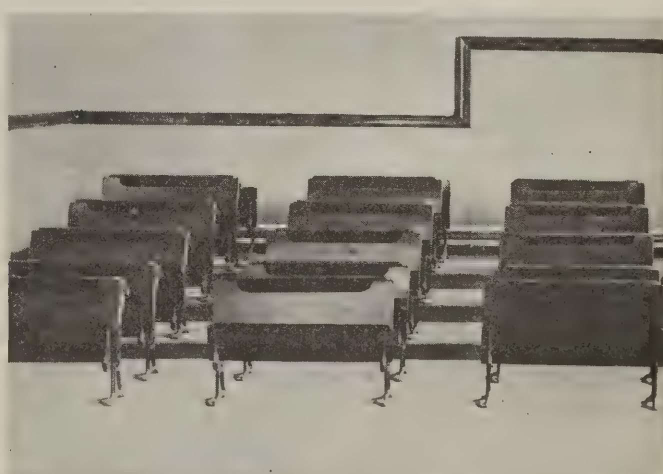
A one-room school built in stone. The jutting out part is the toilet space for the pupils

As a rule the stone wall is a wall surface of contrasts obtained by the use made of large stones both at corners and openings and in the wall between. The wall is often broken up by buttresses and openings to heighten the effects and the small stones are only used in the few unbroken surfaces to fill between the large stones. The pointing is usually done with natural cement, which keeps the walls in general tone with the grey or red colored stone work.

In many of our school buildings we have beautiful examples of masonry in which the stones are not over five inches in height with the usual exceptions of corners and openings. The stone is of a soft reddish or grey color, all being laid on natural beds close together without any dressing of the face of the stone. The joints are carefully raked out as deep as possible, as the walls are laid forming the finished pointing.

The particular value of this type of wall is its use as wall surface where the openings are small and in keeping with the shallow height of each course. Even in our smallest country schools the architect has secured a wonderfully successful result in both the design and texture of wall surface with the use of small stones. In these small country schools the most of the fabric is formed with locally quarried stone and is built with uncoursed joints. The strength of this type of wall depends somewhat on the formation of the corners of the building with large stone, called quoin stones in this country, and also on the quality of the mortar used. Much of the work

Two-room school and teachers' house combined, built of stone



Corner of the junior and senior classroom in a two-room school house and teachers' house combined on this type of building is built with rubble obtained from igneous rock and are exceedingly dense nonabsorbent and practically proof against atmospheric attacks.

Igneous rock is built in the wall as it comes from the quarry. At the most a corner might be knocked off with the wall builder's hammer or a stone might be split in two, but on the whole the stones are built into the wall with the best quarry face exposed.

A three-room school built of stone, with a stone schoolmistress' house farther along the road

Seven-room school built of stone, in self-faced and irregular coursed or snecked rubble

When the stones are built in mortar of a good quality used in sufficient quantity, these walls are undoubtedly satisfactory and durable. Of course all the corner stones are square dressed and in the case of the window and door stones these are checked to receive the window and door frame respectively.

In the one-roomed school the chimney is built with brick, and as this flue is from an open fire in the classroom, the size of the flue is 9 in. square.

The walls of the two-roomed school and teachers' house combined and the three-roomed school and school mistresses' house further along the road are laid in much the same manner. The final pointing consists of natural cement and coarse sand and is done after the wall has been built and cleaned down. The mortar on the raked out joints is applied with a hand trowel and raked over, not smoothed. Smaller stones are completely covered and larger ones partly so, showing only the projecting faces and giving the appearance of a weathered wall in which the plaster coating has begun to peel off.

In the two-roomed school the classrooms extend along the front, while the side wing is the house. Both classrooms are warmed with open fires, which are at the opposite ends of the room.

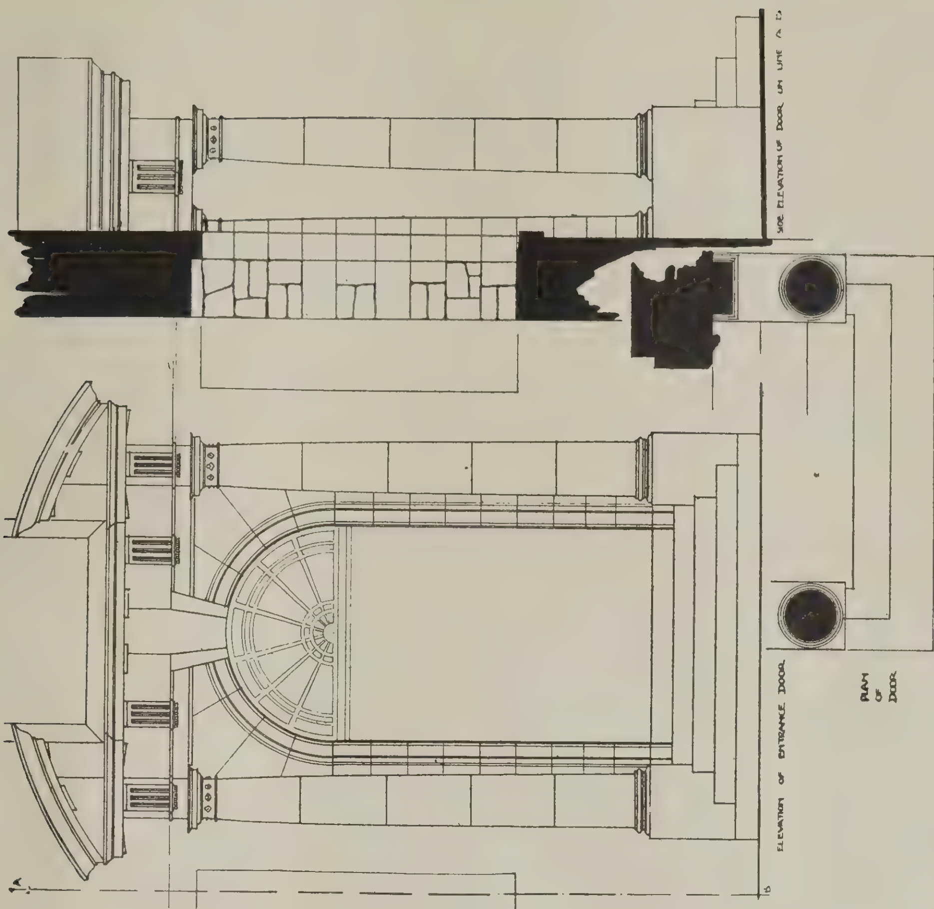
The chimney on the left is from class 701, while one of the pair of chimneys along the same ridge is from the other classroom. The same method of heating prevails in the three-roomed school and the arrangement of the chimneys on the roof top will indicate how the fireplaces are arranged.

The foregoing has been taken entirely from outlying districts, many of them days travel from town life to show what types of stone schools are in use in agricultural districts. That these are the beginning of the use of stone for such class of building must be conceded, but it is only when we come nearer town life that we can see the great possibilities of the use of stone in school buildings and this article would not be complete without showing the beauty of natural stone in some of our suburban schools.

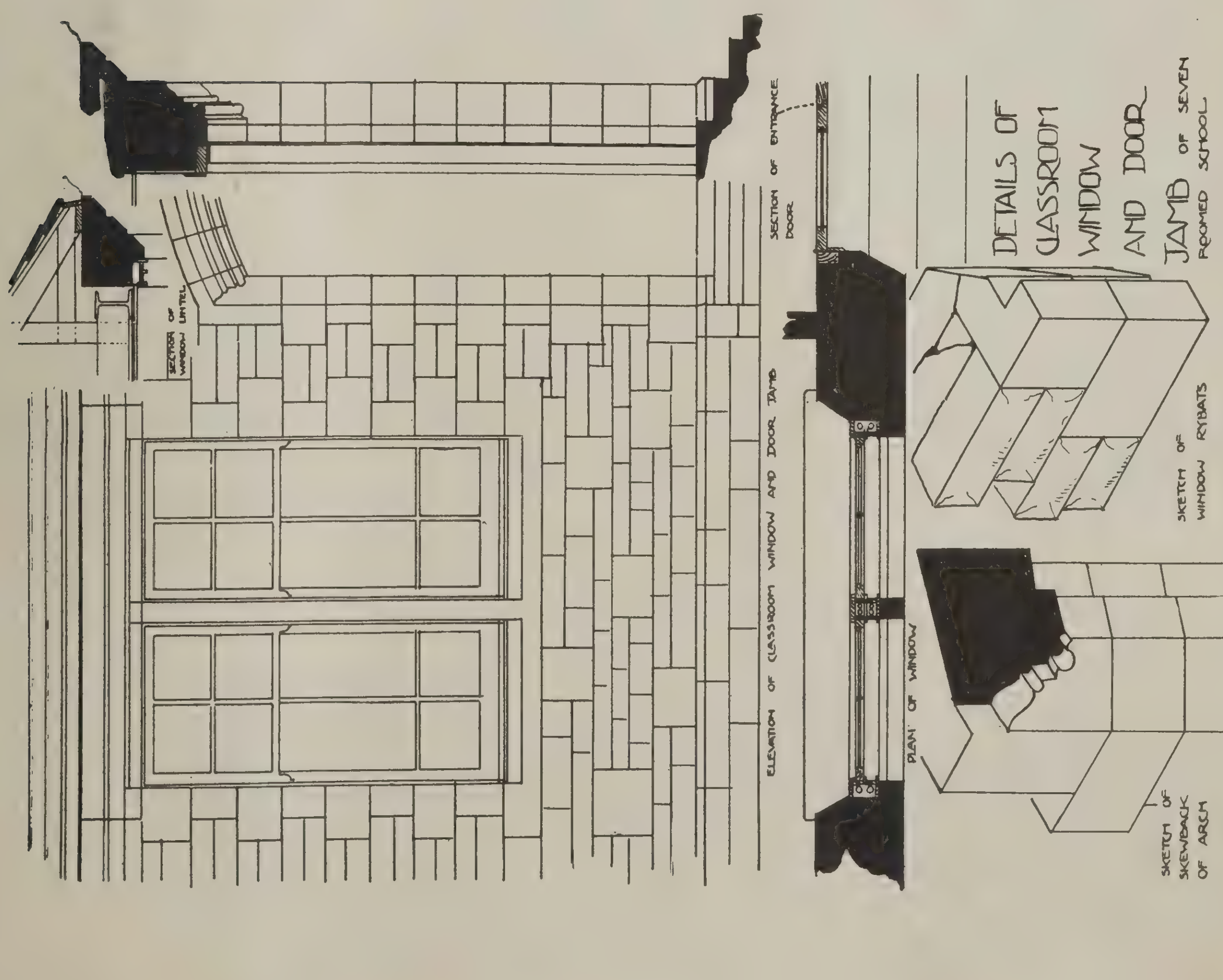
Most of this grade of school building is carried out with square rubble, which gives a better and neater kind of wall than random rubble. Where sandstone is used this class of rock splits naturally along the plane of bedding into courses from 4 to 8 in. high and the slabs are nicked to the required height, usually 6 in., and roughly squared on end. These stone walls are finished on the face in two ways known as straight faced and pitched faced. The latter have a rough projecting face formed with hammer and pitching tool or chisel. The pitched face stone wall is shown in the seven-roomed school and also at the entrance door illustration. This type of work is usually more expensive than the others; still when laid with straight faced corner stones and window dressings a very fine contrast in stone surfaces is obtained.

Building a seven-roomed school in stone with uncoursed rubble walling. The windows are shown built half-way up

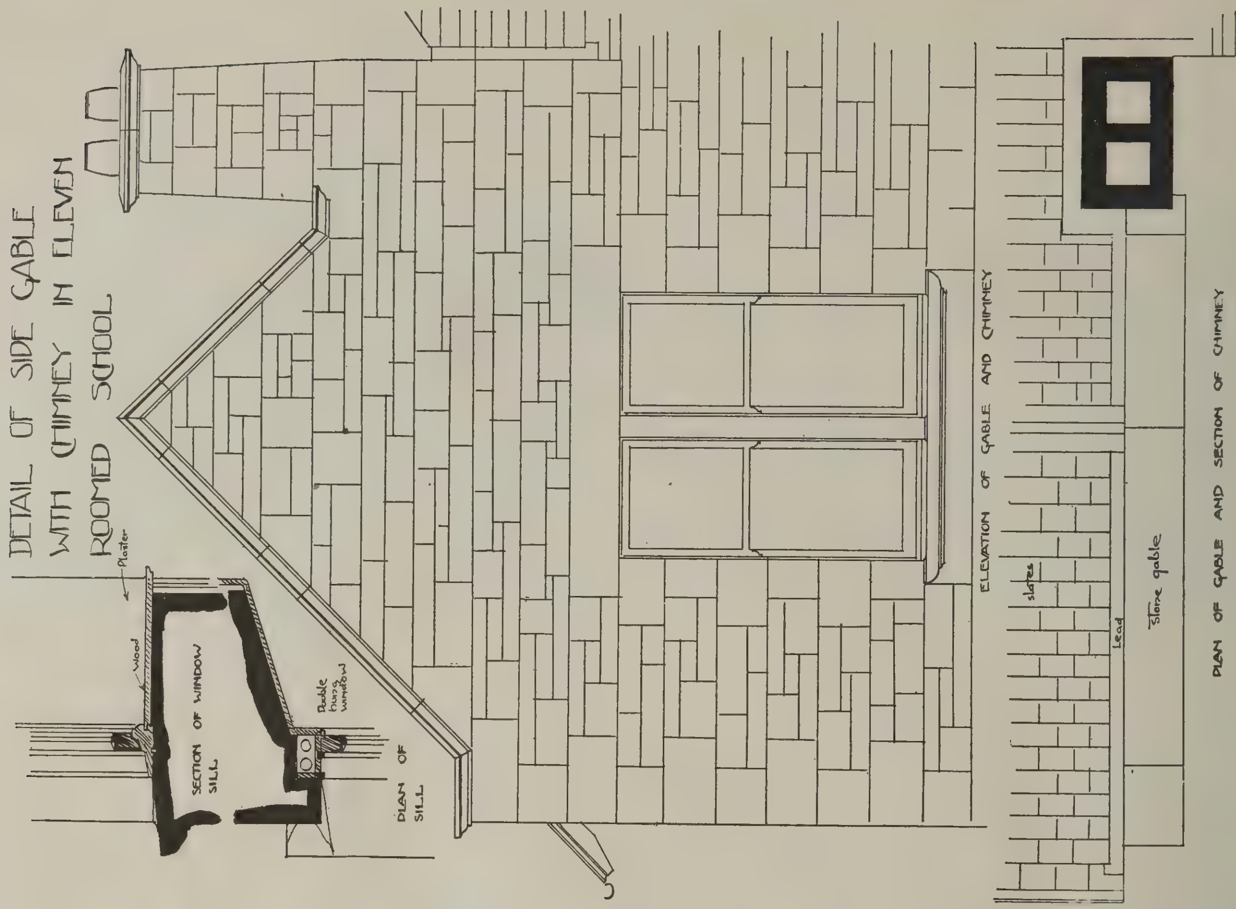
In building a pitched or quarry faced stone wall, the stone is cut to the height and the ends dressed, when a line representing a fair face is marked on the beds and ends at a distance back from the face

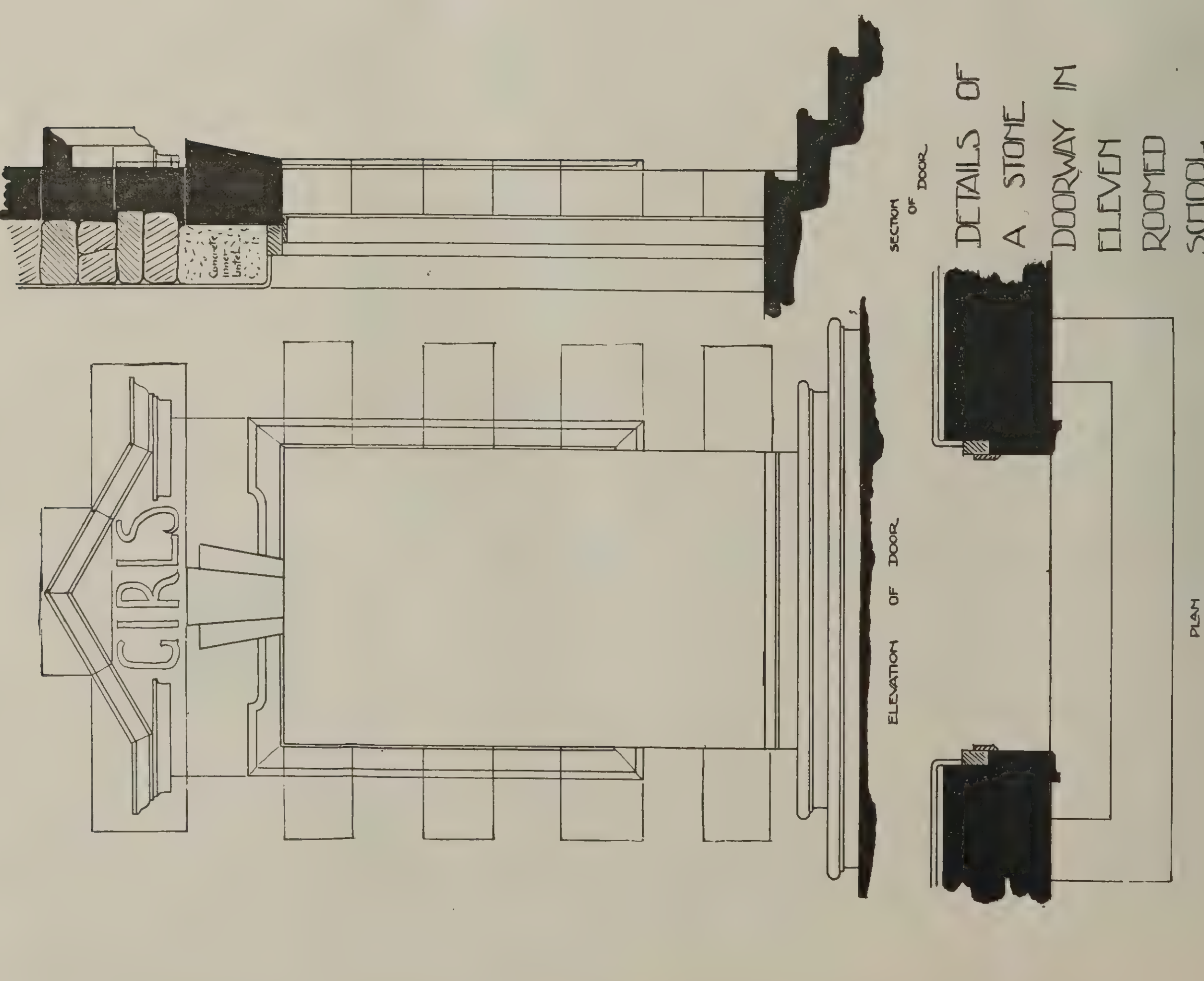


DETAILS OF ENTRANCE DOOR FROM A SCHOOL BUILT IN STONE



DETAILS OF CLASSROOM WINDOW AND DOOR JAMB OF SEVEN ROOMED SCHOOL


DETAIL OF SIDE GABLE WITH CHIMNEY IN ELEVEN ROOMED SCHOOL
Plaster
Wood
SECTION OF WINDOW SILL
PLAN OF SILL
ELEVATION OF GABLE AND CHIMNEY
slates
lead
stone gable
PLAN OF GABLE AND SECTION OF CHIMNEY


DETAILS OF A STONE DOORWAY IN ELEVEN ROOMED SCHOOL
GIRLS
SECTION OF DOOR
Concrete inner lintel
ELEVATION OF DOOR
PLAN

equal to the amount of pitch required. The stone is now placed on the banker and is dressed along those lines, the pitching tool being held at an acute angle to the bed and joints and struck so as to drive off the waste part which projects past the pitch line. The waste part comes off in a wedge shape so that the center part of the face remains untouched. In this way each stone is finished without any chisel marks, which gives the impression that it has been broken in the quarrying with a round face, and for that reason is known to many as self faced. Self faced uncoursed square or snecked rubble is shown in the photograph of the school which is being built. In this class of work the level courses run from 3 to 6 ft. along and stop against a greater stone. These large stones are called the riser and the arrangement should be that no two risers shall touch each other. The usual height for the riser is 11 or 12 in. and the height of the two courses which come against the risers 5 and 6 in. or 5 and 7 in., according to the height of the greater stones. A line sketch of this type of stone wall is shown in the drawing in which a few risers are shown.

Immediately above the lower part of the walling comes the stone sills, which have a rest of at least 6 in. on each side of the opening. The ends of the stone sills are cut with a square stool to receive the stone dressing of the sides of the window. The stone lintel in this case forms the eaves course of the wall, the idea being to bring the head of the window in line with the classroom ceiling. In building the doorway the door dressings are built header and stretcher and the top stone of the jamb is formed with part of the archway cut on. The illustration is shown of the school completed and ready for occupation.

In the example of an eleven-roomed school a very fine example of straight faced stone walling is shown. The joints of the stones are formed in regular courses which vary slightly in height and which are arranged to meet the requirements of the corner stones and dressings. A line drawing is given of one of the end gables, which includes a chimney stack. The vents in the stack are from the teachers' retiring rooms, which are heated with open fires. The arrangement of this gable is so made that the roof butts against it. The top edge is finished with a molded cope. The level part of the gable cope is wrought on the top corner stone and the first raking piece is cut on the stone above. The next length of cope is cut and bedded on to the raking bed of the gable, while the portion above is formed on the kneeler. In this way this raking stone molding is tied into the stone wall.

A feature of the most of stone schools is the entrance door and in this case we have four of those features treated in a very simple and effective way. The side doors have a molded architrave cut on the door dressing, while above the lintel each is finished with a level projecting cap. The front doors are much on the same lines with the addition of a pediment. A few of the courses of masonry above the door are cut in solid stone to receive the various moldings, but beyond that the jointing of the stone work is very simple and the results interesting.

Another example of a stone doorway which has been taken from a school newly finished shows the range of choice in stone designs when there need be no regard for difference in cost. The doorway in this case is made a projecting feature with the open pediment supported on a pair of columns, adding greatly to the architectural importance of the design. The columns rest on a block pedestal and each is built in fine stone, while immediately behind the pilasters are built in courses the height of the school walling. In this the architect has secured a very successful result both in the design and execution of the doorway.

Entrance door and gateway of a school built in stone

Cause and Prevention of Blue Stain

Blue stain is the most troublesome of the sap stains which discolor wood. It is caused by a fungus which germinates on the sapwood and penetrates its cells in search of starches and sugars. This action of the fungus causes no perceptible weakening of the wood, but the discloration which results lessens the value of the lumber for many purposes, such as interior finish, flooring and basket and box veneers. The stain at first may be no more than a bluish spot or streak on the surface, but later, as the fungus develops, the discoloration may involve all of the sapwood and

Eleven-roomed school built of stone which has been tooled on face and with regular coursed joints

become too deep to surface off. The blue-stain fungus can revive in timbers after long periods of inaction brought on by lack of moisture.

Warm weather and a comparatively high moisture content of the wood are the most favorable conditions for the growth of the blue-stain fungus. Most of the infection occurs in green lumber which is piled

Hall or ground floor of eleven-roomed school, showing the arrangement of the girls' staircase. The boys' staircase is at the other end of the hall

Cloak room of the eleven-roomed school, showing the toilet basins and the framed supports filled with wire panels for hanging the pupils' cloaks on

without ample ventilation between the boards, in the mill yard or during shipment.

As yet no absolutely dependable means of preventing blue stain has been found by the U. S. Forest Products Laboratory, other than kiln-drying the lumber. The ordinary kiln-drying process is entirely effective against blue stain, but there are many cases in which this means of prevention is not feasible. Staining during air seasoning can be largely controlled by open piling. This affords free circulation of the air and so hastens drying, but not always sufficiently under adverse weather conditions to discourage the stain fungi.

The treatment of the green lumber with antiseptic dips is the most effective method which is generally applicable at the present time. For this purpose the chemicals commonly used are sodium carbonate (soda ash) and sodium bicarbonate (ordinary baking soda). Neither is a sovereign remedy under severe conditions, such as continuous rainy periods during the warm months, but will go far towards keeping the stock clean. In rainy seasons an 8 per cent solution of sodium carbonate is desirable, but in drier weather half this strength should suffice. A high grade of soda ash should contain about 58½ per cent alkali, and every effort should be made to conform to this standard of purity. When sodium bicarbonate is used, an 11 per cent solution should be employed in wet weather and 3 to 6 per cent in dry weather. This chemical should contain about 37 per cent alkali.

In the use of these chemical dips, the following points should be kept in mind: (1) The solutions should be carefully mixed and the concentrations in the dipping tanks should be kept uniform by means of a hydrometer. (2) The solutions should be heated when applied, the bicarbonate solution not above 120 degrees F., however, because it is broken down into the carbonate by excessive heating. (3) The stock should be dipped as it comes from the saw. (4) After dipping it should be carefully piled so as to insure ample ventilation. Narrow, chemically-treated cross strips are preferable to the wide untreated strips commonly employed, since treated crossers tend to eliminate stain at the point of contact.

Wants a Power Saw to Cut Double Floors

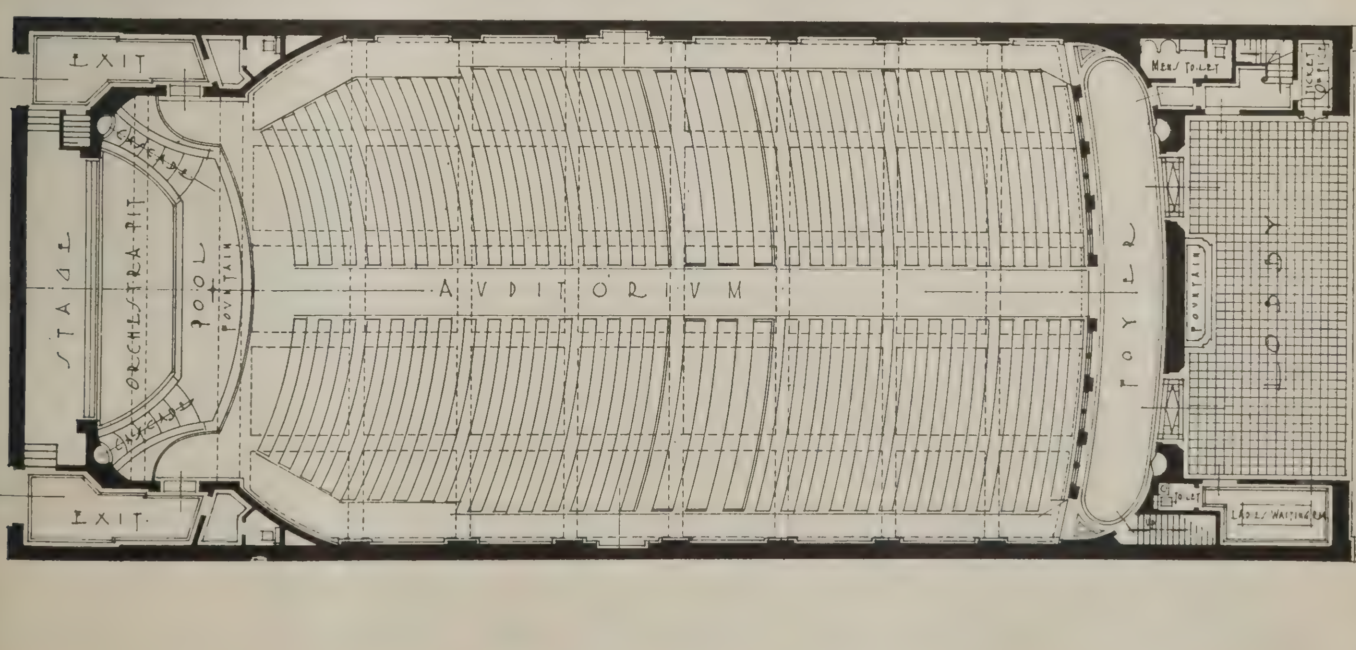
L. G., of Dayton, Ohio, writes us as follows: "I am doing carpenter work in one of the large factories here and of course we have a great deal of floor repairing to do. These floors are all double floors and the only way we have of cutting them is to chisel them. I would like to know if there is a saw to be had for this purpose that runs by motor power, and if so would you please give me the address of the firm that makes them? Any information on this will be greatly appreciated." Persistent inquiry among the large implement manufacturers has been without result. We shall be glad to hear from any one of our readers who may know something about such as saw as L. G. has in mind.

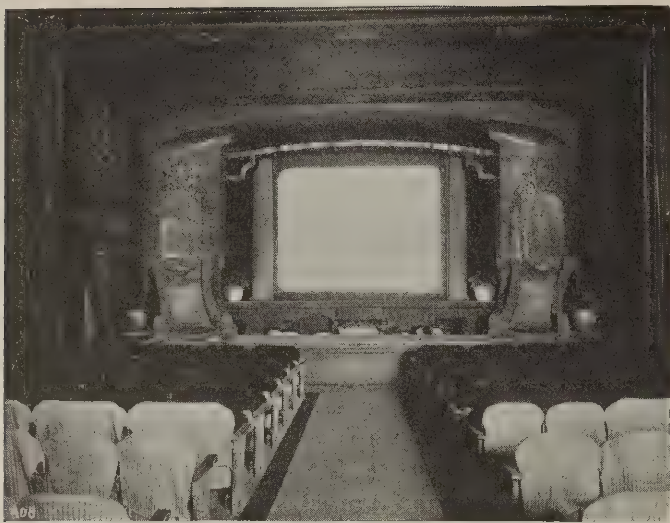
Remodeling Stores Into Theater Buildings

By John Anson Ford

A STRIKING example of the success which can attend the transformation of a plain unattractive store building and hall into a beautiful motion picture theater is found in the Mission Theater of Los Angeles which has recently been opened. The building which has been so successfully changed measured 60 by 148 ft. The front was originally occupied by some small shops

The transformed front. The store fronts were torn out, the wall stuccoed, windows with wrought iron balconies built, and a Granada Vari-color tile roof added. In the center of the deep lobby is an Aztec Fountain of gray artificial stone





The stage, showing the cascades either side of the orchestra pit, which is cut off from the audience by a pool. Most of the wall space about the stage is decorated in gold leaf on which colorful designs have been stenciled and painted free-hand

The women's waiting room with an entrance from the street. This room occupies space which many owners would have been tempted to utilize, together with part of the lobby, perhaps, for store space. The whole effect would have been marred by such a sacrifice to commercial ends, however

The foyer which effects some saving of floor space in the auditorium by reason of its curve. The effort to avoid straight lines and planes is also manifest in the arched ceiling

and an entrance to a hall which occupied the rear. The building was of common brick with an exceedingly unattractive brick and plate glass front.

The entire store front was torn out, the front stuccoed and a gabled roof, sidewise to the street, was erected over the front portion of the building. Red tile made by the Los Angeles Pressed Brick Company, known as Varicolor Granada was used on the roof and is in keeping with the rest of the front which is Spanish in character, broad smooth surfaces contrasting with the ornamentation surrounding the three upper windows, each of which is set off with a wrought iron balcony of Spanish design.

The marquise, supported from the wall by four iron rods, extends across almost the entire front sheltering a deep lobby the floor of which is of red tile laid with black cement. At the back of the lobby in the center is an Aztec fountain of artificial stone of rich gray hue. The whole exterior of the building has been given a distinctive finish by giving it a coating of warm yellow followed by a coat of pink, applied in such a manner that the two colors combine to give a very striking hue. The acid in this color makes it capable of withstanding the

Close up of one of the cascades. The water falls over glass beneath which play lights of constantly changing hues. A small electric-driven pump lifts the water from the pool to the top of the cascades, the same supply of water being used over and over again at small cost

weather, the old Roman method of applying it having been followed.

The success which the architects and engineers, Frank Meline Company of Los Angeles, have had in transforming this exterior has been equalled by their success in altering the interior. Always on the lookout for something distinctive and beautiful in "movie" houses, the designers attained that end in this case by use of cascades of water that flow down either side of the orchestra pit into a pool that extends across the front of the pit. The highly ornate walls between which the water flows are of gray artificial stone, similar to the fountain in the lobby. The same material is used for the indoor pool, or fountain. The water flows in gentle wavelets over glass beneath which are lights of constantly changing colors.

The organ is entirely hidden from view except the keyboard which is located in the orchestra pit. The organ pipes are hidden behind two elaborately wrought grills of

A close-up view of the Aztec Fountain of artificial stone which does much to give the theater a genuinely "classy" appearance from the street — an effect which the designers particularly desired because the building which they had undertaken to transform had been anything but attractive

Typical section of the side walls showing how they have been broken up by pilasters and balconied windows

plaster placed either side of the stage in the side walls and finished to resemble old English fumed oak.

The long side walls which so often prove a problem for the architect seeking an artistic effect have been broken by pilasters running to the beams in the beamed ceiling. These are of plaster which was dashed on and then troweled after which the conventional design shown in the illustrations were stenciled on. In the spaces between these ornamented pilasters are windows with wrought iron balconies projecting eight to ten inches into the room. Heavy drapes and artificial vines complete this decorative feature.

While some builders might hesitate to give so much street frontage to the lobby the arrangement shown here is in a very large measure responsible for the "classy" effect that is obtained. The purpose was to design a theater which was distinctive and would appeal to the better class of trade and by being ready to sacrifice all store frontage an effect has been obtained which gives the theater a front comparable with those in the city which cost several times as much as this playhouse.

At the left of the lobby is the ticket office and men's toilet while at the right opening off of the lobby is a woman's waiting room. On the second floor are the manager's office, a publicity office, dressing room for the orchestra leader, dressing room for the usherettes, toilets, and the projection room. The theater as it now stands represents an investment of $200,000. It has a seating capacity for 900. A good share of the high value is due to the excellent location of the structure. The work of designing and building was in charge of the Frank Meline Company. The man who conceived and worked out the details of this exquisitely harmonious structure was H. O. Davis, who supervised its construction and the installation of its appointments and equipment.

A Successful Utilizing of Old Material

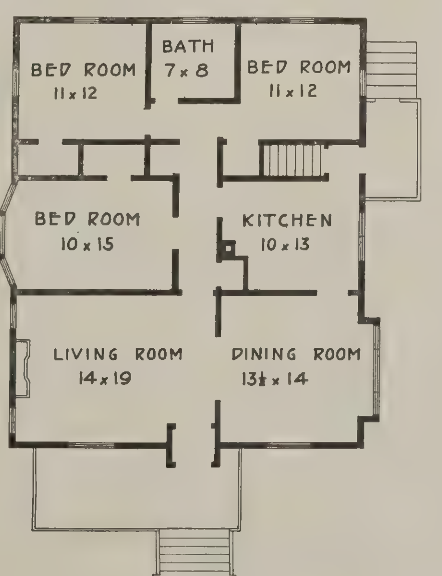
The very comfortable-looking six-room bungalow shown here was built largely of old material, at a time when building materials were at peak prices.

Mr. D. L. Powers of Jonesville, Mich., bought a fine lot and the old house which was on it, near the center of the town. The old house was torn down, and the material thus obtained furnished the greater part of the framework for the new bungalow, the sheathing for the floor, the outside walls, and roofboards.

Bungalow built from old material

Oak was used for the floors and interior trim in the living-room and the dining-room. The rest of the house was finished in yellow pine, with maple floors and birch panel doors, the trim enameled white and the doors mahogany-stained. The kitchen was the exception; here the floor also was of yellow pine, and the trim was finished natural instead of enameled.

A considerable saving in labor was made possible by the owner's doing much of the work himself. The tearing down of the old dwelling and the building of a concrete wall to grade line were accomplished by Mr. Powers with the assistance of one helper. A mason was hired to lay up a stone wall from the grade line. Robert E. Carter, a supply dealer of Jonesville, to whom we are indebted for this story, with the help of one other worker and Mr. Powers, erected the new bungalow, working by the day.



Floor plan

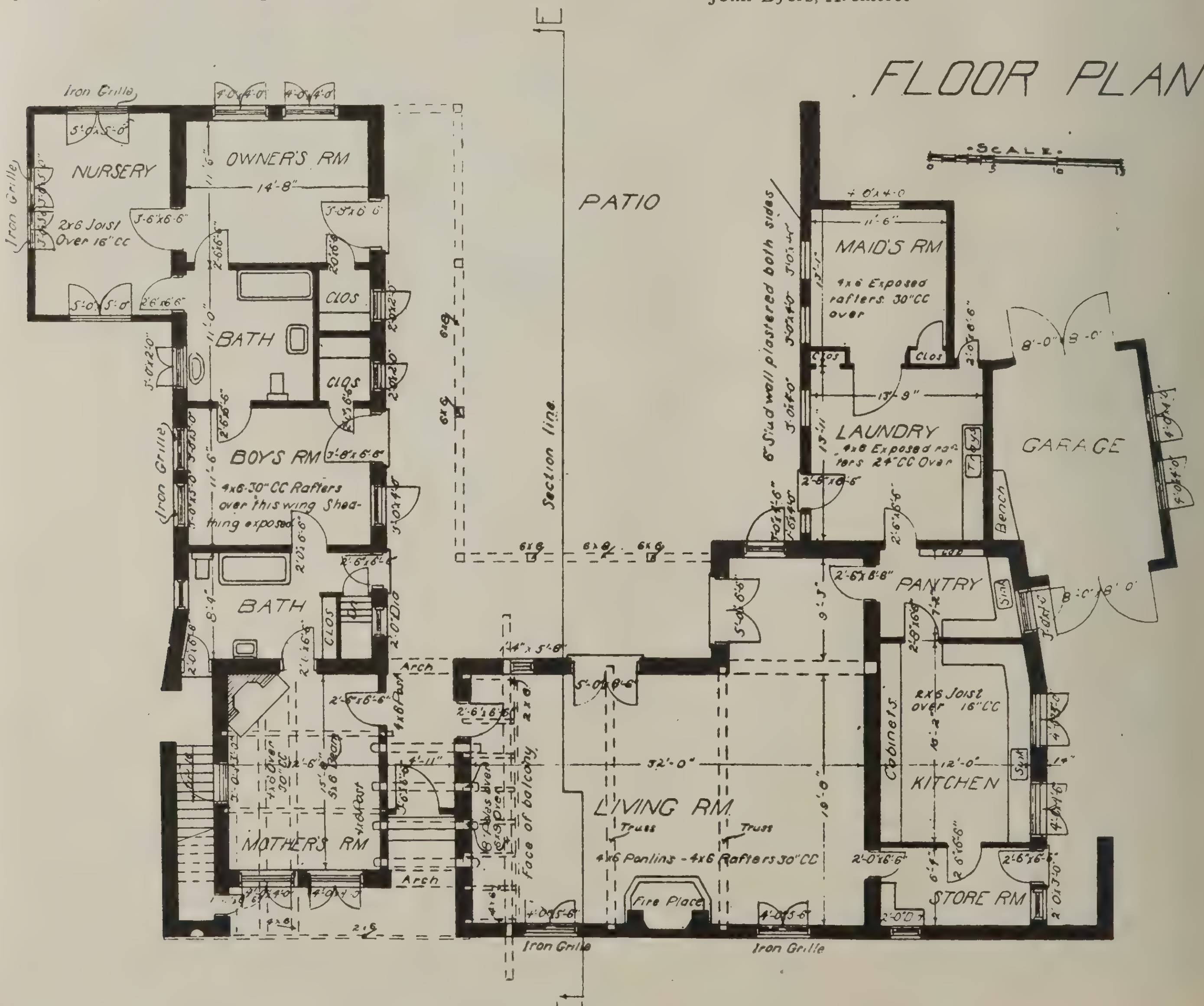
Adobe Residence at Low Cost

By John Anson Ford

AN example of an adobe dwelling illustrating the interesting results which can be obtained at low cost from use of adobe is shown in the accompanying illustrations. What has been done in this instance in southern California can be duplicated in a large measure in most portions of the Southwest and in some other regions where the frost is not sufficiently severe to injure the structure.

This dwelling was built for a family consisting of man and wife, three children and a servant, at a cost, complete, of $14,000. The material used in the walls was found on the premises, thereby eliminating heavy freight and drayage charges. This cost item covers three bathrooms (one for the maid's room having been omitted from this plan), and an expensive type of roof. The cost of this roof was about $25 per 100 square feet, whereas if a rough shake roof

Front views showing nursery on extreme left and living room on extreme right.
John Byers, Architect



had been used—equally suitable to this type of architecture—the cost of this item would have been about one-fourth as much. Had other building materials been used in the walls instead of adobe it is estimated that the lowest cost at which the house could have been constructed would have been $20,000.

The adobes, measuring 4x14x20 in., made and laid, cost $150 per thousand, 9,000 being used. They are laid with "rajuela" —bits of broken tile or brick inserted between the adobes to make a bond for the paster. An important item in the low costs was the native Mexican labor, workmen having been secured who had shared in the restoration of the Spanish missions in southern California.

The house is constructed in the primitive Mexican way, with eucalyptus rafters exposed in the living room. The finish is rough plaster inside and out, the coating following the irregularities of the adobes and thereby affording a suggestion of the solidity of the walls, which are 16 in. thick.

View in corner of the patio, showing type of and overhang of porch eaves

The Mexican plaster used consists merely of the old-fashioned mixture of lime and sand which adheres better to the adobes than modern hard plaster and costs about half as much. The windows are not cased on the inside or outside, the plaster returning to the jamb. The tiles over all overhangs in the patio and eaves are exposed from underneath, showing the different hues in this roof material and producing a very pleasing effect.

The architect was John Byers, Santa Monica, Calif.

Grading Mechanics on Productiveness

THE Builders' Exchange of Phoenix, Ariz., under open-shop conditions, is installing a system of grading the productiveness of mechanics by the card system, using grades "A," "B" and "C" for the different men. The A man, of course, receives the top wage and it is expected that this will prove an incentive to the unskilled man to produce in such quality that his name will have the "A" after it. When a man applies at any of the contractors' jobs, his name is looked up in the system and the man in charge can tell at a glance just what sort of a workman the applicant is.

Announcements and Publications

C. H. Mauk, Sixth and Kelker Streets, Harrisburg, Pa., contemplates the erection of a large apartment building and a line of stucco residences in the spring. He wishes to obtain literature from building supplies companies.

James E. Connaughton, architect, civil engineer and New York City surveyor, announces the removal of his office from Clinton Avenue to Jackson Avenue, Little Neck, L. I., New York. He will appreciate the receipt of trade catalogs, etc., at his new address.

Stone, Walker & Deegan—Under this firm name Joe Stone, Frank C. Walker and John E. Deegan have opened an office at 334 Kennedy Building, Tulsa, Okla., for the practice of architecture.

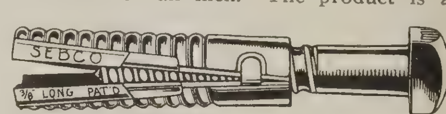
"Practical Business Methods; for Engineers, Architects and Contractors" is written by Francis R. Walker, A. S. C. E., and published by the Francis R. Walker Co., Chicago. This 80-page book is a complete textbook of construction accounting, and illustrates and describes forms and methods that meet the requirements of architects, engineers and contractors regardless of the class of work performed. It gives micellaneous forms in construction work—weekly and semi-monthly payrolls, labor distribution and job-cost records, inventory and stock sheets, plant and equipment, real state installment accounts, proposal and contract forms, contract and sub-contract blanks, estimate sheets, purchase orders, and voucher checks. To assist in selecting the proper form for any size business, a chart is given which suggests the correct forms to use to obtain any desired information.

Dairy Equipment—Illustrated descriptive circular by the Pfaudler Co., Rochester, N. Y., showing permanent dairy equipment such as glass-lined storage, pasteurizing, receiving, weigh and truck tanks, to give elasticity to plant control and simplify the handling of milk.

National Floor Hinges, illustrated and described in the monthly bulletin of the National Manufacturing Co., Springfield, Ill. Shows radical improvements in hinges in that the part bearing the weight of the door and the spring-closing feature are independent of each other, although necessarily combined; the spring pressure is absorbed by a 1-in. case-hardened roller which presents wear on the hinge bearing; the hinges can be put on quickly.

The Armstrong Cork Co., Lancaster, Pa., has engaged Hazel Dell Brown to assume charge of their bureau of interior decoration, linoleum department. Mrs. Brown was formerly supervisor of art in Indianapolis public schools. This bureau has been established as a result of inquiries from women customers. She succeeds Miss Kathleen C. Calkin, now with the J. L. Hudson Co., Detroit.

The Star Expansion Bolt Co., New York City, announces an important improvement in the Sebco lag expansion shields replacing the cast shields with die-formed shields from pressed steel and made uniform to 2/1000ths of an inch. The product is a

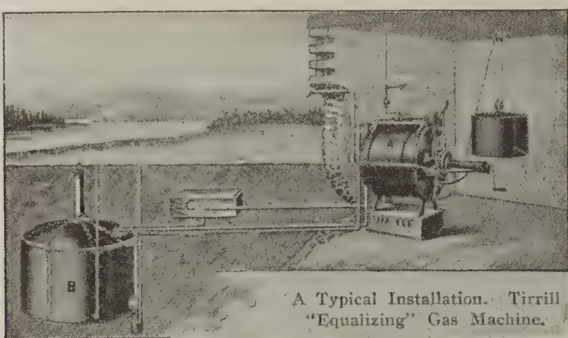


ductile, rust-proofed shield which moulds under screw-pressure to fit every irregularity of the hole, assuring a uniform bearing that gives immense holding power.

Post Economy Punch for Concrete Block and Tile Manufacture—The Kent Machine Co., Kent, Ohio, announces acquiring the sole right to manufacture the Post Economy Punch, a semi-automatic machine for making building block and tile. This machine—the invention of Alvah L. Post, the originator of the Kent continuous mixer —is said to be simple in design, almost noiseless in operation; built to stand years of continuous operation; produces units dense and uniform, free from voids, square and smooth, and will stand the most exacting building-code tests. The operator places a pallat in the mold box and pulls a lever which releases the clutch and permits the machine to make one revolution, during which tapering plungers are forced into the mold box, thereby distributing and forcing the material into shape. The block is then automatically stripped and may be easily removed on the pallat. The cycle of operations requires but 10 seconds, and six blocks a minute can be obtained. The Kent company is planning to manufacture this machine in large quantities.

"Exposure Tests on Colorless Water-Proofing Materials" is the title of a preliminary report now being prepared for publication by the Bureau of Standards. The purpose of the tests is to compare the effectiveness of waterproofing materials now on the market, determine the durability of the treatments when exposed to the weather, and find the effect of the treatments on the appearance of light colored stones. The report will be made available to those interested at an early date.

Tirrill "Equalizing" Gas Machine is illustrated and described in a catalog issued by the Tirrill Gas Machine Lighting Co., 50 Church Street, New York City, a concern founded in 1864. The merits of this machine are: The production from gasoline of an illuminating or heating gas, non-poisonous, by a generator outside the house, with absolute safety from heedlessness or neglect and with great economy. The illustration shows a typical installation.


A Typical Installation. Tirrill "Equalizing" Gas Machine.

"Brick—How to Build and Estimate," now in its third edition, is a presentation of facts for prospective owners of houses and other buildings and a manual of construction data on brick work and the "Ideal" wall for architects, engineers, contractors and builders; it should also prove of interest to those desiring information on brick work and its accessories. The book is written by William Carver, architect, and the Common Brick Manufacturers' Association of America, Cleveland, Ohio, are the publishers.

Telesco Interchangeable Office Partitions are illustrated and described in a catalog issued by Office Partition Co., Elmhurst, New York, N. Y. The Telesco partition is a standard, portable, interchangeable partition intended to meet the requirements of the modern office; is constructed in three kinds of wood, seasoned and kiln-dried, and is shipped crated and knocked down. A copy of the specifications will be sent by the company upon request.

The Ransome Concrete Machinery Co., Dunellen, N. J., will add to their plant a building that will increase the present manufacturing space 54 per cent. This 53x320-ft. building will be equipped with large electric cranes running the length of the factory. The machine shops and erecting floors will have modern equipment, including portable air and electric machines to facilitate increased production. Ground was broken on October 6. This important addition to the productive capacity of the company is indicative of the faith of the management in the business increase steadily pressing on the organization.

The Pacific Lumber Co., of Illinois, 2060 McCormick Building, Chicago, Ill., has recently published a 12½x9½ folder devoting 12 pages to telling why the company's advertising will make redwood easier to sell. In a list comprising 35 trade and technical publications—chosen because they are read by those who buy, sell, specify and recommend lumber purchases—the advertisements were written to inform the readers where and why, in the interest of economy, durability and safety it is better to use redwood.

An Improved Try and Mitre Square, for carpenter's use, have been put on the market by the Lufkin Rule Co., Saginaw, Mich. This Lufkin No. 65 is made in popular lengths, 9-in. and 12-in. blades of substantial steel marked in 8th and 16ths, with clear figures and lines, and fitted with a movable head which can be clamped at any desired point.


Lufkin No. 65 Try and Mitre Square

Building With Assurance, 400 pp., 8¼x 11; published by the Morgan Sash and Door Company, 2287 Blue Island Ave., Chicago, is an unusually complete and well-organized book of plans and details. It starts off with twenty-four sketch plans, with a colored perspective for each. The subjects range from the four-room cottage to the twelve-room house, introducing stucco, frame and brick construction, and types shown include the Spanish, Italian Renaissance, Georgian, Colonial. The next 130 pages take you in logical progression from the entrances through every room in the house, and with fine clear cuts show you a diversity of treatments appropriate for the various rooms, with suggestions (some of them in color) as to wall treatment, choice of furniture, kitchen and sanitary equipment, heating systems, and a number of practical built-in features. Much space following is given to door- and window-design, and a number of good art- and leaded-glass designs are offered. Some of the leading firms in the country in furniture, interior trim, household equipment, and interior decoration, have assisted in the compiling of this valuable and suggestive book. Issued under reservations to responsible firms on application.

The Volute in Architecture and Architectural Decoration, by Rexford Newcomb, is the title of Bulletin No. 121 issued by the Engineering Experiment Station of the University of Illinois at Urbana. It contains a discussion of the origin and development of the spiral in the fields of architecture and art. Of particular interest is the new and rational theory developed which regards the volutes of the Ionic capital as ornamental representations of an ancient structural form which has become obsolete as such. Examples of capitals showing successive development of the form are given in support of this contention, there being 55 illustrations in all. It is a very interesting, stimulating and scholarly pamphlet. 73 pages; 6x9; copies may be obtained free of charge by addressing the Engineering Experiment Station, University of Illinois, Urbana, Illinois.

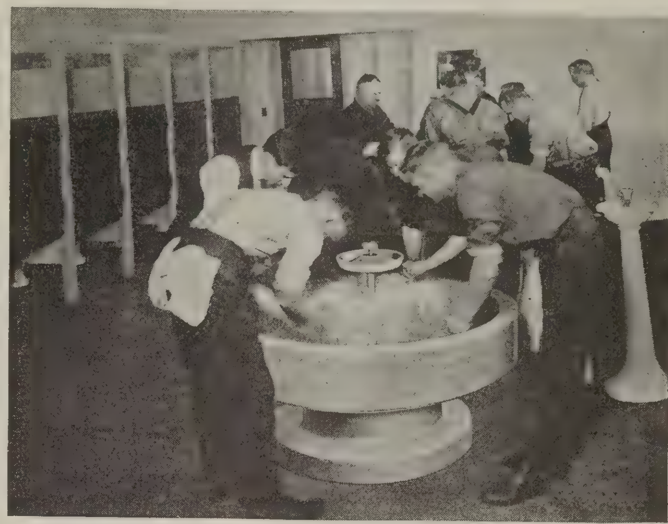
Berloy Building Materials, first edition, has just been issued by The Berger Manufacturing Company of Canton, Ohio. This is a 397-page handbook, 4¼x6½, carefully indexed, containing information "intended to enable architects and engineers to design and detail metal lumber joist and stud construction, and other fire-resistive structures involving the use of Berloy pressed steel structural sections, floor-cores, rib-plex, lath, centering and reinforcing plates." There is information (including illustrations) describing details and methods of erection of Berloy pressed steel building materials, and data in connection with materials which enter into construction with Berloy products. In addition is given a short non-technical discussion of the basic principles involved in the design of beams and joists, with notes and tables. The book is listed at $2.00 per copy.

"City Homes on Country Lanes," by William E. Smythe; 264 pp.; 5x7½; 17 illustrations; $2.50; Macmillan Company, Prairie and 25th Street, Chicago, Illinois. The title to this book is deceptive. It deals not with houses but with gardens, small gardens. Mr. Smythe is an enthusiastic believer in the "back to the land" movement, and in intensive cultivation of small garden plots. It is his solution to the present housing shortage, hard times, and the general unrest. In addition to his enticing descriptions of what has been accomplished along the lines of intensive gardening and small live stock husbandry, he gives some very valuable planting tables, etc., which were prepared by 22 leading American experts for the National War Garden Commission. An interesting, suggestive, and practical book for the home-builder.

"Clear View" Rolling Screen—A new method of screening windows and ventilators in the form of a rolling screen has been placed on the market by Gustave Lidseen, 830-840 South Central Avenue, Chicago. The screen automatically screens a window when the lower sash is raised or the upper sash is lowered, so that a clear view is always obtained through the glass and the screens are not in sight except when in use. The points of merit advanced in

favor of this screen are: It does away with the annoyance of cleaning and storing screen in winter; only small steel channels at the sides, and metal housings in which the screen wire winds on a roll actuated by a spring and variations of as much as a half inch in the window do not affect the action of the screen, which can be unhooked from the sash almost instantly, making it easy to wash windows at any time. The windows are kept cleaner as the screens are not exposed to rain when the windows are closed. Monel and other non-rusting wire cloth is used making the screen almost indestructible.

Bradley "Washfountain"—A new sanitary fountain for factories, schools, hotels and public buildings is announced by the Bradley Manufacturing Co., Milwaukee, Wis., made in two sizes, a 54-in. basin accommodating 12 persons and a 32-in. basin for six people. It is made of Marmorite, a composition of marble chips and concrete, finely ground and polished; is easily cleaned, hard to soil, and economical in installation and upkeep. Soap is supplied by a device which is part of the design;



The Bradley "Washfountain"

the water flow is controlled by either a hand valve or a foot lever. The illustration shows the Washfountain in operation in a factory installation.

Archer Mixers, announced as the latest development by the Archer Iron Works, Chicago, are built in two sizes, the Archer No. 1 special half-sack capacity and the one-bag mixer. No. 1 special has a 3-hp. engine and the one-bag mixer a 6-hp. engine; both have chilled drum rollers and Hyatt roller bearings; are easily charged

Latest development in Archer concrete mixer

and the materials quickly discharged directly into the drum. The height of the No. 1 special is only 13 in. Both types are equipped with Fairbanks-Morse engines and Bosch magnetos.

Ankyra Anchor Bolts—The Ankyra Manufacturing Co., Wayne Junction, Philadelphia, in their latest catalog, describe the general applications of their 2½-in. Ankyra bolt used in connection with hollow wall construction, such as lath and plaster, hollow tile, expanded sheet metal. The bolt is applicable to Nos. 8, 10, 12, 14, 16, 18 size wood screws; each bolt is stamped with a number showing the screw for which it is intended. The E type is for use in solid walls and Nos. 14 and 16 for heavy fixtures—washstands, radiators, etc., they are self-adjusting and self-riveting.

Cyclone "Red Tag" Fence, a folder descriptive of the fences and gates made by the Cyclone Fence Co., Waukegan, Ill., is adapted to any home—front or back yard or as a division fence; ornamental gates are made for each style of wire; pickets are of heavily galvanized wire spaced 3 in. apart at the top, 1⅝ in. at the bottom; they are chicken-proof.

Architectural Details in Brickwork are being issued to architects from time to time by the American Face Brick Association, 110 South Dearborn Street, Chicago, in the form of half-tones, of a size convenient for filing, 8½x11 inches. They are photographic reproductions of various details of building construction, entrances, windows, lobbies, cornices, chimneys, fireplaces, terraces, colonnades, sun-rooms, etc., to be found in residences, hotels, club-houses, school and university buildings and hospitals, and show unusual and effective uses of brick. This material is of suggestive value to designers and draftsmen.

Handbook of Truscon Steel Sash is the title of a reference book of 80 pages, 8½ x11, recently put out by the Truscon Steel Co., Youngstown, Ohio. It is profusely illustrated and contains standard dimension tables, architectural details, and specifications for steel windows. It may be had from the Truscon Steel Co. for the asking.

Oak Flooring—How and Where to Use It is the title of a booklet recently issued by the Oak Flooring Manufacturers' Association of the U. S., Chicago. Illustrated by several notable applications of oak floors in old as well as new structures; the booklet tells the "why" and the "how" of oak flooring. The Association has adopted a trade mark which appears on the back of every piece of oak flooring manufactured by a member.

"The Cream of the Boards" is the title of a folder of Bird & Son, East Walpole, Mass., in which the company announces that Bird's Neponset Board is a five-ply wall board, moisture-resisting on both sides, tough and flexible, and needs no further decoration than its cream-white finish. It is called "three boards in one."

How to Waterproof Foundations, Damp-proof Walls and Dust-free Concrete Floors is the title of a folder put out by L. Sonneborn Sons, Inc., New York City, announcing the uses of Hydrocide, designed to render concrete, brick, stucco and other porous building materials water- and damp-proof.

Care and Uses of Explosives are included in the trade literature recently issued by the Hercules Powder Co., Wilmington, Del. "Progressive Cultivation" shows the uses of dynamite on the farm: "Modern Road Building and Maintenance," how dynamite is employed in construction work and its several applications, and there is a "Talk About Hercules Sporting Powders."

The Universal Cement Mold Co., North Milwaukee, Wis., announces in its folder, "Build the Hollow Wall Way," the applications in building construction to which its molds are being employed in public buildings, factories, residences, and other structures. How the mold is used is shown in the illustrations.

Designs for Houses of Indiana Limestone, Vol. 27 of the Library Series, published by the Indiana Limestone Quarrymen's Association, P. O. Box 400, Bedford, Indiana; 32 pp. 8½x11. This issue consists of a reprint from "The Architectural Review," in which is announced the results of the competition for the design of a detached residence faced with Indiana limestone. The first, second, third, and fourth prize designs are shown, with nine others, some of which received mention from the jury.

The Thermal Conductivity and Diffusivity of Concrete, by A. P. Carman and R. A. Nelson, is the title of Bulletin No. 122 issued by the Engineering Experiment Station of the University of Illinois. It deals with certain experimental work carried on at the Engineering Experiment Station with the purpose of obtaining the absolute thermal conductivity of a number of standard concrete mixtures. The diffusivity, or thermometric conductivity, was also calculated. While this work was undertaken in response to inquiries for information from various engineers, the increasingly numerous uses of concrete make determination of these physical constants for such a common material desirable in any case. The pamphlet is illustrated with details and photographic reproductions, and contains a number of tables. 32 pp., 6x9. copies may be had without charge by addressing the Engineering Experiment Station, University of Illinois, Urbana, Illinois.

Studies on Cooling of Fresh Concrete in Freezing Weather, by Tokujiro Yoshida, is the title of Bulletin No. 123 of the Engineering Experiment Station of the University of Illinois. To quote the author, "the practice of placing concrete in freezing weather renders important a knowledge of the rate at which this material will cool and the effect of the various methods of protecting the freshly placed concrete from the cold. The experiments herein recorded furnish test data on the length of time required for concrete of a given temperature to lose its heat and become cold enough to freeze when exposed to temperature lower than the freezing point of water. . . . Some experiments were made on the protective effects of coverings. . . . It is not considered that these solutions will give complete data regarding concreting in freezing weather under various conditions; however, it is hoped that they will throw some light on the behavior of fresh concrete at low temperatures and will indicate the necessity of protection or other precautions." 55 pages; 6x9; illustrated with a great many charts and tables. Copies may be obtained without charge by writing to the Engineering Experiment Station, University of Illinois, Urbana, Illinois.

The White Pine Series of Architectural Monographs, Vol. VII, No. 4, issued by the White Pine Bureau, St. Paul, Minn., shows the competitive drawings for a three-teacher rural school with teachers' cottage, with the report of the jury of awards in the sixth annual White Pine Architectural Competition, held May 6 and 7, last. Monograph No. 5 of the series is devoted to a comparative study of a group of early American doorways and porches, with notes by Aymar Embury II.

• **The Modern Fertilizer Plant** is the title of the fine big 9x11½, 96-page catalogue recently put out by the Sturtevant Mill Company, Harrison Square, Boston, and of particular interest to contractors called upon to erect fertilizer structures as the book is devoted to the presentation of Sturtevant machinery and equipment, but contains photographic reproductions, detail drawings, and specifications. Besides the individual units and machines shown in the body of the book there is a complete fertilizer installation depicted in a large folder at the back. This company not only build fertilizer machinery, but design plants or parts of plants as well, and maintain an engineering service entirely separate from the manufacturing business.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912,

Of National Builder, published monthly at Chicago, Ill., for October 1, 1921.

State of Illinois, County of Cook, ss.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared Geo. P. Miller, who, having been duly sworn according to law, deposes and says that he is the Manager of the National Builder, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corporation; Editors, N. C. Rockwood and A. H. McQuilkin; Managing Editor, N. C. Rockwood; Business Managers, Geo. P. Miller, all at 542 South Dearborn Street, Chicago, Ill.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Tradepress Publishing Corporation, individual stockholders: W. D. Callender, T. J. Sullivan, Geo. P. Miller, N. C. Rockwood, W. B. Mayor, D. R. Hicks, A. H. McQuilkin, H. P. Sessions, C. O. Nelson, Forrest O. Poor, C. A. Breskin, all at post-office address, 542 South Dearborn Street, Chicago, Ill., and C. H. Fuller, at 101 West 41st Street, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) There are none.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiants full knowledge and belief as to the circumstances and conditions under which stockholders and security holders do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is—(This information is required from daily publications only.)

(Signed) GEO. P. MILLER.

Sworn to and subscribed before me this 29th day of September, 1921.

MABEL OLSEN, Notary Public.

(My commission expires April 12, 1922.)

Form 3526.—Ed. 1916.

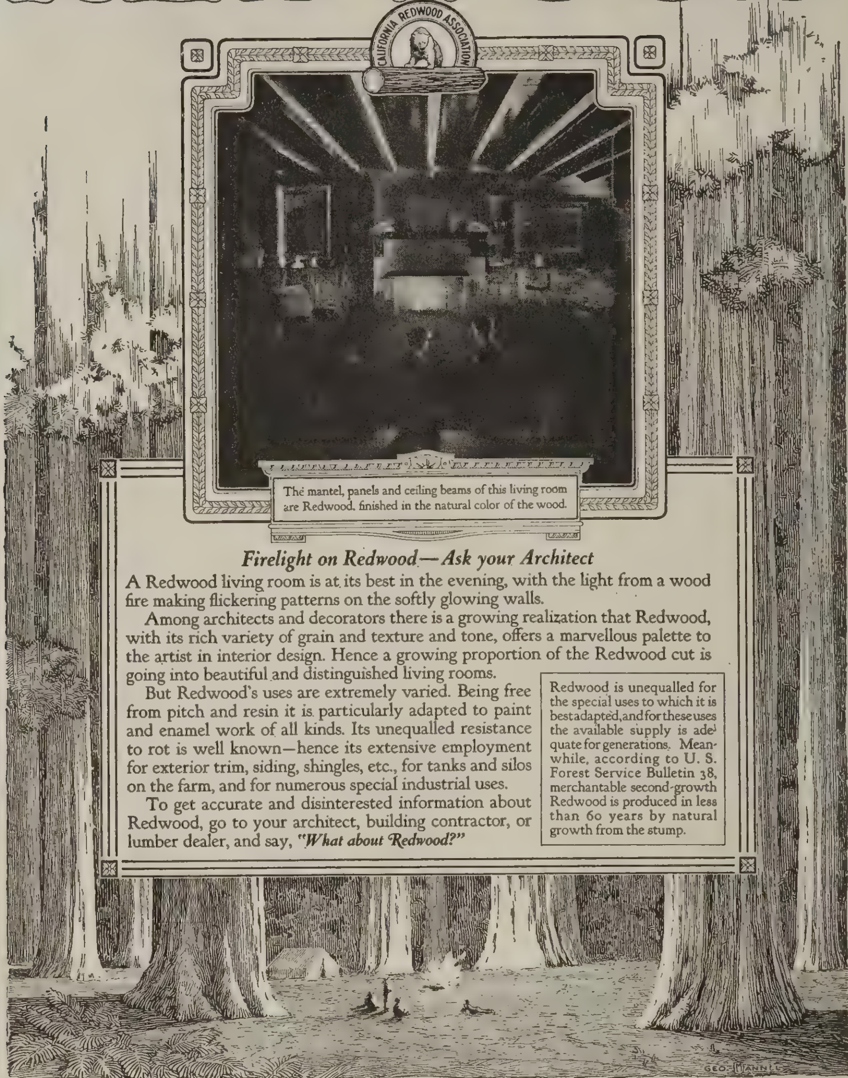
The Only Journal Devoted Exclusively to the Contractor Architect and Builder

National Builder

ESTABLISHED 1864

OL. 64 | December 1921 | NUMBER 1

CALIFORNIA REDWOOD



This advertisement is appearing in the December issue of Atlantic Monthly, Century, Harpers, Scribners, The Review of Reviews, World's Work

THIS advertisement is written with just one purpose in mind: to send prospective home-builders to their logical technical advisers—the architect, the building contractor and the lumber dealer—with a question: "What About Redwood?" You can answer this question, and it is your opportunity to secure a client or a customer. Complete information, prices and specifications may be obtained by addressing any of the sales and distributing branches listed below.

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The Pacific Lumber Company, 311 California Street, San Francisco, and Central Bldg., Los Angeles, California.

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Build Cheaply by using Up-to-Date Machinery

It is an economic waste to do anything by hand that can be done cheaper and better by machinery.

In the saving of labor and of time, in the performance of practically all work on a carpenter's bench, the

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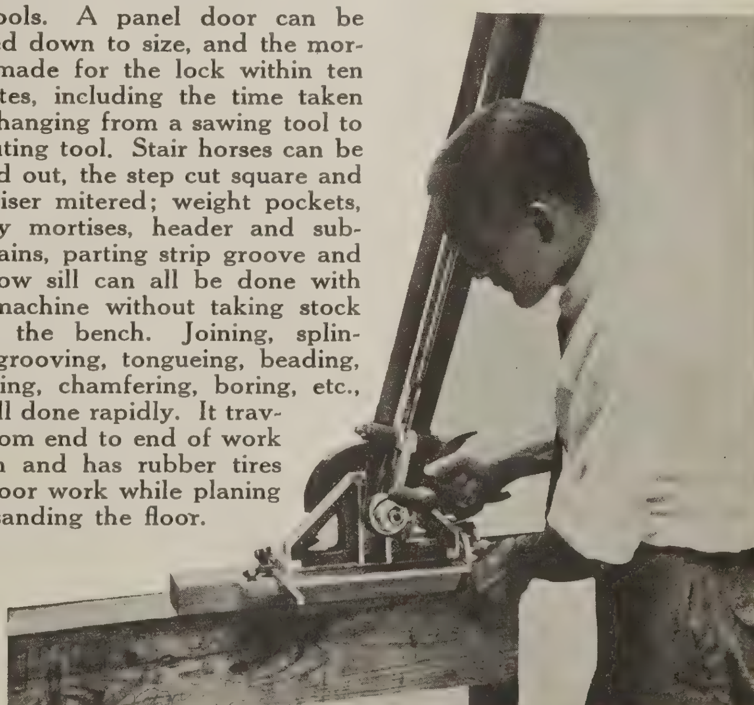
does the job with a nicety and precision which is impossible to achieve with hand tools. High speed is one of the strong points and counter balances take all load off the operator. All changes of tools are made without the use of tools. A panel door can be ripped down to size, and the mortise made for the lock within ten minutes, including the time taken for changing from a sawing tool to a routing tool. Stair horses can be sawed out, the step cut square and the riser mitered; weight pockets, pulley mortises, header and sub-sill gains, parting strip groove and window sill can all be done with the machine without taking stock from the bench. Joining, splining, grooving, tongueing, beading, molding, chamfering, boring, etc., are all done rapidly. It travels from end to end of work bench and has rubber tires for floor work while planing and sanding the floor.



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"This job helps me get more business"

"SEE that building?" said Pat, pointing with pride at just about as fine a piece of brick construction as you ever saw. "That's one of my first jobs. How old do you think it is? 30 years! And b'gorra, it looks just as good as the day I built it!

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"And say," continued Pat, "I've got a wonderful argument today for using brick construction: *its low cost*—no more expensive than frame now. Sounds funny? Not at all. Just lay the brick on edge according to the Ideal Brick Hollow Wall form of construction. This is the latest thing in brickwork—I've tried it out and *know*. Today, you can build a fine brick home at the cost of frame."

For 25 cents any brick mason can get a copy of "Brick, How to Build and Estimate," 72 pages. It describes this Ideal Wall construction thoroughly and is packed full of other valuable information on estimating and handling brickwork. It will save you hours of valuable time.

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How long should it take to lay them? How much cement, lime and sand are required? How long should it take to mix them? Today brick masons are quickly answering these questions by referring to compact, authoritative tables in "Brick, How to Build and Estimate".

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A Book That Helps Get Business

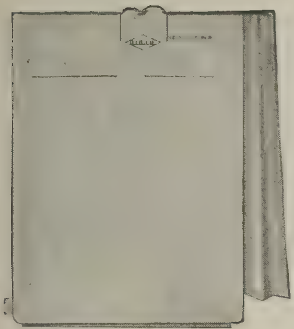
When sending for "Brick, How to Build and Estimate" it is a good plan to ask also for "Brick for the Average Man's Home".

Numerous builders have told us that this book has helped them close contracts. They show the book to prospective builders and interest them in one of the 35 attractive small house designs—bungalows, 1½-stories, 2-stories, 2-families, cottages, garages. *For each of these complete working drawings are available at a nominal price.* The price of the book is only $1.00 postpaid—a small sum for such a business getter.

The best plan is to send $1.25 and get both books. Address, the Common Brick Manufacturers Association, 1307 Schofield Building, Cleveland, O.

The Ideal Brick Hollow Wall has all the advantages of solid brick wall construction and, in addition, is much lower in cost.

"The Roof that's Always New"



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They are not like any metal roof or metal shingle you have ever seen before. They're made—not plated—from pure zinc. It's indestructible—can't crack, rust, rot, warp, work loose or burn—and will long outlast the building it protects.

Other builders have judged it the very best roofing material and the very best form of shingle ever placed on the market. But we want you to judge it **for yourself.**

Please send, therefore, for samples and descriptive booklet. We will leave the rest to you.

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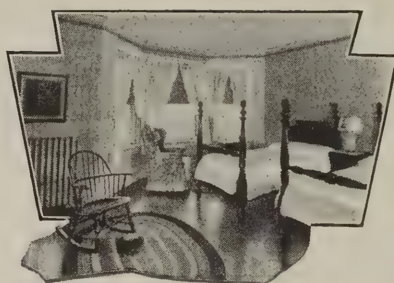

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For general specifications, see page 458, Sweet's Architectural Catalogue, 16th Edition.

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Turn Your Practical Knowledge Into Cash

No matter whether you are a builder, contractor or carpenter, here is an opportunity for you to add to your income. When work is slack, as in winter, you can always line up buyers for Oak Flooring.

Oak flooring is really easy to sell—when you know how. The thing to keep in mind is the price. Everyone knows that it is the most beautiful, durable, sanitary and easy-to-clean flooring. But people outside the building trades and professions think it is very expensive.

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Prospects do not know, for instance, that Oak Flooring costs less than ordinary flooring, plus carpets. Or that it adds 25 per cent or more to renting and selling values. In quoting prices, give them by rooms, not by the thousand. That makes the price look bigger to the prospect than it is.

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A special ⅜-inch thickness is milled for laying over old, worn floors. This is a job that can be done in any weather. You know where building is going to start. Where repairs are needed. See your friends among Oak Flooring dealers and then see the people you know are in the market for flooring.

Write for our 3 free booklets, in colors. They contain all the information necessary to make you a competent Oak Flooring salesman. Write today.

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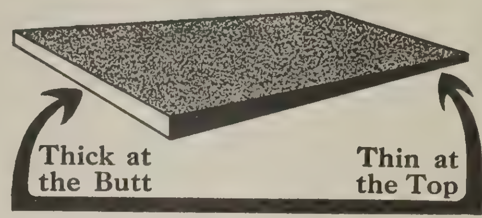
1045 Ashland Block, Chicago, Ill.

Shingles Must be Tapered



The taper makes the shingle snuggle down to the roof and leaves no place for wind to catch or moisture to gather. Shingles that are tapered will not curl or warp; will not collect rain, snow or moisture, will not rot, run or corrode. Insist on having shingles that are tapered.

Winthrop Tapered Asphalt Shingles are the only asphalt shingles that are tapered. They have all the qualities of ordinary asphalt shingles, permanency, fire-safety, flexibility, plus beauty and the Taper.

Learn all about these excellent shingles—a free sample and a copy of "Shelter, the Second Instinct of Man," will be sent free. Write, today, to the nearest factory.

Send for Book

Here is a valuable history of roofing. On every page is a photograph of a different kind of a roof in different parts of the world. It will be mailed free to responsible parties.

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-the Big Butt Shingle

Winthrop
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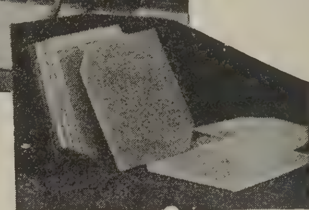

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First, the architectural beauty of the garage is preserved without sacrificing convenience. Second, the sets in no way limit the architect. They are suitable for any size, style or design. Third, every piece of hardware in the set is good. Smooth and uninterrupted performance is insured. Fourth, every set goes out in a box, eliminating the possibility of a slip.

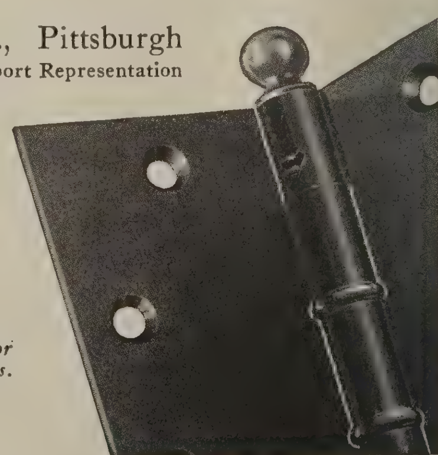
Fifth, to safeguard any possibility of mistakes in application, simple and certain directions are placed in each box.

Because McKinney considered these points architects have been saved considerable time in specifying. Now it is only necessary to designate McKinney Garage Sets by number—then the finished garage is sure to interpret your design down to the swing of the door.

The whole McKinney garage idea is pictured in a readable book. The information is arranged for the convenience of the busy man. We will mail a copy promptly if you request it.

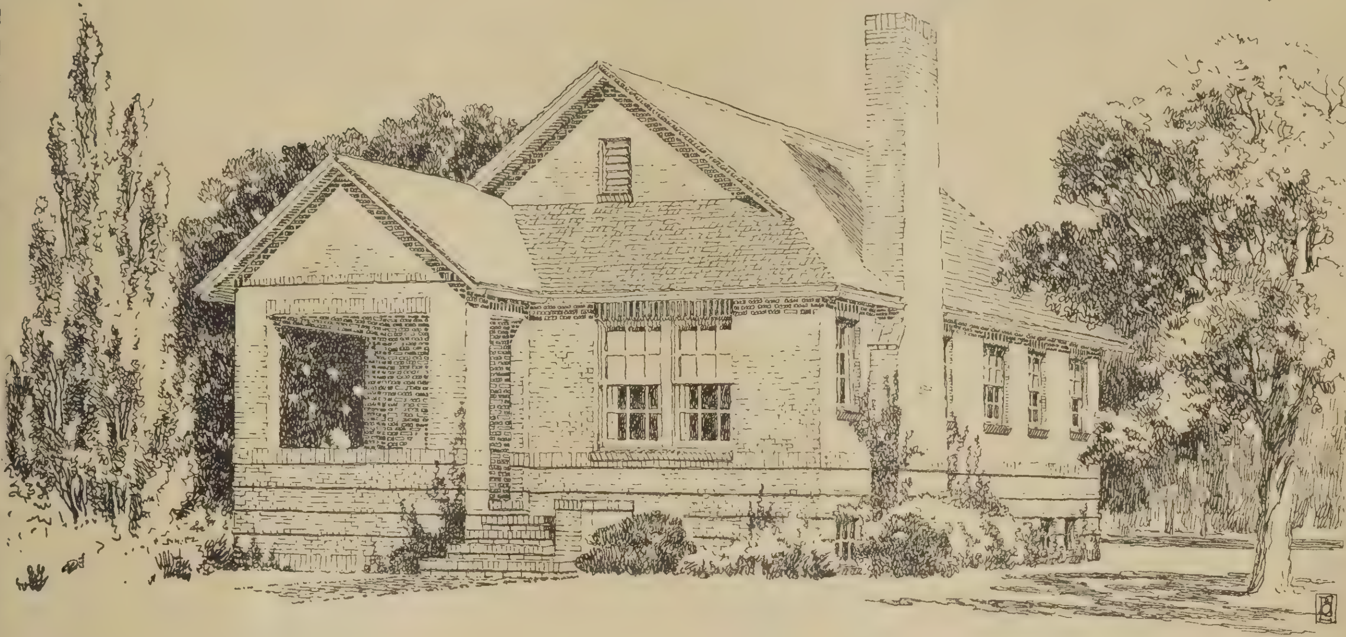
McKINNEY MANUFACTURING CO., Pittsburgh
Western Office, Wrigley Bldg., Chicago Export Representation

McKINNEY
Hinges and Butts



Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks.

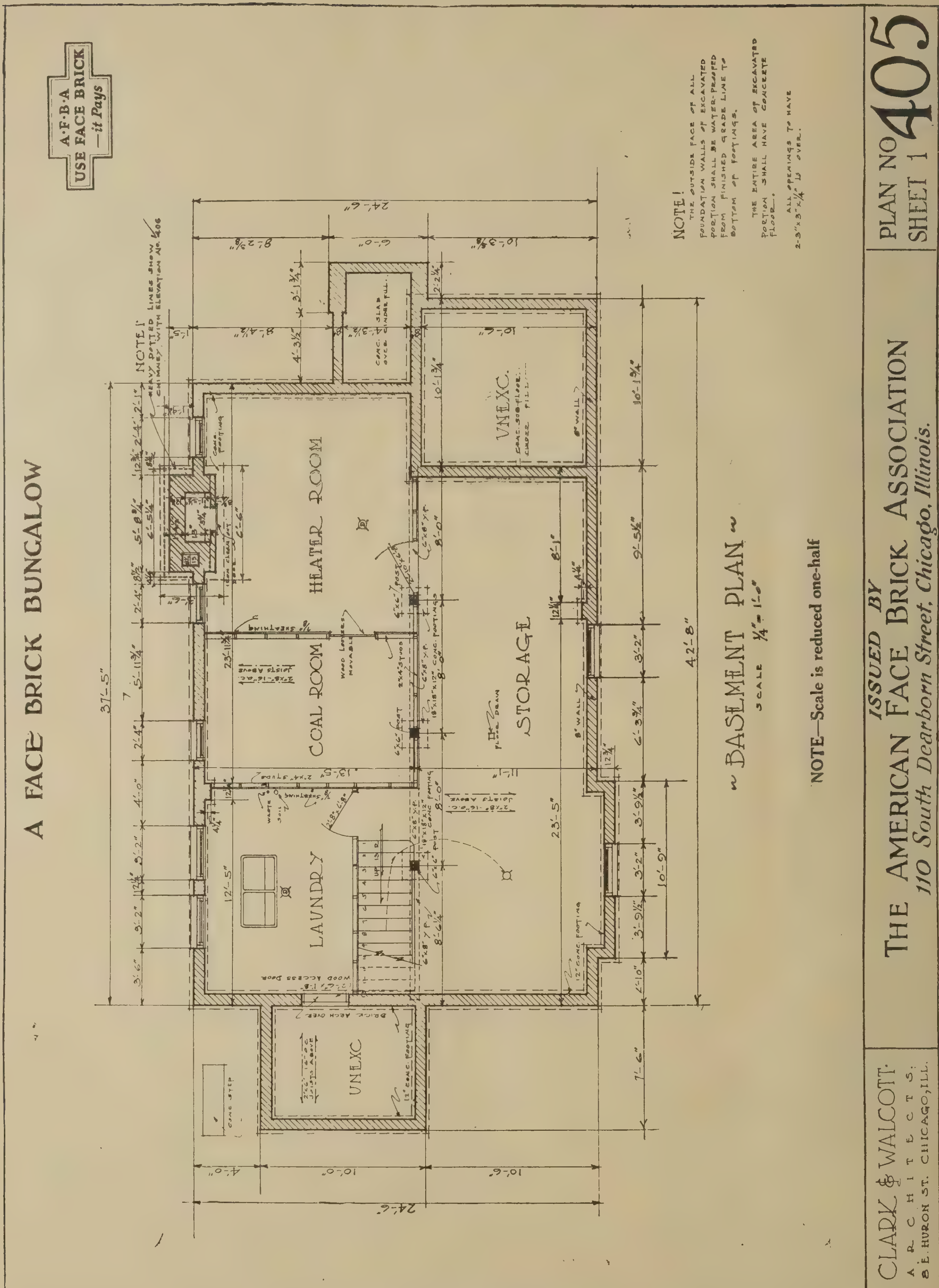
A Face-Brick Bungalow

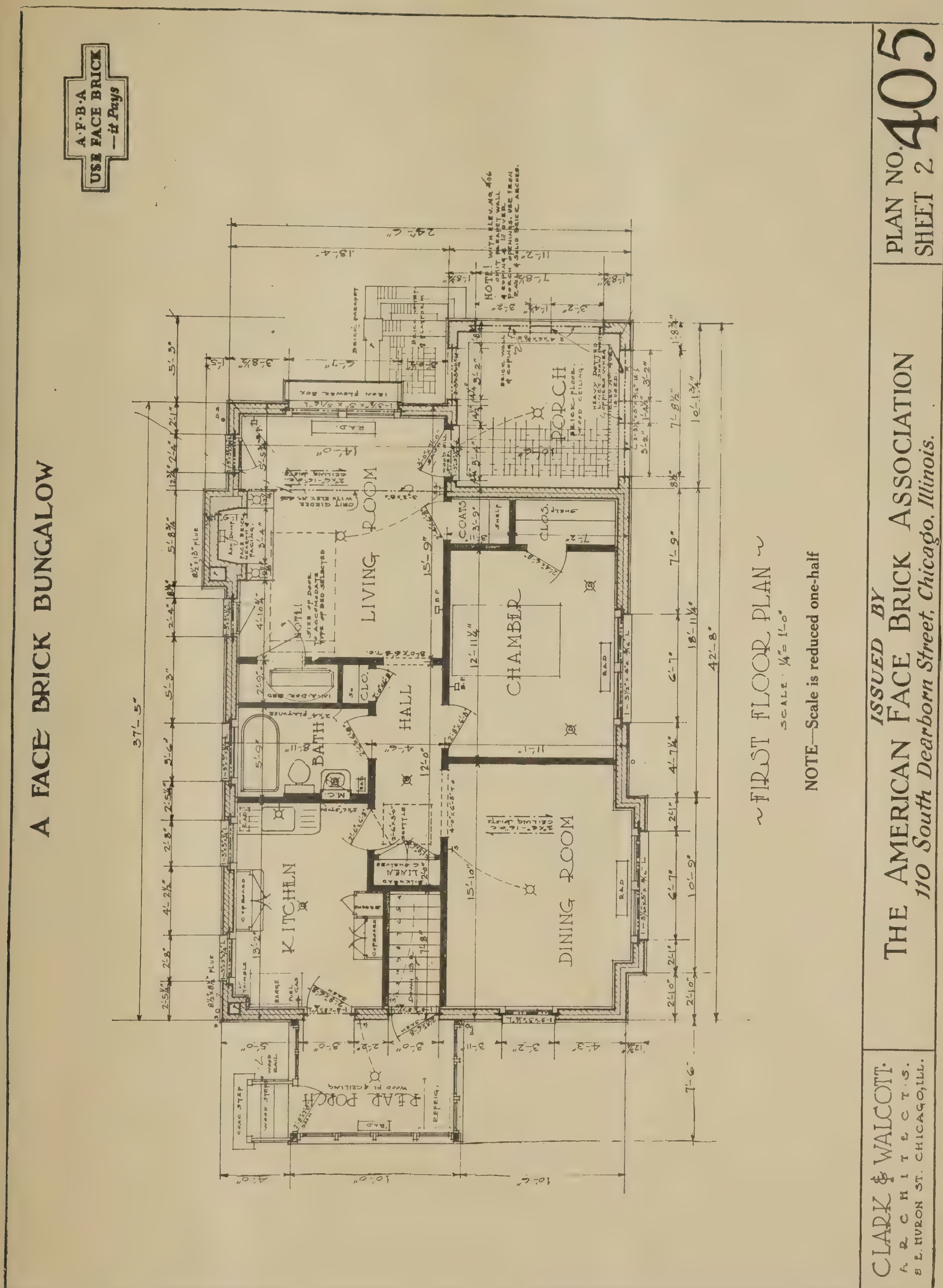


THE architects have succeeded in producing an extremely attractive effect with the restricted masses and simple lines of this small house. The fine chimney, the roof, the gabled porch, the proportion of height to length and breadth, and the fenestration combine into a very pleasing whole. The large, square porch forms a complete protection for the entrance, which lets you directly into the ample living room where a convenient coat closet accommodates wraps, umbrellas, and the like. A cheerful fireplace gives the room a very homey feeling. A closet for a disappearing bed practically makes of the living room another bedroom when occasion demands.

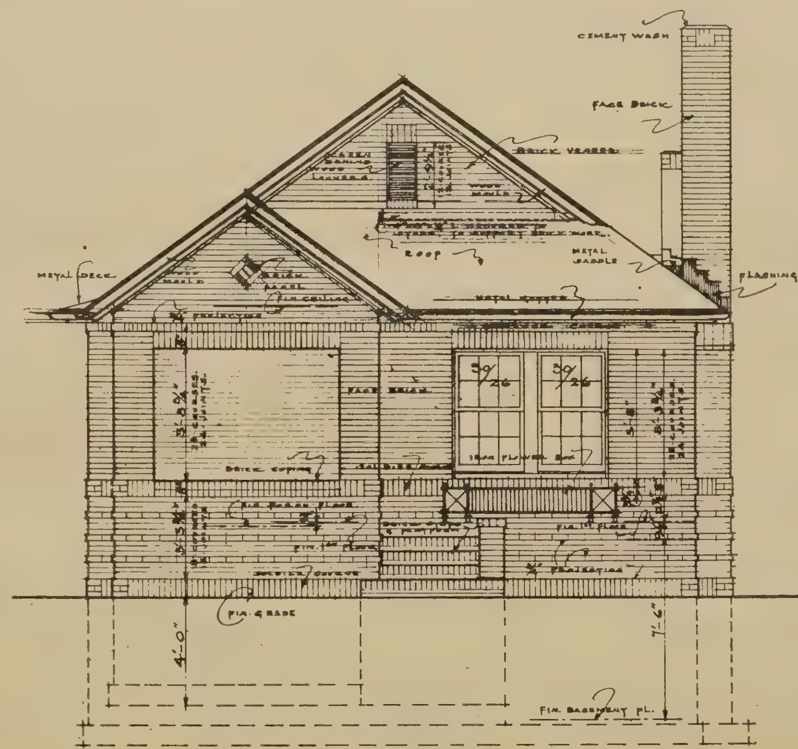
A short hall leads to the dining room and kitchen, and connects the bedroom with the bath. The rear porch is glazed, screened, and heated, and has a foundation wall around it, so that it may be used for more than just a rear porch. It could be made an attractive all-the-year-round dining porch.

Standard specifications, for modification, will be supplied on request.


A FACE BRICK BUNGALOW
A·F·B·A
USE FACE BRICK
—it Pays
NOTE! HEAVY DOTTED LINES SHOW CHIMNEY, WITH ELEVATION No. 406
HEATER ROOM
COAL ROOM
LAUNDRY
STORAGE
UNEXC.
UNEXC
~ BASEMENT PLAN ~
SCALE 1/4" = 1'-0"
NOTE—Scale is reduced one-half
NOTE!
THE OUTSIDE FACE OF ALL FOUNDATION WALLS OF EXCAVATED PORTION SHALL BE WATER-PROOFED FROM FINISHED GRADE LINE TO BOTTOM OF FOOTINGS.
THE ENTIRE AREA OF EXCAVATED PORTION SHALL HAVE CONCRETE FLOOR.
ALL OPENINGS TO HAVE 2-3"x3"x1/4" LS OVER.
ISSUED BY
THE AMERICAN FACE BRICK ASSOCIATION
110 South Dearborn Street, Chicago, Illinois.
Advertisement
PLAN NO 405
SHEET 1
CLARK & WALCOTT
ARCHITECTS
8 E. HURON ST. CHICAGO, ILL.
37'-5"
42'-8"
24'-6"


A FACE BRICK BUNGALOW
A·F·B·A
USE FACE BRICK
—it Pays
~FIRST FLOOR PLAN~
SCALE ¼" = 1'-0"
NOTE—Scale is reduced one-half
ISSUED BY
THE AMERICAN FACE BRICK ASSOCIATION
110 South Dearborn Street, Chicago, Illinois.
Advertisement
PLAN NO. 405
SHEET 2
CLARK & WALCOTT
ARCHITECTS.
8 E. HURON ST. CHICAGO, ILL.
LIVING ROOM
CHAMBER
DINING ROOM
KITCHEN
BATH
HALL
PORCH
REAR PORCH
COATS
CLOS.
LINEN
37'-5"
42'-8"

A FACE BRICK BUNGALOW



~ FRONT ELEVATION ~
SCALE 1/4" = 1'-0"

NOTE—Scale is reduced one-half

CLARK & WALCOTT
ARCHITECTS.
8 E. HURON ST. CHICAGO, ILL.

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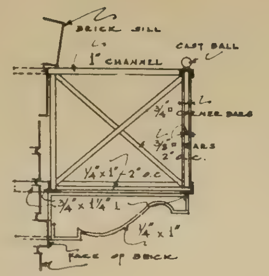
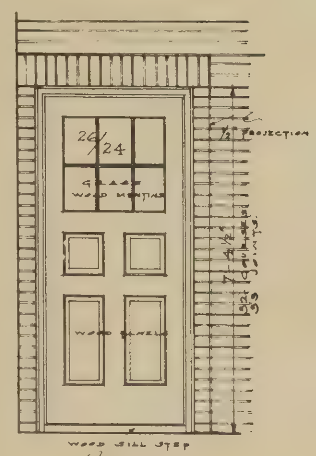
THE AMERICAN FACE BRICK ASSOCIATION
110 South Dearborn Street, Chicago, Illinois.

PLAN NO. 405
SHEET 3

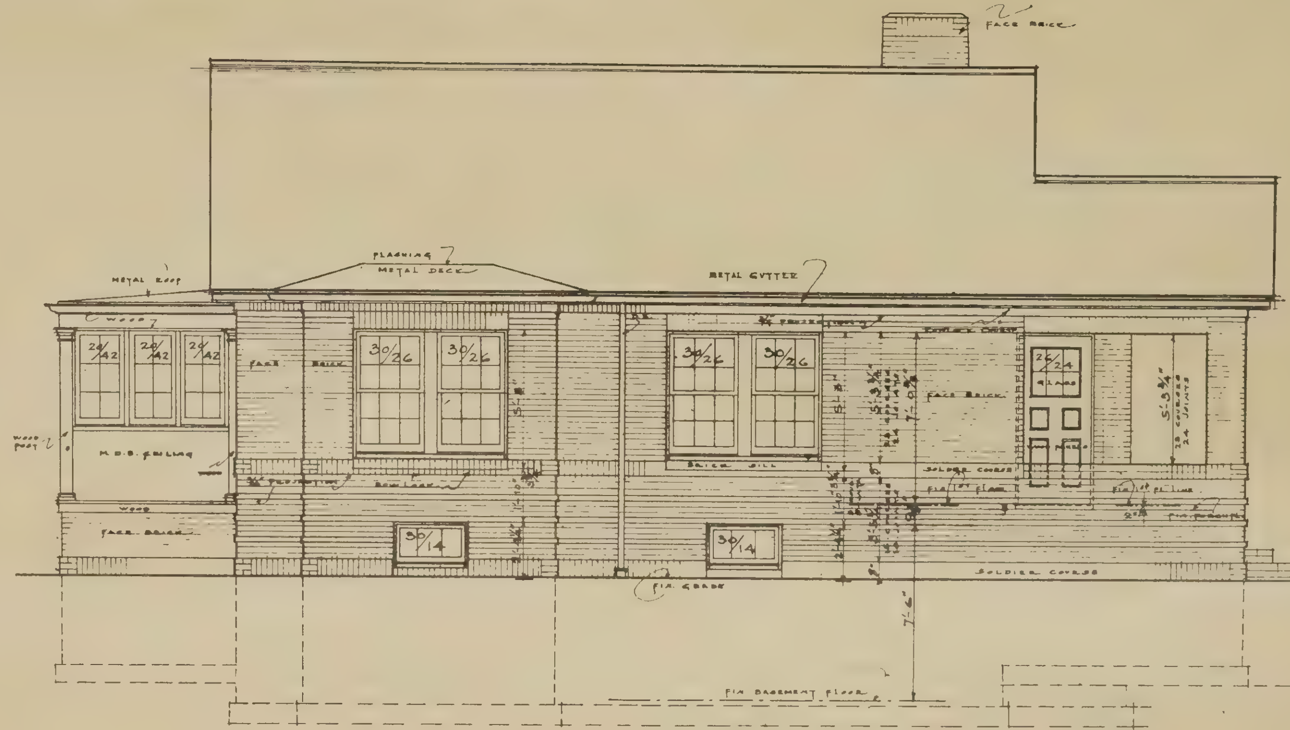
A FACE BRICK BUNGALOW



~ FLOWER BOX ~
SCALE 1½" = 1'-0"



~ FRONT ENT. DOOR ~
SCALE ½" = 1'-0"



~ SIDE ELEVATION ~
SCALE ¼" = 1'-0"

NOTE—Scale is reduced one-half

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ARCHITECTS
5 E. HURON ST. CHICAGO, ILL.

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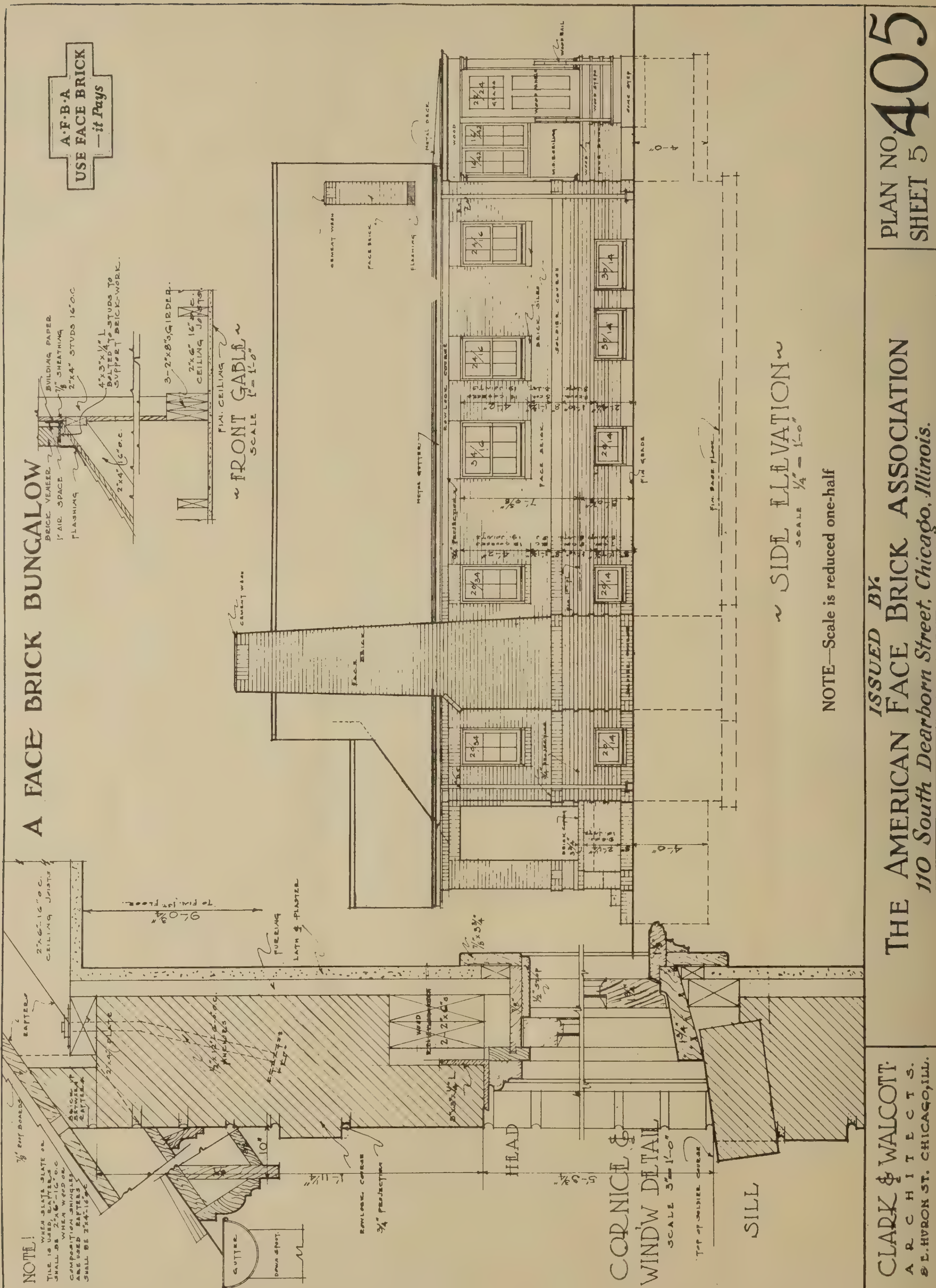
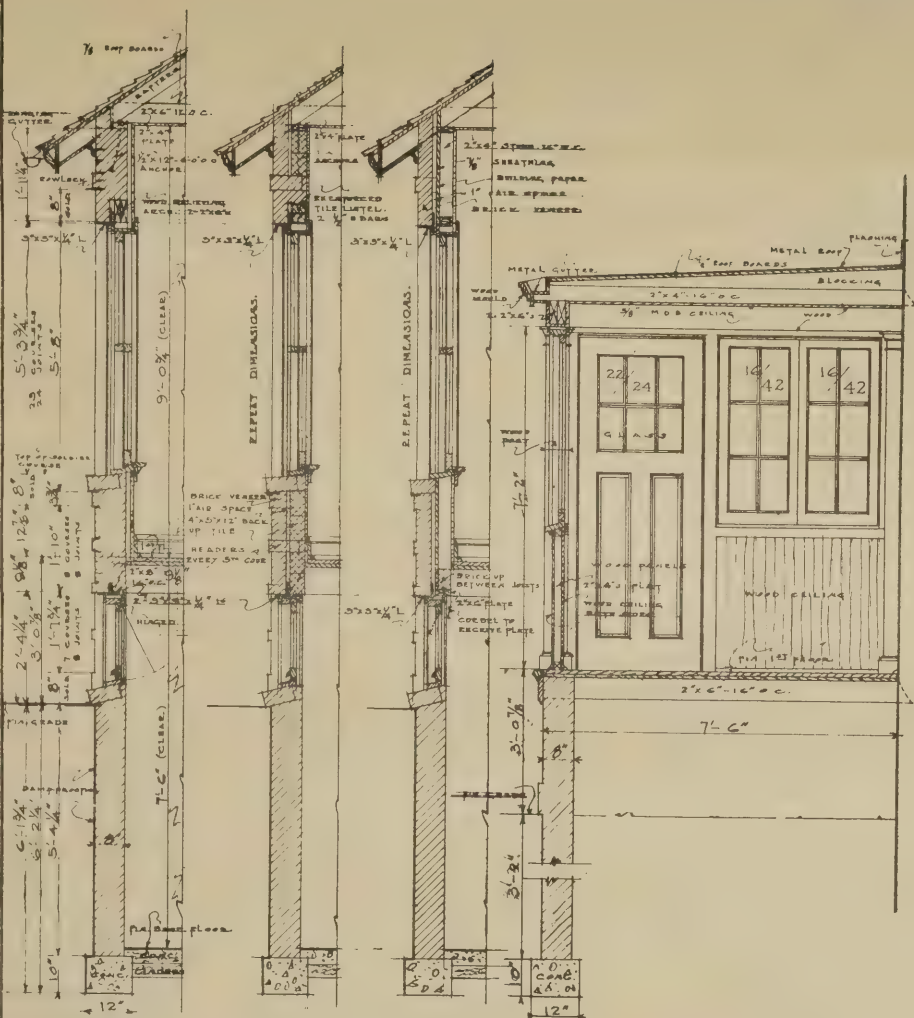
PLAN NO. 405
SHEET 4


A FACE BRICK BUNGALOW
A·F·B·A
USE FACE BRICK
—it Pays
FRONT GABLE
SCALE 1" = 1'-0"
SIDE ELEVATION
SCALE 1/4" = 1'-0"
NOTE—Scale is reduced one-half
CORNICE & WINDOW DETAIL
SCALE 3" = 1'-0"
HEAD
SILL
ISSUED BY
THE AMERICAN FACE BRICK ASSOCIATION
110 South Dearborn Street, Chicago, Illinois.
Advertisement
PLAN NO. 405
SHEET 5
CLARK & WALCOTT
ARCHITECTS.
8 E. HURON ST. CHICAGO, ILL.

A FACE BRICK BUNGALOW

A·F·B·A
USE FACE BRICK
—*it Pays*

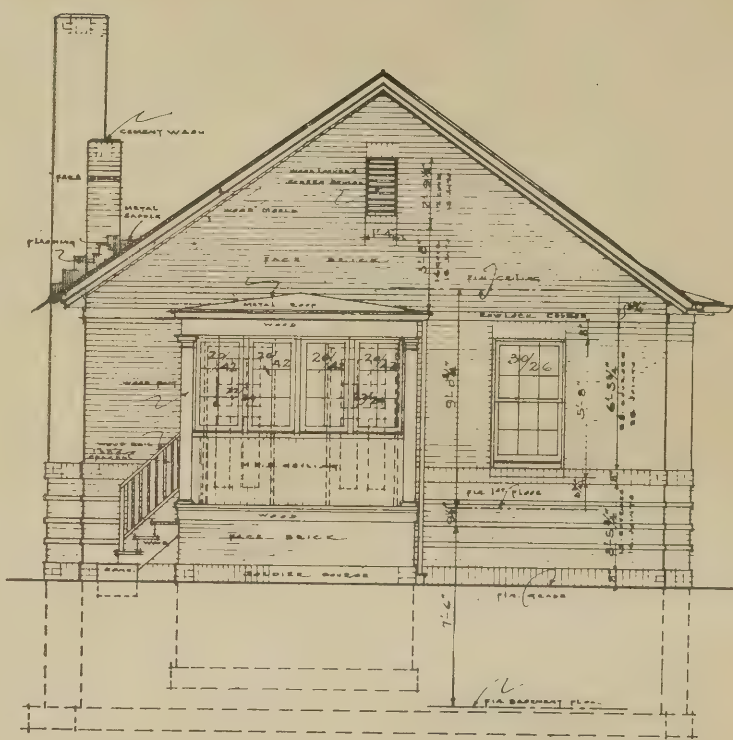


~SOLID BRICK CONSTRUCTION~ ~BRICK VENEER TILE BACKING~ ~BRICK VENEER ON STUDS~

~WALL SECTIONS~

~SECTION THRU REAR PORCH~

SCALE ½" = 1'-0"



~REAR ELEVATION~

SCALE ¼" = 1'-0"

NOTE—Scale is reduced one-half

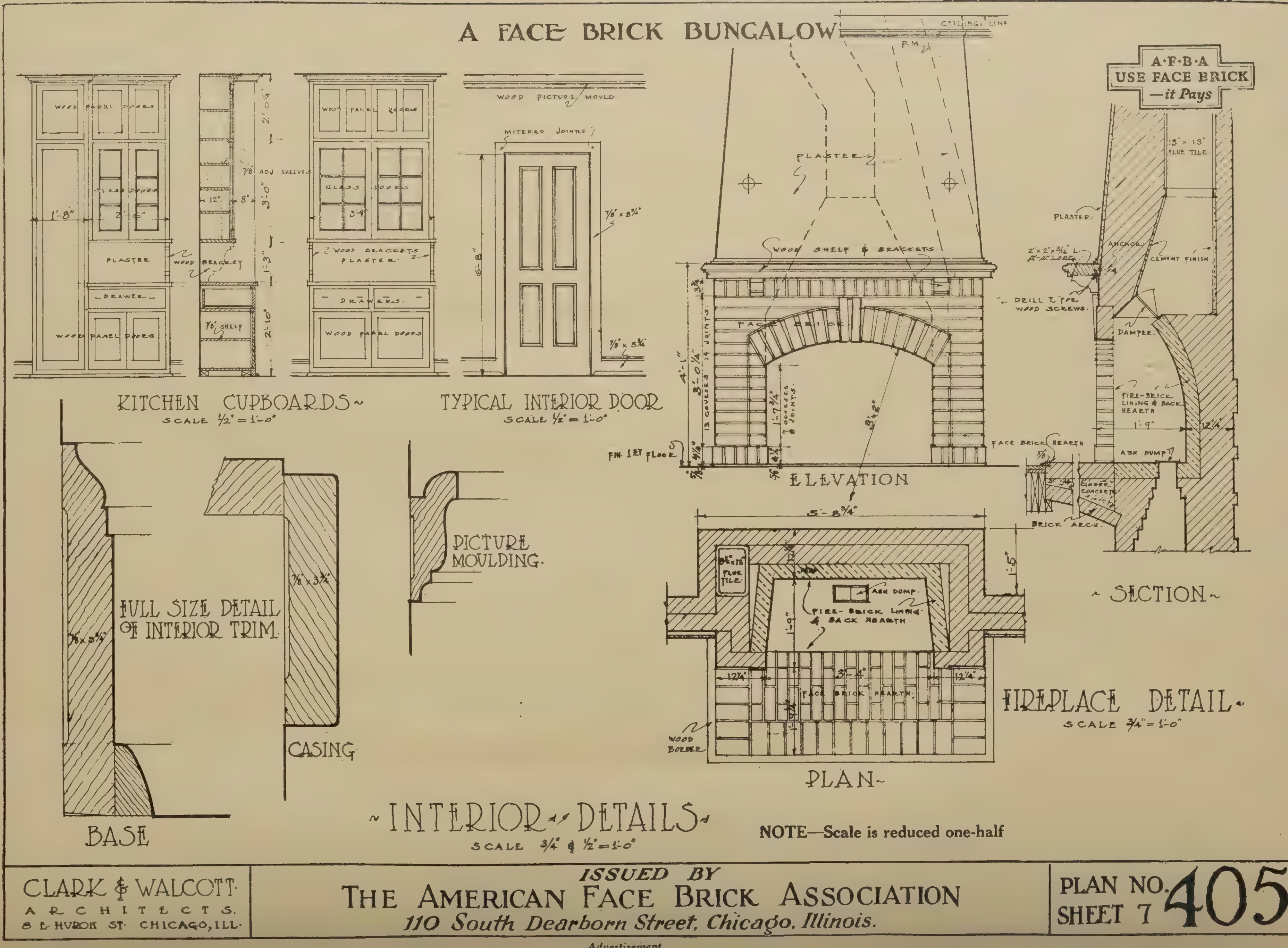
CLARK & WALCOTT
ARCHITECTS.
8 E. HURON ST CHICAGO, ILL.

ISSUED BY

THE AMERICAN FACE BRICK ASSOCIATION

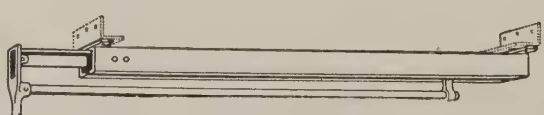
110 South Dearborn Street, Chicago, Illinois.

PLAN NO. 405
SHEET 6


A FACE BRICK BUNGALOW
A·F·B·A USE FACE BRICK —it Pays
KITCHEN CUPBOARDS~
SCALE 1/2" = 1'-0"
TYPICAL INTERIOR DOOR
SCALE 1/2" = 1'-0"
ELEVATION
SECTION
PLAN
FIREPLACE DETAIL
SCALE 3/4" = 1'-0"
PICTURE MOULDING
FULL SIZE DETAIL OF INTERIOR TRIM
CASING
BASE
~INTERIOR DETAILS~
SCALE 3/4" & 1/2" = 1'-0"
NOTE—Scale is reduced one-half
CLARK & WALCOTT
ARCHITECTS
8 E. HURON ST. CHICAGO, ILL.
ISSUED BY
THE AMERICAN FACE BRICK ASSOCIATION
110 South Dearborn Street, Chicago, Illinois.
PLAN NO. 405
SHEET 7
Advertisement

Saves Space and Construction Costs

THIS IS WHAT YOU BUY



This is the Knape & Vogt Garment Carrier. Adaptable to any closet, new or old. Easy to put up—anyone can do it. Made in all lengths from 12 to 60 inches.

HOW IT WORKS

Operating on a telescoping roller bearing track, the carrier containing the wardrobe comes from the closet at a touch of the fingers. Selection of garments is easy. Even closets 14 inches deep by 24 inches wide will hold a surprisingly large amount of clothing. These carriers sell immediately once their usefulness is demonstrated.

By building smaller and more compact clothes closets which will accommodate the Knape & Vogt Garment Care System, from 10% to 17% in the construction cost of the home can be saved. People have failed to realize until now what expensive, space eating items are large closets. The Knape & Vogt Garment Care System provides for smaller closets that save space, yet accommodate more clothing and care for it better than the old fashioned closet twice the size. These modern garment cases preserve the original lines of good clothes, prevent moths, create order, and give permanent satisfaction.

The builder or architect who is not acquainted with this system is not giving his client the benefit of the most modern developments in home comfort.

See Sweet's Catalog for Construction Detail

KNAPE & VOGT MFG. CO., Grand Rapids, Michigan

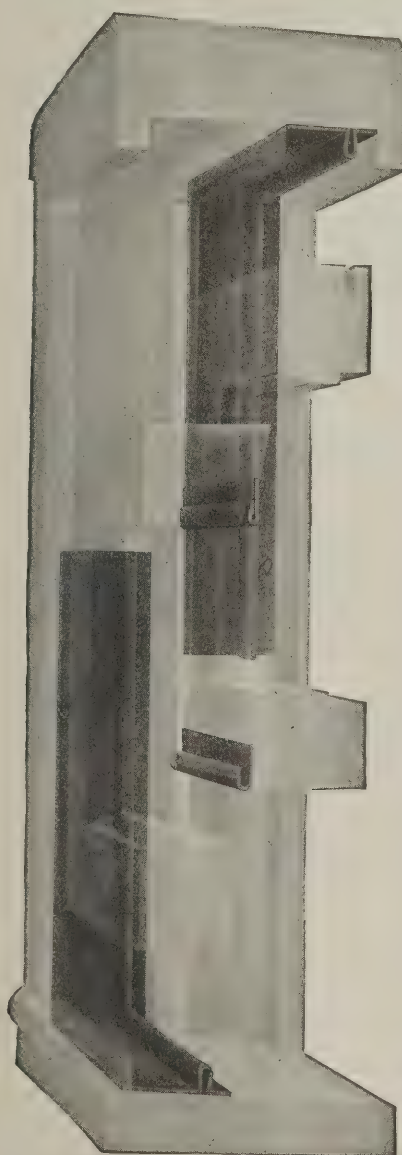
In the Days of Our Grandfathers

Rags and Old Papers were stuffed in the Cracks around Windows and Doors to keep out Cold, Wind, Storm and Dirt.

OUR FATHERS

Used Strips of Wood and Rubber or Felt which Wore Out, were Unsightly in Appearance and Inefficient

LOOKS LIKE OTHERS BUT ENTIRELY DIFFERENT



X-Ray View of Window Showing How it Appears Installed

We of Today

Demand that which is scientific in principle, practical in application, efficient in service and lasting in quality.

That's the "Why" of

Diamond Metal Weather Strips and Diamond Calking Compound

They Meet Every Requirement
Time Tested and Tried

Our Trade-Mark is Your Protection Against Imitations

PRACTICAL THE DIAMOND WAY METAL WEATHER STRIPPING

(Registered)

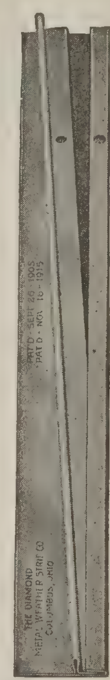
See that your specifications read and your contractor installs "DIAMOND" Weather Strips and Calking Compound in the Windows and Doors of your New or Old Building.

CONTRACTORS, CARPENTERS and Building Specialty Men will find a "DIAMOND" Agency Most Profitable

Some Very Desirable Territory Still Open

Send for Our Agency Proposition NOW—TODAY—Address

THE DIFFERENCE



The runway or side strip is made in two sections, a base with a foldover under which the rib interlocks and is held in place by a screw and mitre at sill or top.

To remove sash take out screw.

Only one side need be removed.

To replace sash just reverse operation.

After rib is removed if it is necessary to get into weight pocket it can be done without kinking or damage.

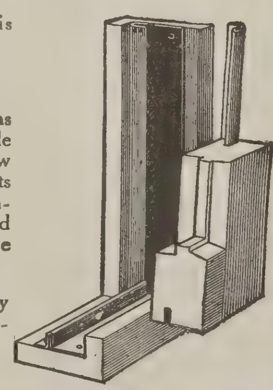
Our Equipments A, B, C, have this removable and flexible feature which is fully appreciated by carpenters and repair men.

Sash warp, swell and shrink and cause trouble by binding.

Parting stops or the dividing strip being exposed to the weather swell and bind the sash making it difficult to raise.

All this is avoided if *Diamond Flexible* strip is used as they are so made that they allow for these defects and adjust themselves to meet and overcome these objections.

That's why windows equipped with *Diamond Flexible* strips always slide easy.



Section Showing Removal of Sash and "Flexible" Strip at the same time.

The Diamond Metal Weather Strip Company

626 KERR STREET, COLUMBUS, OHIO

WESTERN FACTORY BRANCH — FORT DODGE, IOWA

This is a Winter Job for Some Carpenter-Contractor

Don't let your business die away during the winter months because new building declines. You can maintain a profitable volume by devoting your energies to remodeling store interiors.

Remodeling with Beaver Board is always profitable. But after the Christmas rush is over, retail stores regularly do their remodeling and interior alterations for the ensuing year. This is a real source of winter business—and Beaver Board is the logical material for many reasons.

It can be applied without muss or litter—*without hindering business.* It produces exceptionally artistic interiors and ceilings which are permanent because overhead traffic and jars do not effect it. It never develops cracks or flaws.

We have a special department which will prepare without charge specification designs and color combinations on jobs you are either figuring on or actually have.

Write for the details of this helpful service which really is producing winter business for carpenter-contractors all over the country.

THE BEAVER BOARD COMPANIES

Administration Offices, Buffalo, N. Y.; Thorold, Ontario, Canada; London, Eng.
District Sales Offices at New York, Philadelphia, Atlanta, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, Kansas City and Dallas.

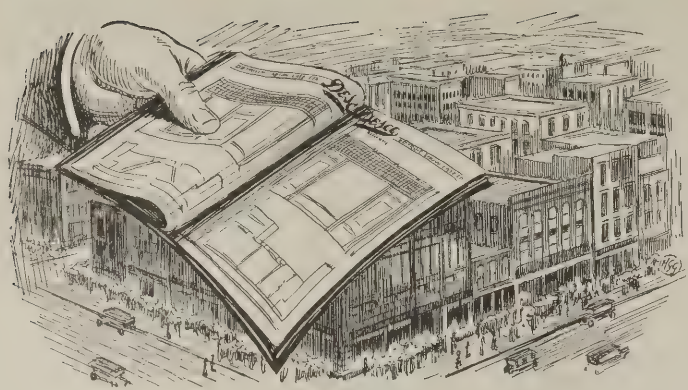
Sold by Lumber and Building Material Dealers Everywhere

BEAVER BOARD

You can't expect Beaver Board results unless this trademark is on the back of the board you buy.

BEAVER QUALITY

FOR BETTER WALLS & CEILINGS



A Book of Money Making Suggestions

There is an opening in your town to become the recognized store front builder. Every retailer desires a modern store front and with the proper effort you can turn that desire into profit for yourself. This is a big store front year. Thousands of contractors throughout the country are making big money tearing out old store fronts and replacing them with modern fronts. Hundreds of these contractors are using "Desco" construction because it is practical, protects the glass, is permanent, is easy to order, and because any carpenter can properly install it.

Turn to pages 819-827 of Sweet's Catalogue and you will find details of this modern and practical store front construction.

To be of help to you in going after the store front business in your town we have prepared a book which will be sent to you gratis; also full information, with details, about "Desco," and will give you a price list so that you can figure the cost of a job right on the spot. Speed is an essential in building store fronts and we are prepared to co-operate with you.

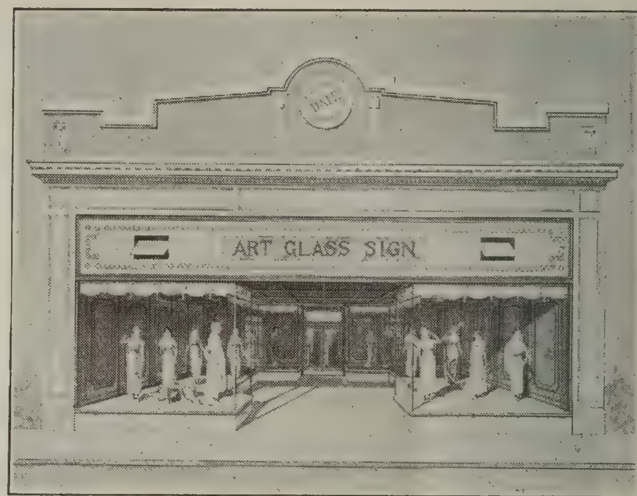
Your letter will receive our prompt reply.

DETROIT SHOW CASE CO.
1655 W. Fort St. Detroit, Michigan

(36)

Desco METAL STORE FRONTS

INTERNATIONAL MODERN STORE FRONTS



Easily and Quickly Installed
Reasonable Cost to the Merchant
Good Profit to the Contractor

Many contractors are making money installing International Store Fronts. There are plenty of opportunities right in your town. Send us a list of some of the stores that need new modern store fronts and our service department will help you land the business. We furnish everything complete, ready to install, including full size detail drawings that make the erection simple and easy.

Our organization consists of competent men of wide experience and ability, who are equipped to design and prepare plans, answer questions and furnish information regarding construction of any character. Modern machinery and complete stock of material enable us to quote interesting prices and make prompt deliveries. We can demonstrate to your satisfaction our ability to give you real service.

STRUCTURAL STEEL
COMPLETE STORE FRONTS
COMPLETE PUBLIC GARAGES

STEEL SASH	ELEVATORS
SKYLIGHTS	BRIDGES
STEEL CEILING	MILLWORK

Write for "Garage Illustrations" showing at least 50 modern buildings designed by us

INTERNATIONAL STEEL & IRON CO.
ADDRESS DEPT. 21
EVANSVILLE, INDIANA

FOR sun parlors, sleeping balconies, and all flat surfaces, it is ideal. Chemically treated so that it will not crack, stretch, shrink, curl or peel. The burning sun, and cold winds and frost will not affect it.

Con-ser-tex is a business-getter, used where more expensive materials are not wanted. It stands up well under severe use, and looks attractive. Recommended by responsible builders and contractors in all parts of the United States.

It is well worth your while to write for our illustrated booklet, "Roofing Facts and Figures," and for samples.

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50 Leonard Street New York City
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Lunken Windows Installed in Residence Mr. T. Melbye, Wellesley Hills, Mass. Architects, Blackall, Clapp & Whittemore, Boston, Mass.

Before You Build Learn of the Many Advantages of

Lunken Windows

For the Residence, Hospital, Apartment Building and Hotel—Insuring Health—Comfort—Convenience and Economy

A double hung window, with any degree of ventilation up to 100% of frame opening. **Zero tight** when closed due to copper weather-stripping.

Copper Screens cover entire opening and can be safely stored within the window pocket in ten seconds.

These Combined Advantages in Lunken Windows are unknown in every other type of window now in use. They save heat, labor and screen damage, can be easily installed in any type of new building. There are no complicated parts, and their construction admits of any desired inside or outside trim or decoration, yet their appearance when installed is the same as a standard double hung window.

Delivered from Factory Complete—glazed, fitted, screened, hung, weatherstripped, tested and guaranteed—ready to set in wall.

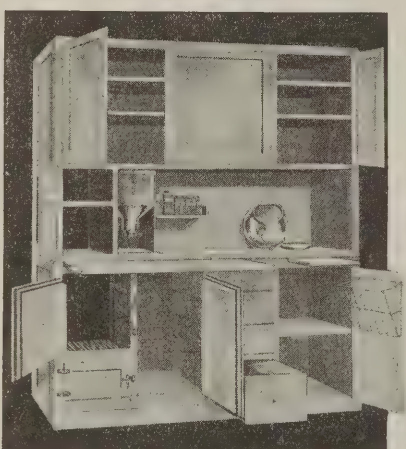
Investigate the advantages of **LUNKEN WINDOWS** before planning new buildings. Grant us the privilege of sending detailed information. Write today.

THE LUNKEN WINDOW COMPANY
4505 Cherry Street Cincinnati, Ohio

KOZY-KITCH

Trade Mark Reg. U. S. Pat. Office

Readi-Built Kitchenets



Patents Pending

Kozy-Kitch Refrigerator and Service Kitchenet

For Apartments and Homes

Write for illustrated catalog and ideas as to kitchenette and kitchen arrangements. Give full information as to what you intend to build.

The best kitchenet for apartment builders

Home building companies, build your homes the Kozy-Kitch Way and watch them sell.

THE ELECTRIC KITCHENET CO.
Sole Originators and Patentees of the "Kozy-Kitch" Line
Dept. C, FORT WAYNE, IND., U. S. A.

Wood-Mosaic Borders

Add Pep to Hardwood Flooring Sales

Hardwood flooring is desired by every home owner and home builder. Wood Mosaic Parquetry borders make hardwood flooring so desirable that sales will be easy. They can be made to fit any flooring you may be handling by sending us a sample so that the exact size of tongueing and grooving can be secured. Comes in many patterns and sizes.

You can sell new floors for old buildings now if you try

If you will send us the exact size of your customer's floors, we will send you a sketch with exact estimate of the cost of the material required.

Don't put aside this incentive to profitable flooring sales, but send now for beautiful catalogue showing parquetry and floors in natural colors.

Wood-Mosaic Co., Inc.
New Albany, Indiana

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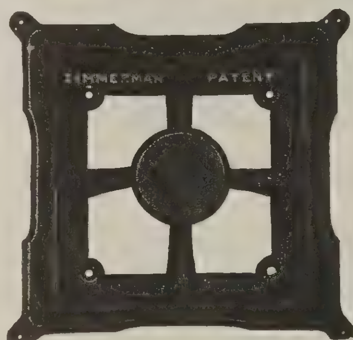

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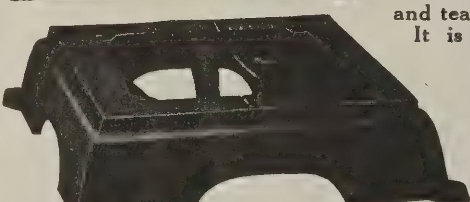
For Wood Porch Columns

The Zimmerman Base not only protects the base of the column from rot caused by the wood soaking up water but also protects the base from usual wear and tear.

It is the only base having center bearings. It lifts the column from 1⅞ to 6″ off the floor, allowing air to circulate between floor and column.



Sizes from 4″ to 16″ ready for shipment. Special bases made to order with or without lugs.

S. Cheney & Son

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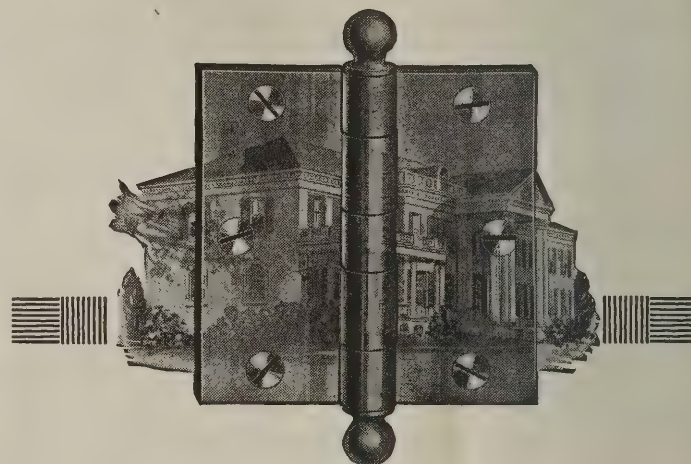

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If our success may be attributed to any single factor, it is due to the fact that we proceed always on the basis of ***finest quality.***

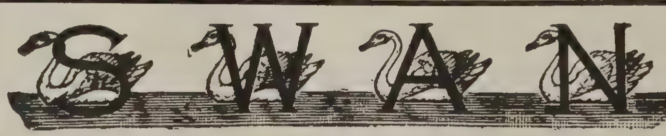
The Griffin Hinge adds that distinctive touch of harmony, without forgetting comfort and service.

Sample Sent on Request

The Griffin Mfg. Co., Erie, Pa.

229 W. Randolph St., Chicago
45 Warren St., New York

Awarded Medal of Honor, Panama-Pacific Exposition



Mechanics' Tools

The James Swan Co.

Seymour, Connecticut

■ ■ ■

NEW YORK OFFICE
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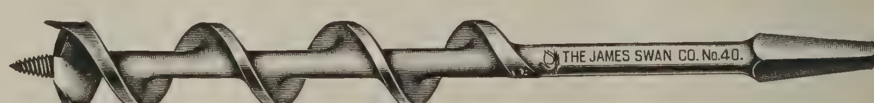
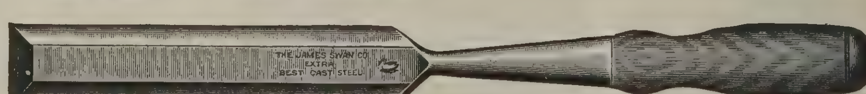
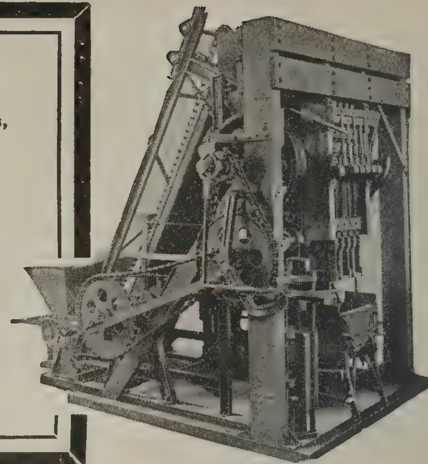
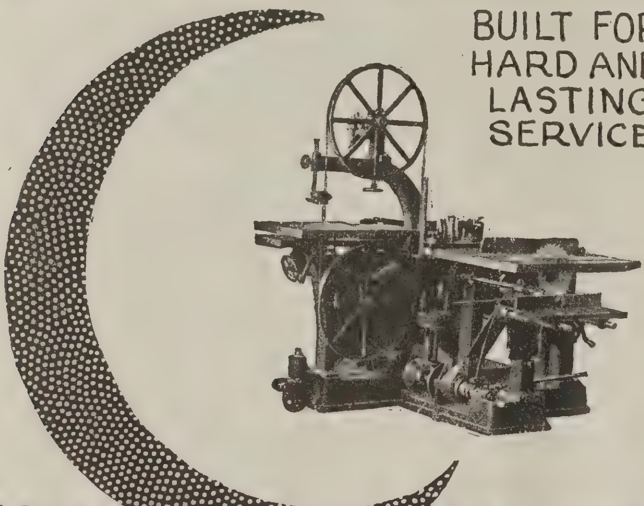








Sandpapering Disc 14 inches in diameter

For sandpapering and refinishing wood floors, old or new.

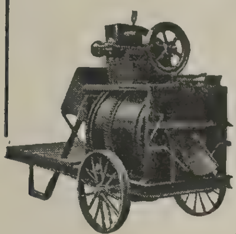
Stone Rub Holder Attachment

For surfacing and polishing marble, mosaic, terrazzo, cement, etc.

This Is the DAY of

SMALL MIXERS

Contractors, today, find that it pays to own several small concrete mixers rather than one large one. Thus, they can have mixers on several jobs at once or they can put them all on one job and get better results.



ARCHER MIXERS

Light—compact—can be moved by one man. Discharge direct into forms in 15 seconds. No wheelers needed. Two sizes—bag and half-bag.

Archer Mixers will cut your costs. Write for special prices now in effect.

ARCHER IRON WORKS
2452 West 34th Place CHICAGO

BOSS

CONTRACTOR'S EQUIPMENT

MIXERS BUILDING ⇌ PAVING **HOISTS** GASOLINE ⇌ ELECTRIC

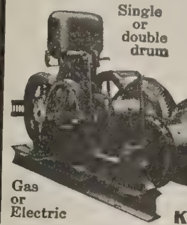
BUILT OF STEEL
HYATT ROLLER BEARINGS

Write now for our down-to-bedrock prices and easy terms on the famous Boss line.

All sizes from 3 ft. to 24 ft. cap. Gas, Steam, or Electric.

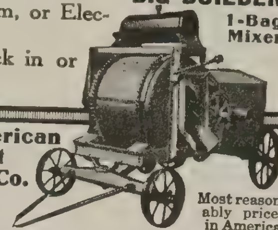
Complete stock in or near your city.

HOISTS Single or double drum



Gas or Electric

BIG BUILDERS 1-Bag Mixer



Most reasonably priced in America.

The American Cement Machine Co. Inc.
Keokuk, Iowa

Reduce Your Costs

Obtain FOUR times the amount of work as previously done. HOW?

By using a Hodges Stucco Machine.

For Particulars Write

The Hodges Stucco Machine Co.
3618 Colerain Ave., Cincinnati, Ohio

ELASTICA

THE IDEAL EXTERIOR WALL COVERING

COMPLETE IN A SACK!

For full particulars write

Wisconsin Lime & Cement Co.
Conway Building
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American Materials Co.
101 Park Avenue
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Art Stucco Materials Co., Inc., 12854 Oakland Ave., Detroit

If *You*

are contemplating the purchase of a Level—one that will insure you against mistakes which may prove costly—

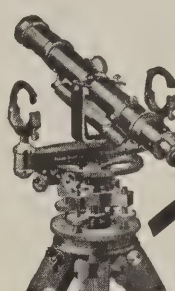
Try a "KOLESCH"

Builder's Level

We would like to send you full particulars and prices.

K TRADE MARK

KOLESCH & COMPANY
Sole Manufacturers
138 Fulton Street, New York



LOOK!

TWO INSTRUMENTS IN ONE!

You secure a level and a transit combined in our

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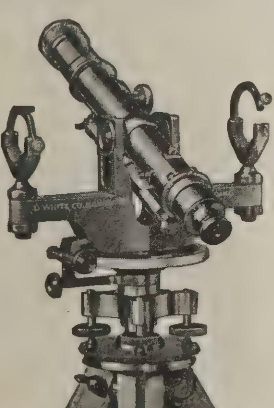

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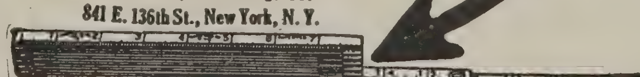

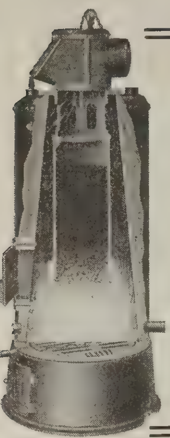

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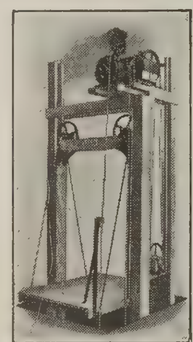

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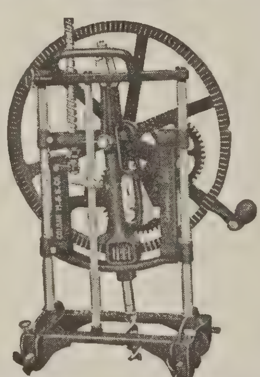

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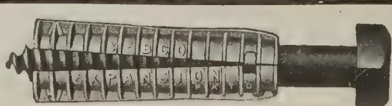

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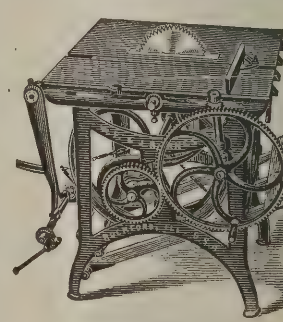

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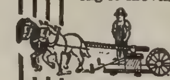

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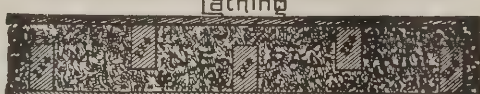

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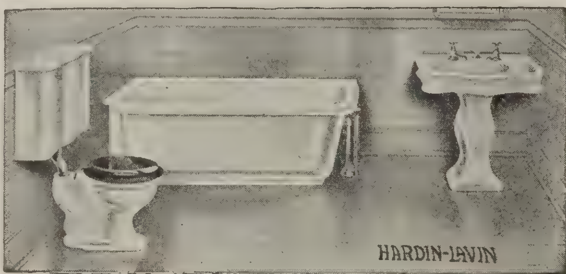

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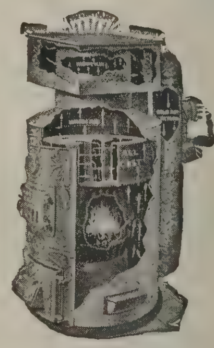

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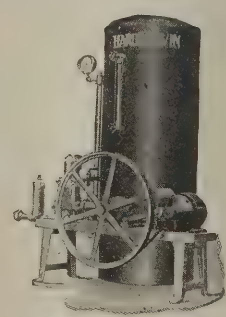

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