THE BUILDERS' JOURNAL

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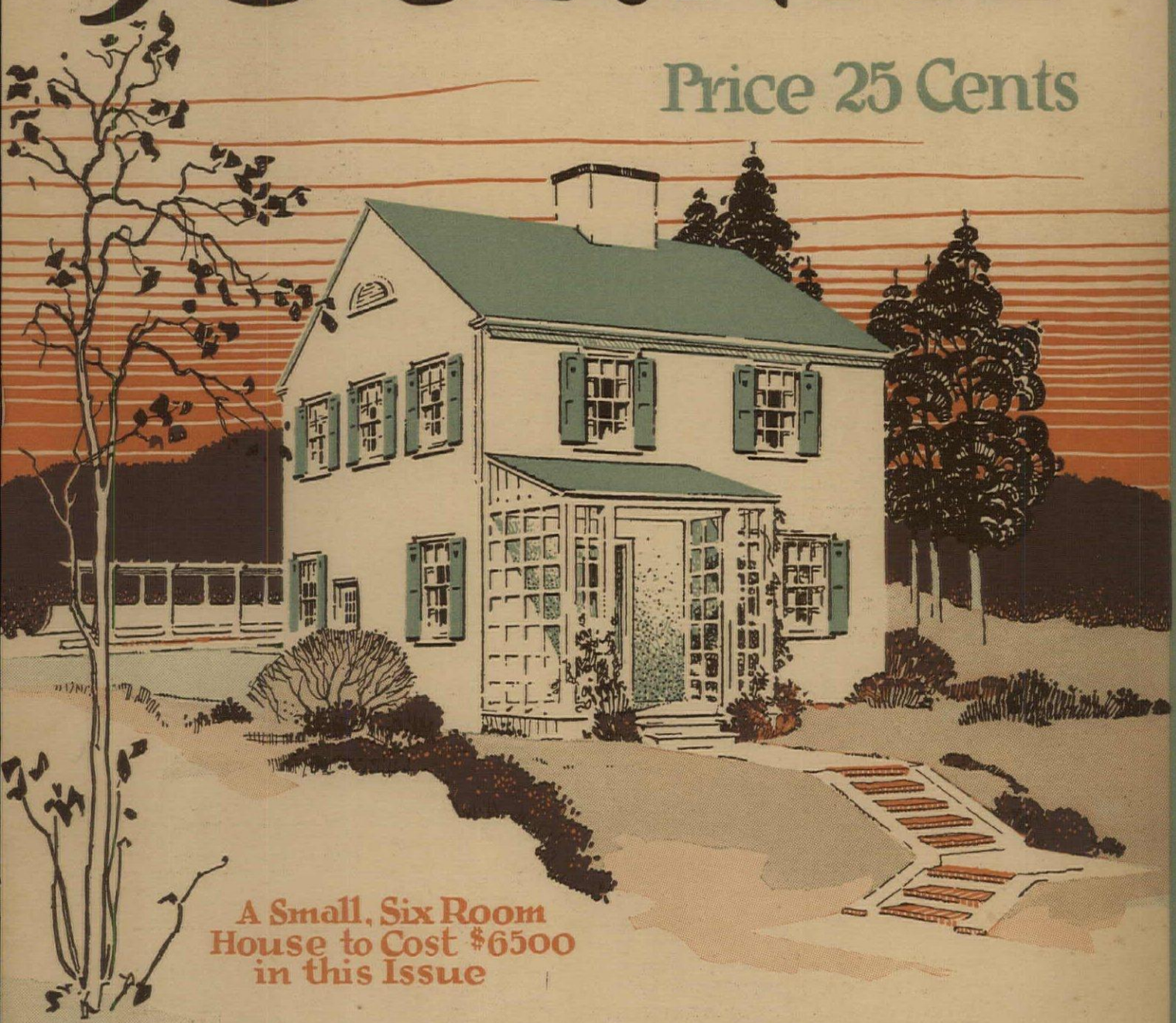

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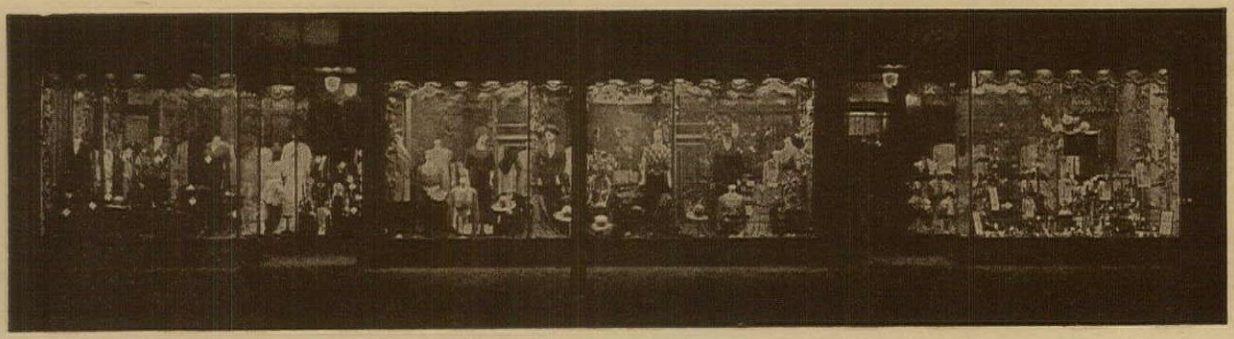

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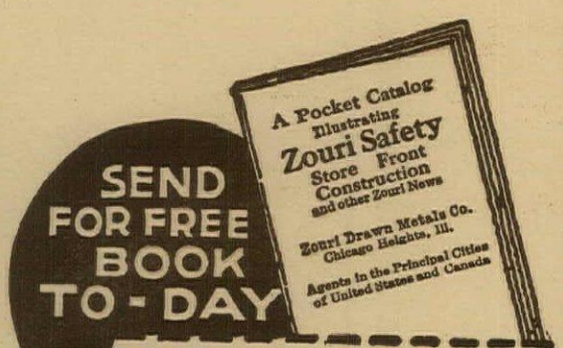

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THE BUILDERS' JOURNAL

A stimulating influence in the construction industry for
Good Design Enduring Construction Craftsmanship Business Capacity

VOLUME ONE NUMBER EIGHT

Contents for December 1920

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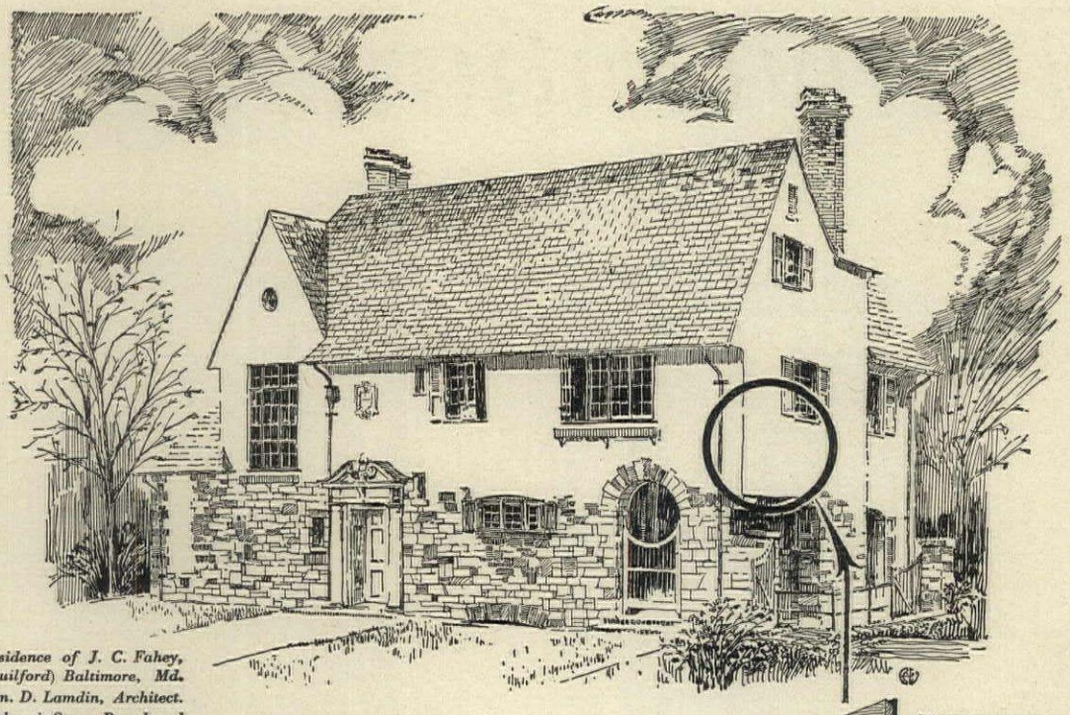
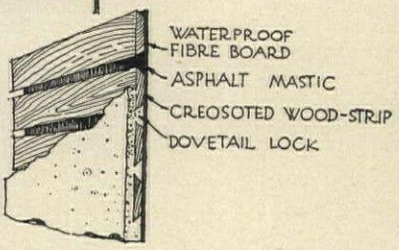


Residence of J. C. Fahey, (Guilford) Baltimore, Md. Wm. D. Lamdin, Architect. Bishopric Stucco Board used on Exterior.



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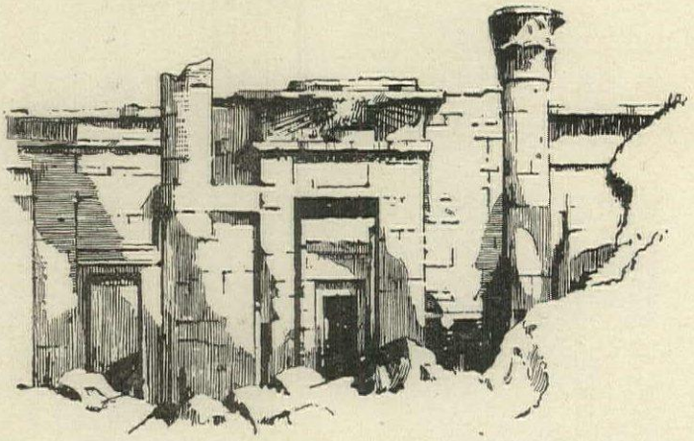

THIRTY centuries ago along the River Nile stood the city of Memphis, capital of Egypt. Today this city—famed for its architectural beauty—is being uncovered five strata below the country's present level.

Out of these ancient ruins looms a new understanding of Egyptian accomplishment. Their knowledge of lighting effects, mural decorations and building technique is a revelation. But the greatest surprise came when historians uncovered great wooden doors, swung on brass hinges. Think of it. Hinges used 3000 years ago.

Down through the ages the simple, often unnoticed hinge has remained in constant use. Today its selection is important. A creaking, squeaking, sagging hinge ruins architectural perfection—cheapens expensive workmanship and presents a discord where harmony should prevail.

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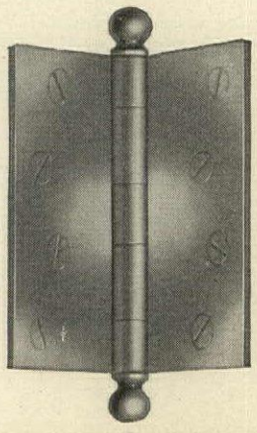


THE BUILDERS' JOURNAL

The Magazine of Better Building

VOL. I, NO. 8 DECEMBER, 1920

"1921"

AT least $4,500,000,000 must be spent to meet the present building shortage in the United States.

$1,000,000,000 a year represents the additional expenditure which must be made to meet the normal demand in the building field. Of this total amount considerably over one-half will be spent directly through builders of moderate cost dwellings and structures of every type.

There can be little doubt that 1921 ushers in a period of increasing prosperity for the average builder. New levels are being established in material prices. Labor costs are lower as individual efficiency increases. From every section of the country come reports of improved transportation facilities.

A study of the volume of building during past years shows that a sound period of prosperity for the building industry comes usually after a period of industrial prosperity and at a time when rapid decline in commodity prices shows a tendency toward normal stabilization. In view of these conditions the builder may expect activity in his field.

The New Year is usually a period of good resolutions. The building field, however, needs no moralizing. What it does need is the definite, concerted effort of everyone interested to make certain that in the period of activity to come the best possible service will be rendered to those who may be called upon to invest in this field.

Conditions in many respects have greatly changed in the past few years. The public demand for better building has become widespread. The standards of living have been raised to a point where every man wants a well designed home with modern equipment. The rapid improvement of building practice in moderate cost construction, together with the placing on the market of many new forms of quality materials and methods, has developed building construction to the point of a science, not difficult, but absolute, in its requirements. The builder who will render a real service in the years to come is the man who seeks constantly to improve not only the product of his organization but the business relations between the owner, the architect and himself. The year 1921 should, therefore, be significant to many builders as the time when they begin to give a greater measure of close study to their business and to the application of service made available to them through manufacturers and manufacturers' associations, through co-operation with the architect and the banker, and through taking full advantage of the definite suggestions offered by such a publication as that in which this editorial appears.

Current Notes and Comments

Preparations for Export Trade Stimulate Building in the South

THE opening of trade with South and Central America and Cuba has been responsible for the formation of new companies and the extension of others at Savannah, Ga., and incidentally has called for no small amount of construction. The latest is the construction of extensive coal docks by the Savannah Coal & Dock Co., which are estimated to cost $3,000,000 and are expected to be completed in a year. A. Bentley Sons & Company of Toledo, Ohio, have the contract.

In general, however, Savannah has experienced a building slump, the permits for October showing only $140,000 against $689,000 for the same month last year. The latter figure was increased largely by a $400,000 apartment house of 41 apartments which is now completed. October also saw the completion of a 6-story apartment hotel. The completion of these buildings has aided the housing situation, but the evidence of the continued demand for living quarters is seen in the fact that all apartments were leased before the completion of the buildings. (*J. H. Reese, Sec. Savannah Builders' Exchange.*)

Open Shop Conditions Foster Harmony in Little Rock

ALTHOUGH a reasonably high wage has been paid all workmen for the last ten months, no decrease has taken place and none is expected during the present year, at least. There is general satisfaction with present labor conditions and this harmony between contractors and their employees is one of the great successes of the open shop policy in this city, which was adopted in January, 1920. Efficiency is greater and there is no tendency on the part of employees to limit production; all mechanics are going about their work in a businesslike way, with the view of earning an honest living and receiving an honest reward for their services.

Just at the present time there is a surplus of mechanics in all crafts, particularly among the carpenters. While there has been a surplus of "saw-and-hatchet" carpenters for some time, this is the first surplus of first-class finishing men since the fall of 1919. This is due chiefly because no contracts for large construction work have been let recently with the exception of one for the construction of two one-million-dollar reinforced concrete bridges across the Arkansas River, on which work has not been started. (*C. T. Reynolds, Board of Commerce, Little Rock.*)

Norfolk, Va., Finds Advantages in the Open Shop

AT Norfolk, shortly after the formation of the Builders' and Contractors' Association, an agreement between it and the trades affiliated with the Building Trades' Council was reached under the closed shop plan effective from August 1, 1919, to April 30, 1920. The first of this year the plasterers, with whom no agreement was in force, demanded an increase from $1 to $1.25 per hour and upon being refused, struck. In February they were joined by the bricklayers in a sympathetic strike. These difficulties were overcome by bringing in men to work under open shop conditions in these trades. Upon the expiration of the agreement with the Council, a new one could not be arranged because of the wage demands of approximately $1 a day increase and all of the trades struck. Upon their refusal to return to work an open shop policy was declared by the contractors. This is now in force and labor is being satisfactorily supplied; most of the members of the Association are pleased with the present system and report that they would not return to the closed shop principle. (*R. D. Briggs, Sec. Builders' and Contractors' Assn., Norfolk.*)

Erie, Pa., Builder Claims Today's Conditions Favorable to Building

ALTHOUGH prospects for building are not very encouraging in this section of the country at the present time, and from present indications there will be more men looking for work in the building trades lines, this winter, than any time since 1912, it does not always help to fall in with prevailing views.

One large contractor in this vicinity says that right now is the opportune time to build. We can get the pick of skilled mechanics, much of the material we had difficulties in getting can be supplied now at a lesser price than three months ago and with the transportation problems fast clearing up conditions are more favorable than they will be next spring, when there will be labor shortage and another possible shortage of materials and a greater congestion of transportation. This contractor is right and the public should be informed of these conditions through the Chamber of Commerce and the Build a Home Campaign Committee in every city.

In a report made a few weeks ago at a convention held in Detroit, it was stated that the replies to a questionnaire showed a decrease in production from 8½% to as high as 31%, regardless of the fact that the same questionnaires showed an increase in wages from 10 to 32% over 1918-1919. In one city with a population of only 95,000 an increase of wages amounting to $876,500 has been granted to the building trades industries alone over what they received in 1919. The public pays this bill, yet it cannot understand why building operations run so high. (*Earl F. Stokes, Builders' Exchange, Erie, Pa.*)

Building Permits Fall Off in Richmond, Va., Despite Large Demand

THE wage scales in Richmond shows signs of dropping to a slightly lower level. No demand for wage increases has been reported. Unemployment is general in the building trades on account of the slump in construction and there seems to be little likelihood of improvement before spring.

The Real Estate Exchange expresses the belief that dwelling houses will be higher in the spring of 1921 than at present. Many who would in normal times buy homes have been, against their will, forced to double up or rent apartments. They are just waiting for an opportunity to buy or build, but the problem with the real estate agent is not to sell, but to find something to sell. Even with the upward trend of the market in homes, there are few houses for sale, and the scarcity may be expected to increase as spring approaches. Another factor is legislation against landlords that limits new construction, for the man who would build for a fair return on his money has no opportunity. (*R. L. Shotwell, Builders' Exchange, Richmond, Va.*)

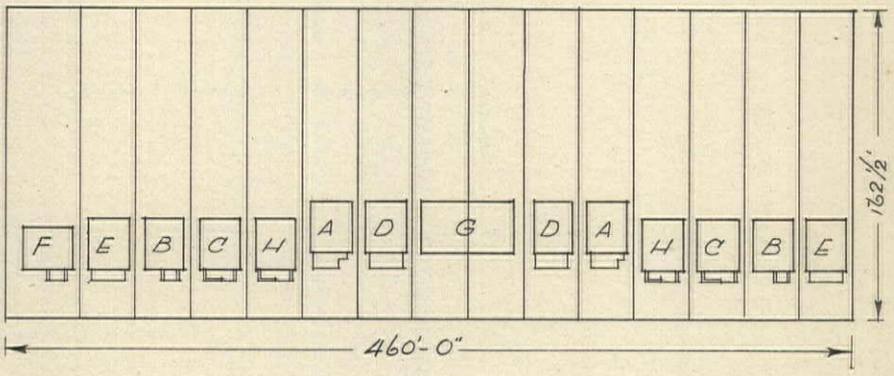
A Practical Housing Group

Chicago Housing Association provides houses for wage earners Good design and permanent materials insure value

Charles S. Frost, Architect; Bright & Diamond, Contractors

THE underlying thought back of this housing project was to give to the home buyer every advantage of economy in building through efficient and large scale operation. The chief feature in reducing the cost to the buyer was the manner in which the land was developed. The site comprises 40 acres and lies within the city limits of Chicago. It is supplied with good transportation facilities and is located conveniently with respect to large industries. Two of the streets crossing the property were laid out for business purposes and the lots fronting on them made 25 x 125 ft.; the balance of the plot yielded 35 residence lots 200 ft. deep and 140 lots 162½ ft. deep, all on a 30-ft. width basis. The business lots are to be sold at a price which will cover the cost of the entire 40 acres so that the purchaser of a house on an interior lot has to pay nothing for his land. It can readily be seen that in a community of 175 houses, which forms only a nucleus of a larger development, there will be an immediate demand for stores, small theater buildings and other community features and by applying the profit on land sold for these purposes to the cost of the residential lots a decided advantage is given at the start to the home buyer.

The houses have been designed for single-family occupancy and with the exception of a few duplex houses all are of the single type and contain 5 rooms. While they are placed closely together there is no feeling of crowding because of the depth of the lots and the 100-ft. wide streets with parkways between the sidewalks and roadways which will be planted with shrubs and trees. The houses, furthermore, are

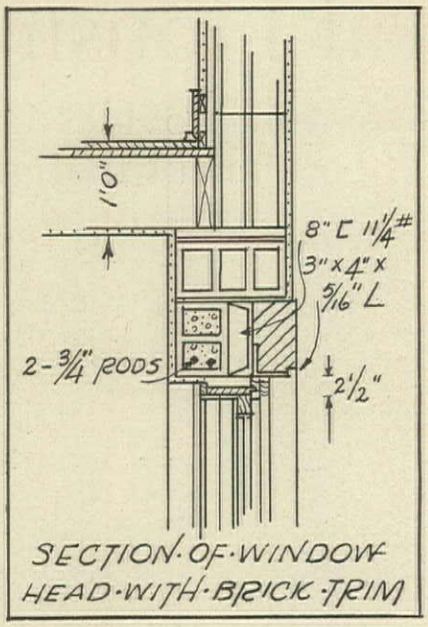


The plan at the right shows the houses on a typical block. The letters indicate the type of house. Below is a view taken while paving was in process; note the wide street and absence of monotony in houses

set back 30 ft. from the sidewalk with a hedge along the entire lot frontage. Although the work is not completed, from this description and the construction view on page 7 the reader will easily appreciate the fine effect that will be obtained.

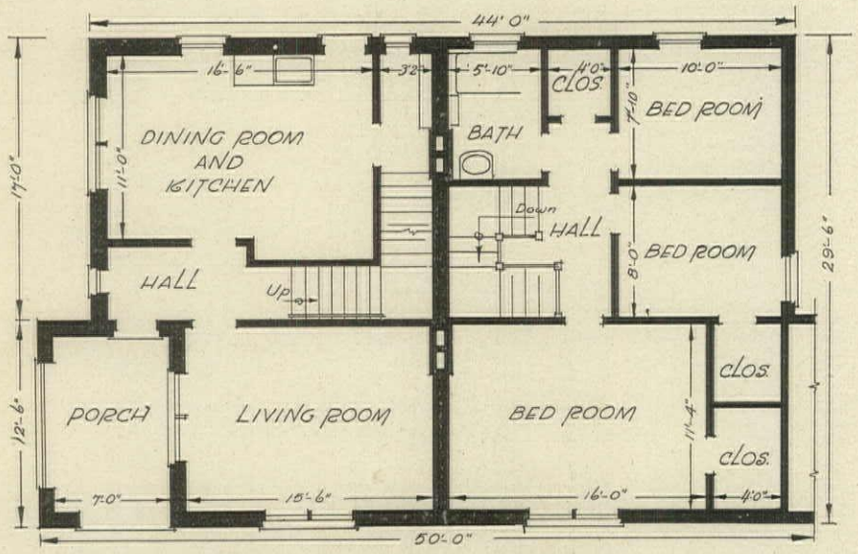
This sub-division of land is not necessarily ideal, however, because there is always the danger with deep lots of having undesirable buildings eventually built in the rear, but owing to the fact that the Chicago street system had been extended through the plot it was necessary to adopt these dimensions and it is intended that the rear space will be utilized for home gardens.

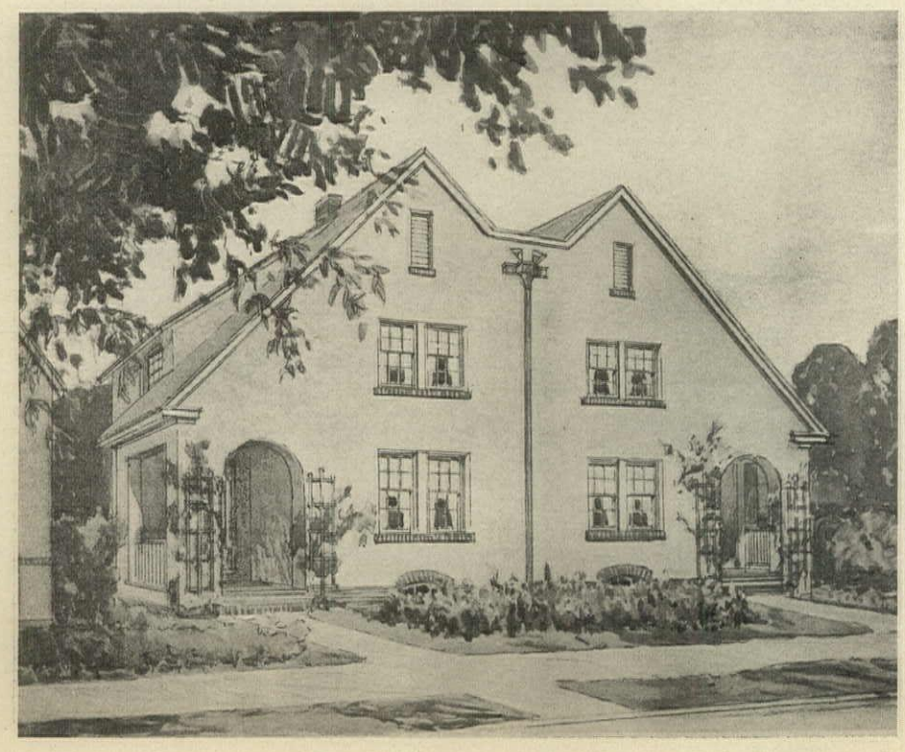
It was natural in an undertaking of this size, in which a large amount of capital will be tied up for a number of years, that the promoters would investigate all types of construction and it is interesting to note that in view of exercising the strictest economy they decided upon a fire-resisting type of construction with concrete foundations, hollow tile or brick walls and asphalt shingle roofs. While normally this type of construction represents a slightly higher first cost than frame, over a period of years, when cost of repairs and insurance premiums are considered, the final saving is considerable.



The development is successful in showing what can be done with standardized designs for houses and still avoid monotony; there are only seven different types of exteriors and but three different plans, yet owing to the grouping of houses and the interesting broken roof treatment, the buildings present the appearance of individual houses.

The three types of plans are illustrated and with them are also shown reproductions of the architect's perspective drawings to give the character of the exterior design of a number of the types. These are reproduced, rather than photographs of the individual houses, because they indicate the planting which is so necessary to give a correct impression of the development and which, of course, is not yet in place. The general photographic views taken just at the completion of the houses show the grouping along the streets, however, and indicate the character of the construction.





The basement walls are of concrete to grade and the floors are likewise of concrete. Two soapstone wash trays are in each basement and also a one-pipe furnace. Tile drains are laid around the foundation walls for drainage. The exterior walls are of either brick or hollow tile and to comply with Chicago building laws the first story walls are 12 ins. thick and the second 8 ins. Furring strips have been used with both materials.

The porches have concrete floors in all cases and the wood detail is of the simplest construction, the roofs being supported by square, built-up posts and the balustrade being of 1 x 4 boards sawed to a pattern. The chimneys are built of concrete sections made on the ground. Where stucco is used it is of the magnesite type which gives a bright, clean surface.

The kitchens are provided with flues for coal ranges and also with

Exterior and plans of the double house at left (type G). They are placed in the center of the block

gas connection. Hot water boilers supply hot water to both the sinks and bathrooms. The sinks and drain boards are of the enameled iron type equipped with nickel plated faucets. The bathroom floors are of composition and the usual three fixtures of good grade are installed. The floors throughout the other parts of the houses are of birch and the trim, which is the square cut type with cap moulding, is of cypress or gum wood stained brown. The simple character of the interior finish is indicated by the detail drawing of a stairway which is shown herewith and on which it may be noted the rail is made up of 1 x 4 boards cut to a pattern.

Owing to the small sizes of the houses it was desirable, in getting good proportions, to have them built as close to the ground as possible and in order to bring the cellar windows above grade and eliminate the use of areas the floor joists were framed around the windows and the heads of the windows brought very near the level of the first floor which is shown in the detail drawing on page 10.

One of the attractive features of the houses, and one furthermore that has a practical point for builders in this era of high prices, is the type of brick used. At the time these houses were put under construction there was a great shortage of common brick, but there were

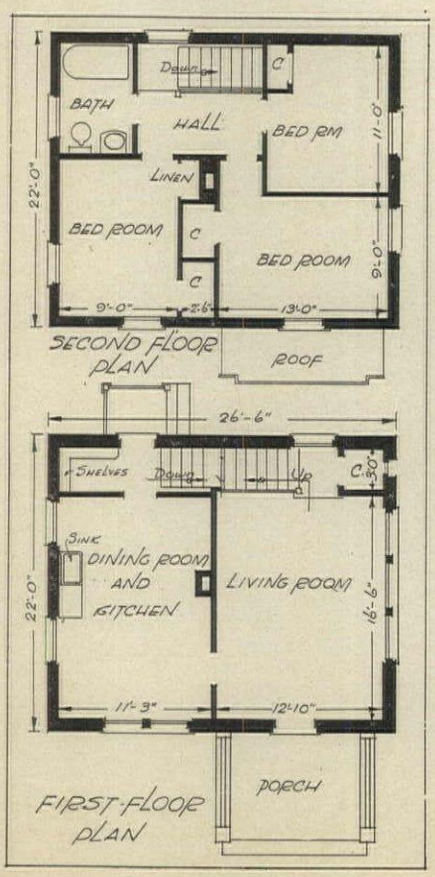
Part of a street view showing double house grouped with single houses. Note varied roofs

in the yards of the various brick plants many thousands of overburned bricks that were not ordinarily salable because of their being off color and also irregular in shape. These brick, however, are fully as strong as the more perfect types and the architect saw in using them a possibility of obtaining some unusual effects at a minimum cost.

A large quantity of them was purchased in the fall of 1919 for $11 a thousand and, owing to their wide variations in tones ranging from a light yellow through all the shades of brown to almost black, it was possible to work out a number of different combinations by using one color for the trim around windows and doors and another for the body of the walls. By varying the color of the mortar joints further differences were had so that what at first might be considered an unpromising material produced an effect that would ordinarily be thought possible only at considerable expense.

Another feature which gives much character to the development is the broken roof line. It is ordinarily recognized that it is much more expensive to build this type of roof than one of simple planes, but by employing modern equipment in the way of power saws and eliminating entirely all hand sawing by carpenters on the job these attractive roofs were produced at a cost less than that of the usual box-like affair.

Other examples of the way in which cost was reduced are of interest. Owing to the fact that the

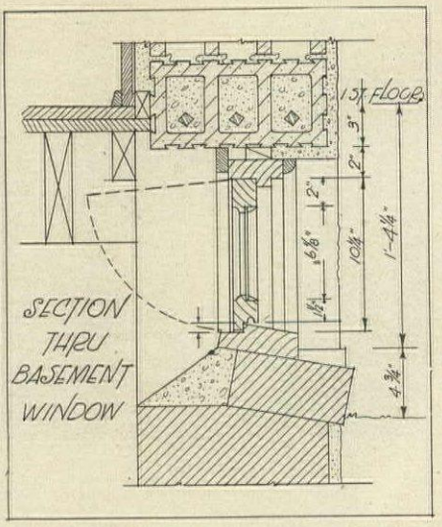


Floor plans at left and exterior view below of House F. This has a wider frontage than the others and is used at corner locations

houses were placed closely together and practically in straight lines the excavation of the cellars was done by a steam shovel which cut out a trench the length of the block and as wide as the houses are deep. In this trench the foundation walls were built which permitted fast construction of the forms for concrete. When the walls were up the steam shovel filled in, from the excavated material, the spaces between the houses.

As soon as the carpenters' forms were in place concrete mixers were installed at points where several houses could be served by means of runways and wheelbarrows. The construction of the houses was worked in groups. This called for the minimum number of mechanics and also enabled the contractors to keep all the trades constantly at work. As soon as the first group of foundations were completed the concrete men moved to a new group and the carpenters laid their floor joists and first story partitions and then the masons followed to lay up the exterior walls; in the meantime the carpenters moved to a second group of houses where the foundations had been completed and then returned to the original group for the roof framing.

Construction was begun in the fall of 1919 and continued through the winter, during which the excavation, water supplies, etc., were completed. In the spring months, however, owing to a great deal of rain, the construction progress was seriously handicapped by the broken and wet ground. The top soil of the property is black earth for about 2 ft. and this became impassable to horse-drawn vehicles or motor trucks. The emergency was met by the employment of two small, powerful tractors which were able to pass over the soft ground without any difficulty and to tow on a type of sledge the brick, hollow tile, sand, etc., needed for construction.

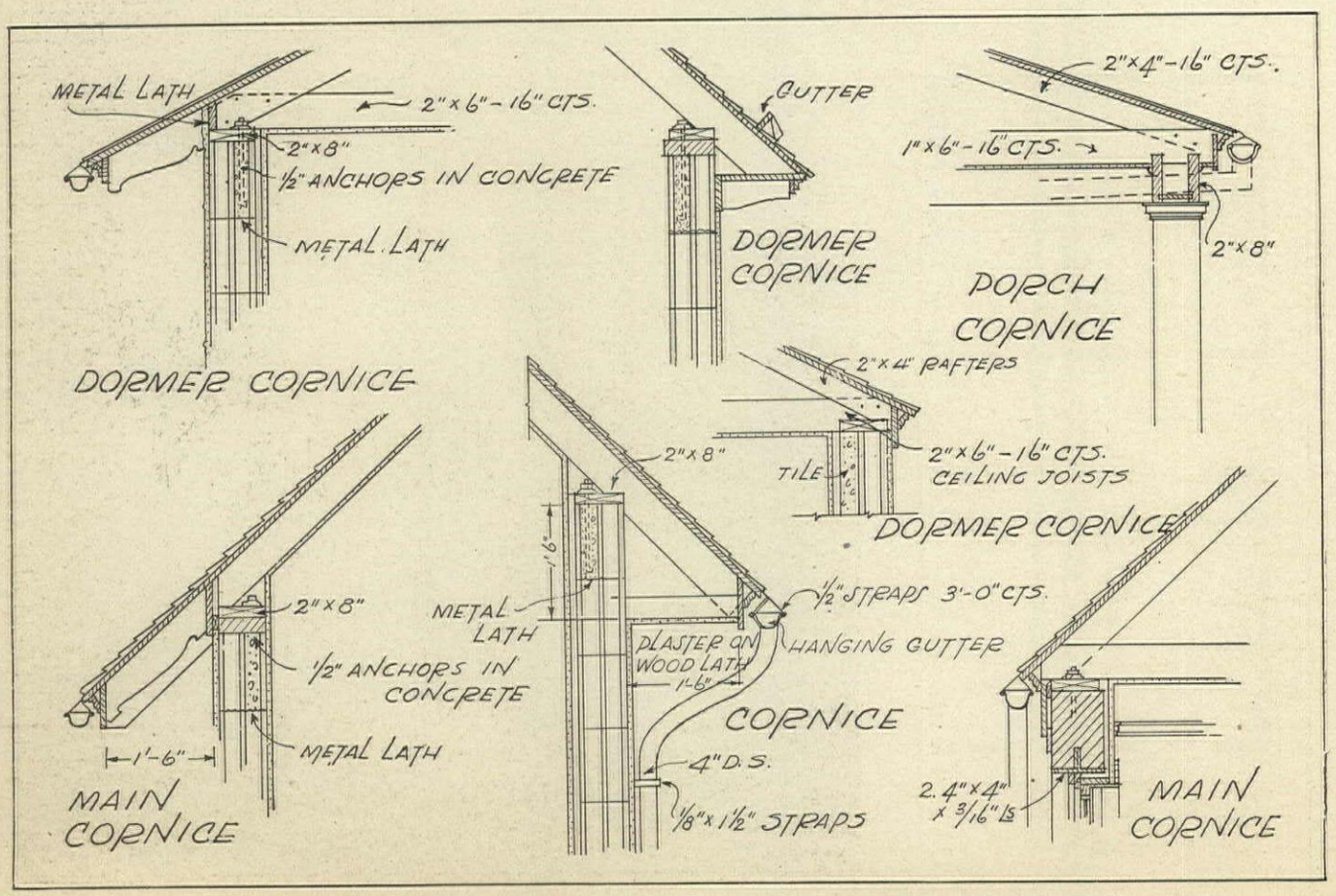


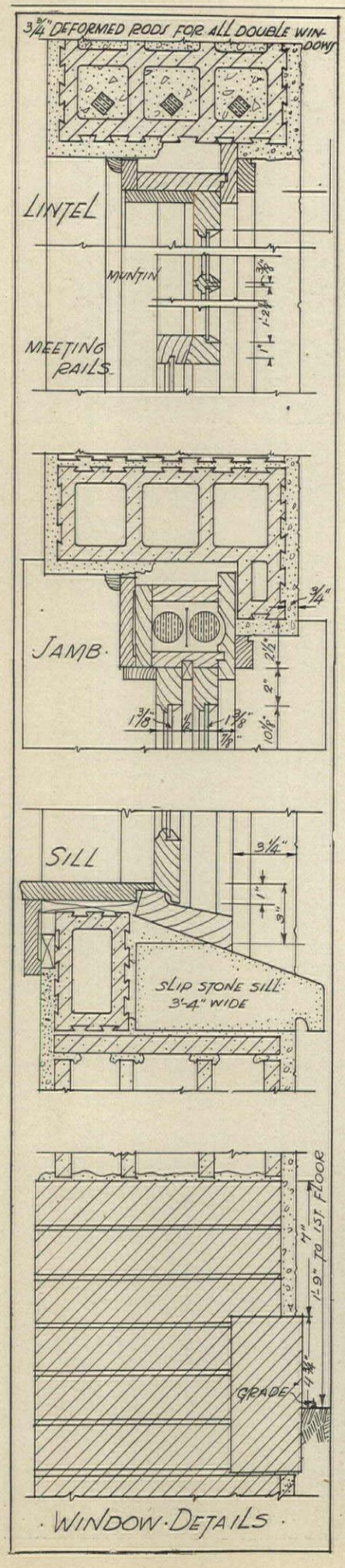
Detail showing cellar windows just below floor level to avoid areas

The method of financing the sale of the houses to the individual owners is of particular interest. The original money necessary for the start of the program was subscribed by important manufacturers, bankers and others similarly interested in the development of Chicago. The principal and most unusual feature of the financing is the fact that no profit goes to the promoters and that, as before stated, the business portion of the property is sold so that the profits from that pay for all the land.

The houses have been built so that they may be sold at prices ranging from $4000 to $4500 per family. The single corner houses sell for $4500 while the double houses sell for $4200 per family and the single houses on inside lots at $4000. The purchaser is required to make a down payment of 10% and the balance is covered by one mortgage which is amortized at the end of 15 years by monthly payments of from $33 to $35, according to the cost of the house. This monthly payment includes, in addition to the

Cornices were varied but all of simple construction as shown below



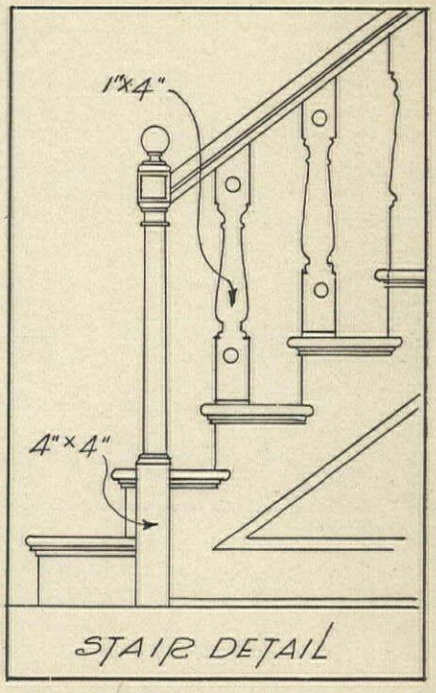


The drawings at left show details of windows in 12-in. tile walls; note plaster jamb inside, and at bottom, soldier course of brick at grade

interest and payment on principal, the premiums on a life insurance policy, a health and accident policy and a fire insurance policy.

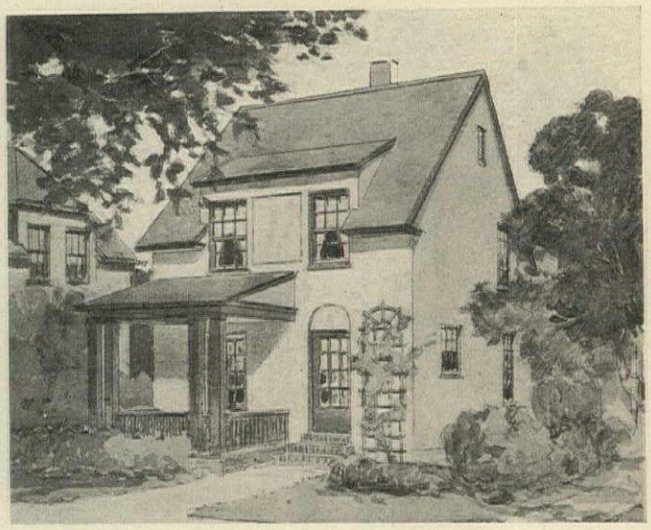
The life insurance policy is designed to protect the family in case the head of the family dies, when the house is turned over to his widow without any further payment. In case of sickness the health and accident insurance meets the payments on the house for 6 months.

With such generous terms of sale it is only reasonable that some system of choosing the proper candidates for the ownership of the



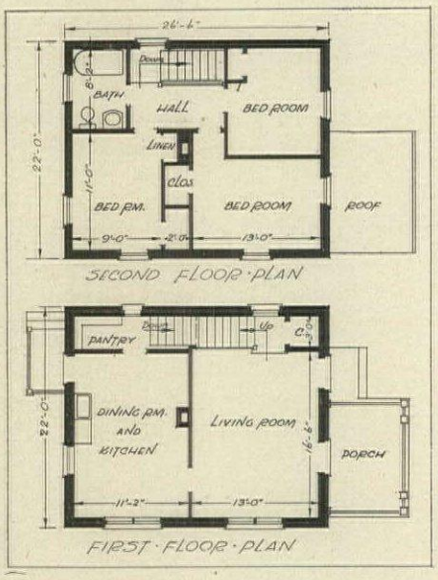
Stair balusters are 1 x 4 sawed boards

Note the varied effect below in the use of brick and magnesite stucco



houses should be adopted and preference is given to American citizens who are living in poor quarters and supporting families on small incomes. People desiring to buy the houses are required to make applications giving the details of their present living quarters and the amount of money earned weekly by the members of the family contributing to the support of the home. These statements are investigated and if found satisfactory the sale is made.

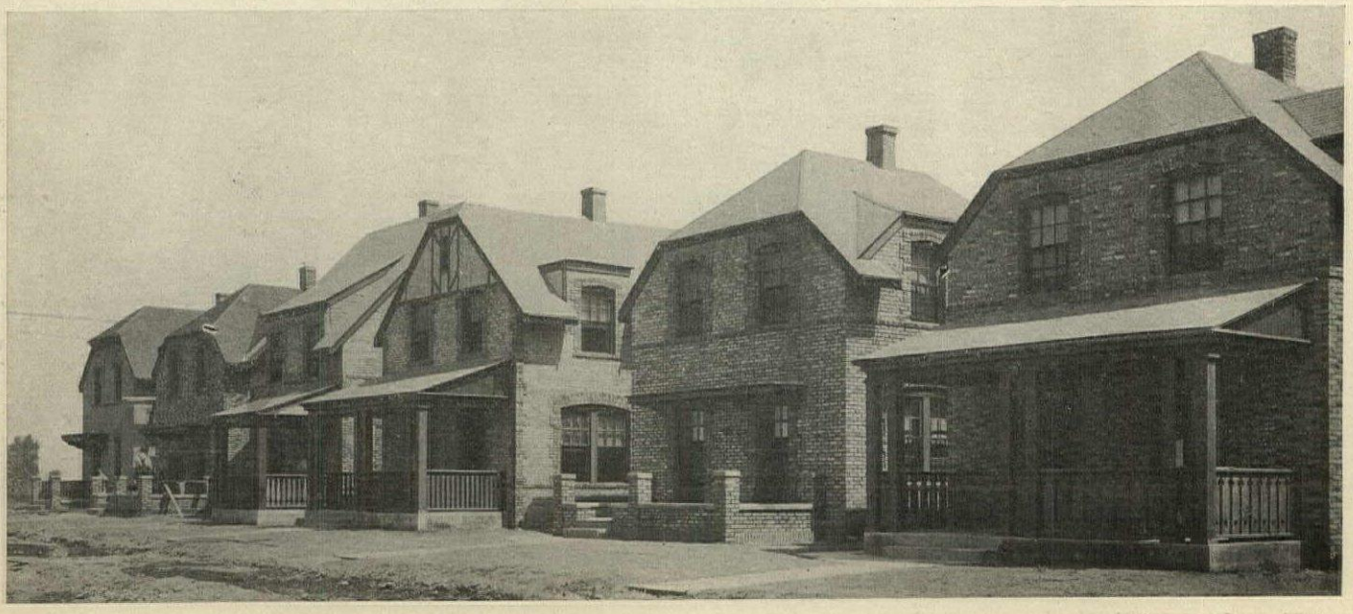
In order to prevent speculation the purchasers agree not to resell the property except with the consent of the Association. If a man changes his employment and desires to remove from Chicago the Association will have first option on the property, being privileged to return to him the money paid and to resell the house to another. This prevents speculative dealing and insures to the persistent man who holds to the determination to become a home owner the benefits of increased value that comes to the property.



Typical plans of narrow frontage houses. Types A, B, C, D, E and H have this plan with varied elevations. A and D are shown at top of page

The money for mortgages is secured by the sale of 6% bonds in amounts of $100 and upwards. This arrangement enables the public to show in a practical manner its interest in improving housing facilities and, further, releases the original capital so that more houses may be built. The sale of bonds also offers poor people, who are not in a position to make a 10% down payment, an opportunity to accumulate this fund by buying on an installment basis the bonds which can be turned in as the initial payment on the purchase of a house.

From this brief description it will be seen that a fundamentally simple plan has been adopted for the financing and selling of houses and that, through economical and sound methods of developing and construction, the houses have been placed at the disposal of buyers at an extremely moderate cost.



How's Business?

Are all the troubles in the building industry due to the "other fellow"? Perhaps builders can show more life—read this and look around for opportunities

By R. E. Dockham

"When the whole blame world seems
gone to pot,
And business is on the bum,
A two-cent grin, with a lifted chin,
Helps some, my boy, helps some."

RIGHT at the start and to clear the air, so to speak, we'll admit that business is bad, yes even rotten, if you wish to put it stronger. Now then, what are we going to do about it? Let's size up the situation a little. Everything is high — wages, lumber, cement, brick, hardware, plumbing, furnace work and everything.

The people can't afford to build, yet these same people are buying autos, victrolas, pianos, better clothes and more luxuries than ever before. What's the matter? Well, I strongly suspect that you and I have much to do with the general situation. You are called to submit a price upon some work. What happens? You hand in your price and almost before your prospect has a chance to look it over you commence to apologize for the cost. "Of course, it's pretty high, but everything is very expensive. Wages are high, etc." You start at once to "gum the works" instead of exercising a good brand of salesmanship which should point out the necessity of the work required, the quality you can deliver and the dispatch with which you can finish the work.

What are people waiting for? The answer is plain, of course. They are waiting for prices to come down. Do you personally believe that the next four or five years will see any material change in prices, that is, in a downward direction? The writer is only a member of the building trades, with ambition to be known as a man whose opinion is of weight. He has no conscientious scruples in saying to his customers: "If you have any intention of building or remodeling any time in the next five or six years, the cheapest time for you to do it is *Right Now.*" This gospel has been preached pretty consistently by him for the past three years and it is still believed to be a good, honest doctrine.

IN conditions such as confront us and in the light of certain statistics of the general trend of business as reach us frequently, it seems that one man's guess is as good as another's. You may differ with me in what I say, but I believe a backward look from 1925 will show that these words are not merely ramblings. We may rest assured of the fact that labor will not be cheaper.

Material? Do you realize that there are scores of mills and factories making products which enter largely into building of which the output during the war was reduced 50%? These factories are still way behind in their work and are fairly begging buyers to purchase conservatively and only for immediate use. Furthermore, it is impossible to get from them any reasonable promise as to a positive shipping date. It is almost an unheard-of occurrence to get better than a six months' delivery. Now, in the light of these facts, can we consistently expect a reduction in price?

Do you know, for instance, that there is practically no pipe to be bought in the New England markets, and that only the skimpiest supply of plumbing and heating material is available?

Portland cement? It seems as if we would have to establish a "bread line" in order to get any of it. So the situation might be enlarged upon, but the fact I am trying to establish is just this: with such conditions in existence, are we doing ourselves justice in holding out to our customers the vain hope of a big reduction in price, when the coming spring will undoubtedly show, if not an increase, at least a continuance of the present schedule?

Families without number have been leased out, ordered out and actually kicked out of hired homes that they have occupied for years. Their attitude in regard to the housing situation is much the same as in the cases of those who have been through the coal and sugar famines. Never, when coal was $6 or $7 a ton and sugar 8 or 9 cents a pound, did thousands of people stock up. But, having experienced the pinch, these same good folks now make sure of enough to carry them by, and this at a slight advance of some 100%. We may rest assured that these folks are going to, somehow or other, by hook or by crook, provide themselves with permanent homes. It is not preposterous, I believe, to predict that one result of present conditions will be a greater percentage of home owners in this country. That is one hopeful sign of the times.

WELL, what are we going to do about it? Let's be specific and ask what are *you* going to do about it? I have put that question, in a little different form, to several builders of my acquaintance: "What are you doing to create new business?" The answer in every case was "Nothing."

Is there anything we can do to help the situation? Let's see.

Advise smaller buildings, and build with an eye to additions in the future. Bruce Barton, in his wonderful little book, "More Power to You," in a chapter, "A House or a Home," asks, "What is the ideal house?" and in answering writes: "I should say, first of all, it is a cozy place, a place not large. The turtle does not construct a shell 10 times larger than it needs; the bird does not spread her nest across a whole tree-top merely because materials happen to be at hand. Only man commits the foolish error of building a house too large to be a home."

Yes, advise building smaller. The possibilities of attractive layouts for the combination dining-living room with furniture selected to harmonize have not yet been fully realized. The small kitchen with all its appliances in easy reach makes a strong appeal to the housewife who has lived for a time in a small apartment with its kitchenette. The advantages

of small repairs, easy heating and easy selling possibilities should form strong sales arguments in presenting such a house to prospective clients.

Next as to material. It is surprising that building methods have not undergone some radical changes in recent years. Yet apparently we build today much the same as we did 10 or more years ago. In frame construction, for example, we erect our studs, then rough boards covered with paper and finally with clapboards or shingles. I wonder why cut siding, which finishes the outside of a building in one operation, has not come into more general use. My contractor friend informs me that it costs some $600 to rough board a house of average dimensions. Following that comes the clapboarding and you men know how much more that adds to the cost as given above. Ah yes, I hear somebody say, and siding may look just as well as a house done with rough boards and clapboards but it is not warm enough. My answer is all ready and it's in the form of a question.

DID you ever live in a bunk house, in winter, when the only protection between you and the weather was a 1-in. pine board and one thickness of tarred paper? And did you, honestly, ever feel cold? There's a more scientific reason for it which I'll give later, but the warmth of a house depends quite a bit on its tightness. Well, just look into that siding proposition and I'll wager it will commend itself to you.

So then, let's get inside of this house. The first question in this new plan house of ours, after the floor timbers are laid, is floors. Ordinarily you'd lay rough hemlock, then paper, and then you'd lay a soft wood floor.

Let's ask right at this point, What for? Why two floors for the average house? Warmth?—bosh. In this house we will lay hard pine floors, in every room in the house, directly on the timbers. Don't you think your client will listen hard to that? Hardwood floors in every room! And he'll never live long enough to wear them out, either!

Then we'll put up the strapping. Next we'll take care of our plastering. Sounds kind of back-end-to and somewhat strange? Well, when Westinghouse proposed to stop express trains with compressed air they thought he was a fool. However, we've got to get this house done. Laths next? Not much. We are going to use plaster board, made up of several layers of paper, plaster and paper again. We are going to nail it on in 3- or 4-ft. square sheets, directly on the side studs and the furring on ceilings. Nail it with a liberal number of nails, with large heads, so it will have no chance to sag away and then we'll apply to it a skim coat and we'll have walls and ceilings as white and permanent as if we had gone through the old process of lathing, rough plastering and skimming.

What about the warmth, you ask? Let us stop here long enough to dip a little into science—just deep enough to get a fundamental truth fixed in our minds. Now then—"Radiant energy when it enters a medium which can transmit it, and which differs in density from that in which it is traveling, is changed in velocity." Again—"Since the molecules of substances differ in mass, as well as in complexity of chemical composition, it is natural to infer that wave motion will be taken up and transmitted by them with very different velocities." From "An Elementary Treatise on Heat." (Marden.)

Let's count up our layers on the side of our house. We are on the inside looking out.

FIRST our skim coat of plaster, then under that, upon one side of our plaster board, a layer of paper, next plaster of paris (gypsum),* then paper again upon the other side of our plaster board. The board being applied to the studs the next layer is an air space. Then our regular building paper and finally our siding. Keeping in mind the law given here, I ask you if you think the heat loss through this building is going to be a rapid process.

Next let's eliminate blinds; we never use them anyway and they are somewhat like a fifth wheel. And, furthermore, the idea is growing.

Don't scoff at our house, good folks, for it is practical, economical and exceedingly comfortable. The writer has been interviewing an owner and occupant of the house described who is enthusiastically pleased with it. He has dwelt therein for two years, which means last winter and the preceding season, which in the words of the street was "some winter," if you remember.

*"Gypsum in the solid state is an incomparably bad conductor of heat." (Tyndall's "Heat as a Form of Motion.") It is evident that upon the tightness of a building much depends. That our building may be made infinitely tight, there can be no denying.

THERE is another phase of the building situation we should keep in mind. Not 20 miles from where these words are written is a new concern which is turning out ready cut houses. Does this have any significance to you? To me it does. Where is the natural outlet for this product? The logical answer would seem to be,—the builder. I commend this feature of the situation to you for earnest consideration.

Heating—We've got to heat our building so, though I hate to admit it (Mr. Dockham is a steamfitter!—Ed.), let me say to you, good fellow craftsmen, the one-pipe furnace is a "war baby" with wonderful possibilities and, incidentally, it's cheap. Plumbing too must be considered; a careful study of local ordinances and conferences with local men of that trade will pay in many cost-saving short cuts to a perfect installation.

Of the cost of tinted walls *vs.* papered, poured cement chimneys *vs.* bricks, center electric drops *vs.* side lights — all these and many others I mention simply in passing but your mind will suggest ways and means to further our object, for I must hasten to finish.

About financing. Haven't some of your prospective customers a little money they plan to put sometime into a home? Couldn't you chaps manage a second mortgage through a Morris Plan bank?

Perhaps you know of a man who wishes to buy.

Among my acquaintances is one who will buy me a house, secure a mortgage loan, remodel it for me and turn it over to me ready for occupancy. Incidentally, he will collect from its previous owner his commission for selling it.

It's all suggestion, this talk of mine. Is your mind working?

Finally, a word in general. I pass daily, from my home to my office, many houses with valleys which leak every time snow packs in. It's strange that some builder has never gotten to the owners.

Coal is up around $15 or more a ton. I can shake the windows of my house, and no carpenter has ever tried to impress upon me the importance of weather strips and storm doors or double windows. Recently my roof developed a leak; it looks badly and needs shingling. No carpenter, and I am friendly with many, having business relations with them, has apparently noticed that there is a job waiting for some one. I'll have to do the looking up myself.

My last word is this. It's largely a question of good salesmanship. Think it over.

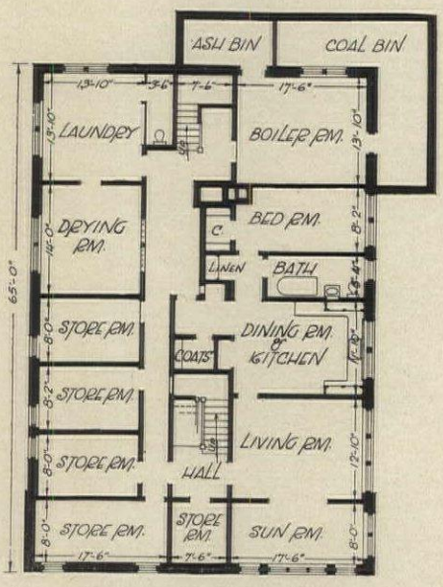
A Small Apartment House

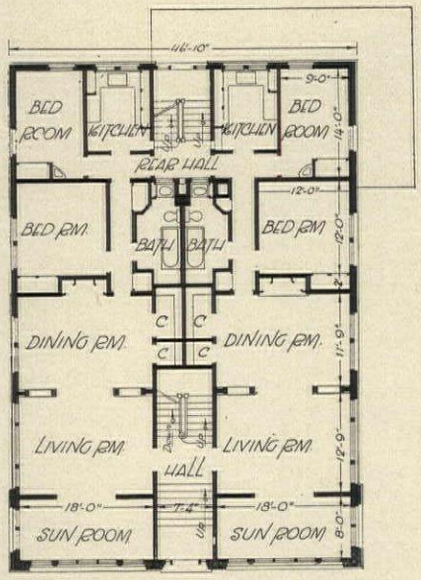
Simple plan and construction noted in this St. Paul building

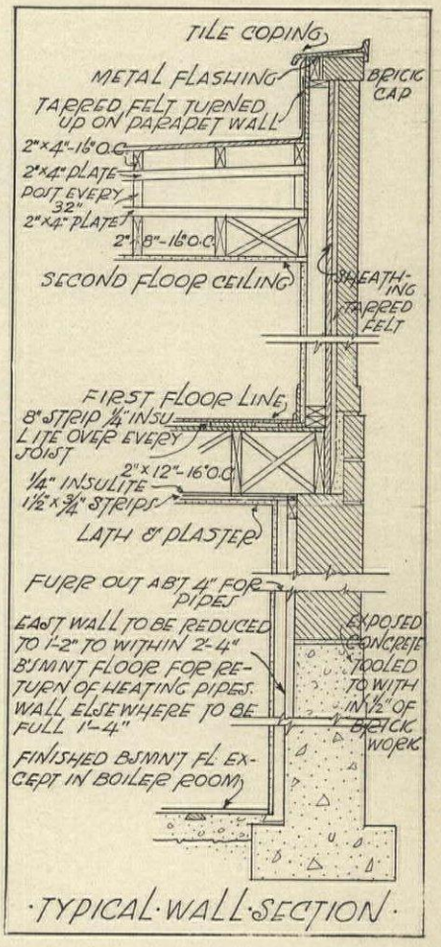
H. A. Sullwold, Architect

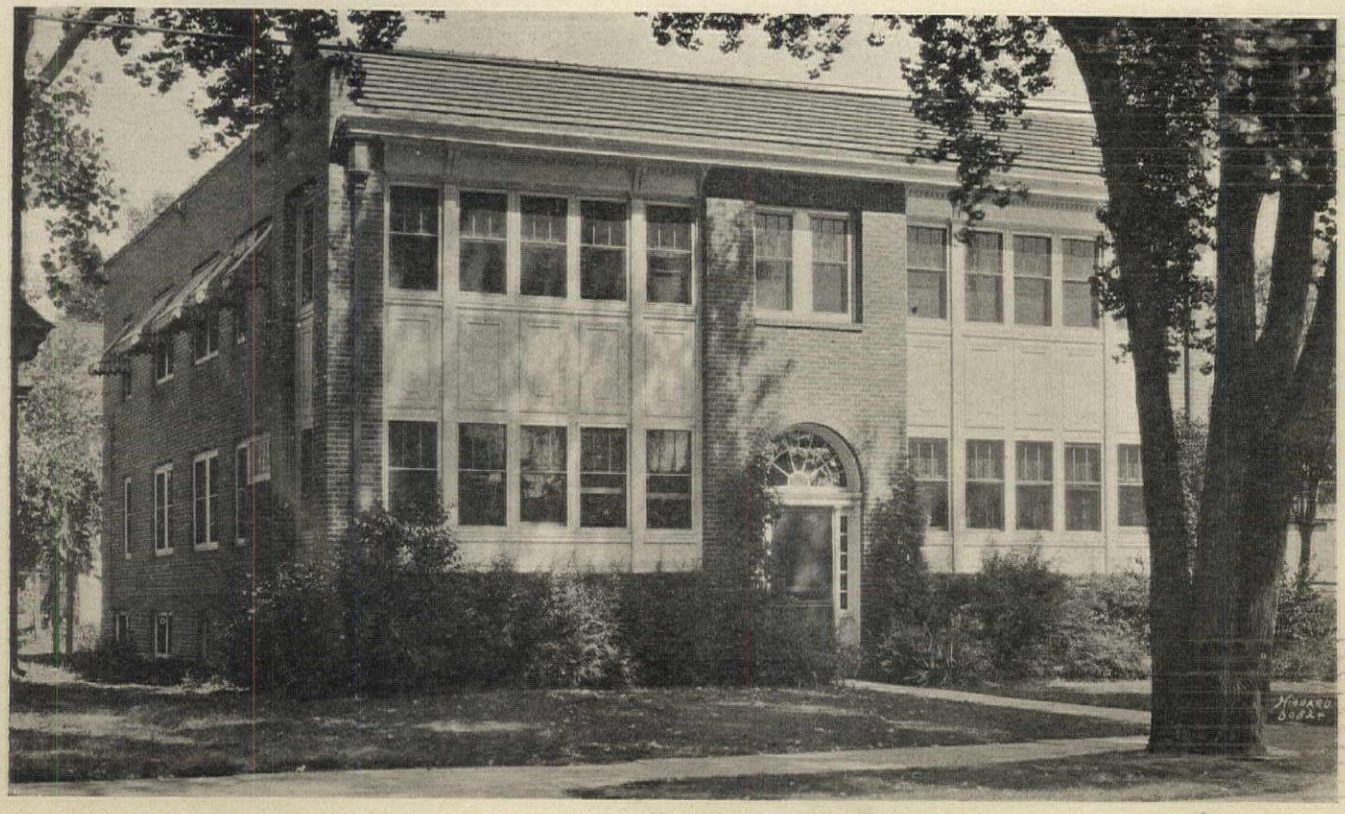
THIS small apartment house was built in 1916 at a cost of $15,000 exclusive of lot, or at 15c. per cu. ft. The architect advises that this type of building can only profitably be built under today's conditions on a co-operative basis and that it should then be made 3 stories high.

There are 2 apartments to a floor and the janitor's rooms as well as storerooms for the tenants are in the basement. The walls are of red brick; the front portion has a small pitched roof covered with tile and the remainder a flat roof as shown in the detail opposite. Heating is by hot water; the kitchens are equipped with incinerators and gas ranges, the bathrooms are tiled and the glazed porches are heated. Patent wall beds are installed in the dining rooms of the first floor and in the sun porches on the second floor.









Hot Air Heating for Houses

By Maurice M. Osborne, Monks & Johnson, Engineers

This is the first of a series of practical articles which will consider the different types of heating that are suited to various small buildings

ENGINEERS and architects are agreed that a simple hot air furnace, of adequate size, with properly designed flues and cold air inlet, furnishes the best heat for any small single dwelling of compact form, not too extended as to plan. With a good hot air apparatus installation cost does not exceed cost of installation of any other type of system, heat can be secured in wide variation of degree through simple manipulation of the fire;—and what is the most importance, when the cold air box is in use the house is constantly supplied with clean, fresh, warm air. To obtain this ventilation in any other way is vastly more expensive than by means of the simple hot air system. Quite apart from the more practical considerations is the advantage of the appearance of such a system, in that no radiators must be exposed, or concealed in various ways.

The objection many people have to hot air heating is the result of experience with unsatisfactory installations. Cheaply built furnaces and piping put in without reference to exposures and length of runs will not produce a satisfactory system. There is nothing wrong with the principle of hot air heating and when the system is intelligently operated it is economical of fuel. However, when cold air is taken in constantly, the fuel expense will be higher than for direct steam or hot water heat. The re-circulating arrangement suggested here does much to offset this disadvantage. To properly install a hot air system the piping should be considered before the framing is done, because the pipes should have the fewest possible changes of direction and they should be concealed in the partitions. This requires more planning than for steam or hot water, but it is essential if a good installation is to be had.

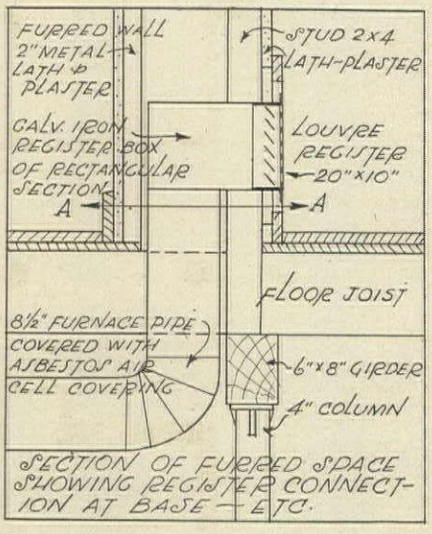
Plans of a house roughly 39 x 34 are shown to illustrate a typical installation. The best practice sets a maximum length for horizontal leaders, between the furnace and base of vertical stacks, of 15 ft. with a pitch of 1 in. per foot. It will be possible to keep within this limit in a house of this size.

In selecting a furnace for the house the grate area is the first thing to be determined. Only a fixed number of pounds of coal can be burned on a square foot of grate with natural draught, and we must have enough area to burn the number of pounds of coal required to give the heat.

It has been found that *total window surface + 1/4 total exposed wall surface, divided by 200 = required grate area*, all surface areas being in square feet.

The total glass area is assumed to be 132 sq. ft., and the total exposed wall area is assumed to be 3536 sq. ft., then

$$\frac{132 + \frac{3536}{4}}{200} = 5.08 \text{ sq. ft. grate area.}$$



This will be equivalent to a much larger furnace than ordinarily figured for such a house, but one which will really heat it in zero weather.

The smoke flue should be ample for this furnace—not less than 8 ins. square inside, preferably lined with vitreous flue lining of that size.

In the selection of a furnace care should be taken to procure one in which the greatest possible ratio exists between the heating surface and the grate area. A large number of hot air furnaces made for competitive sale have a very small heating surface in proportion to grate area. A careful examination into this point by the prospective purchaser will be well worth while.

Practically all hot air furnaces have some method of adding moisture to the air. The usual scheme is a water pan attached to one of the doors on the furnace front. This pan must be filled frequently, as its capacity is not great and it quickly becomes dry. The simplest method of keeping it filled is to have a connection run from the cold water piping in the basement to a point just above the pan when the door is swung wide open. A faucet at this point allows the pan to be filled every time the furnace is attended to. A somewhat more costly, but automatic, arrangement is to have the pan connected with an outside tank at the same level in which there is a ball-cock exactly like that in a water closet tank. For the very best results the water pan should be located not on the side of the air entrance but in the dome of the furnace. Some furnaces are made in this way, and, in addition, have either a porous earthenware container for the water or porous earthenware plates set edgewise in the water pan in order to assist in the evaporation of the water. These refinements doubtless add considerably to the humidification of the air. They are not necessary if the air is to be re-circulated.

An important item is the size of hot air pipes leading to each room. An established rule for sizing is to divide window surface plus ¼ exposed wall surface in square feet for each room by 1.2 for first floor, 1.5 for second floor and 1.8 for third floor. This area will be in square inches. The figuring for the living room will then be:

$$\frac{\text{60 sq. ft. glass} + \frac{1}{4} \text{ of 490 sq. ft. wall}}{1.2} = \text{151 sq. ins.}$$

The detailed computations for other rooms are not figured out but results obtained are:

Hall	55 sq. ins.
Dining room	106 sq. ins.
Pantry	28 sq. ins.
Bed room No. 1	70 sq. ins.
Bed room No. 2	48 sq. ins.
Bed room No. 3	54 sq. ins.
Bed room No. 4	63 sq. ins.
Study	30 sq. ins.
Bath	20 sq. ins.

It may be assumed that the kitchen is heated from its coal range and the second floor hall from the first floor hall. The attic is not heated.

In choosing actual pipe sizes it is better to use round pipes as being less expensive and of better form than the thin, flat type designed to be concealed in partitions. Somewhat more planning is required to accommodate these, and some extra furring, but their use is well worth while. The thin, flat pipes of rectangular section, designed to fit within 6-in. partitions, are extremely inefficient as conductors of air. The circumference of a section of pipe is what causes friction in it. The most efficient section is the circular, in which the area is greatest in relation to the circumference. The sizes shown in the plans are taken from a table of areas of circles, to the nearest ½ in., upper limits being always used. In case of the living room and the dining room, where two pipes of normal size are required to carry the air, a single oval pipe has been fixed upon, the larger diameter of which equals that of the two pipes, and the small diameter being the same as that of one pipe.

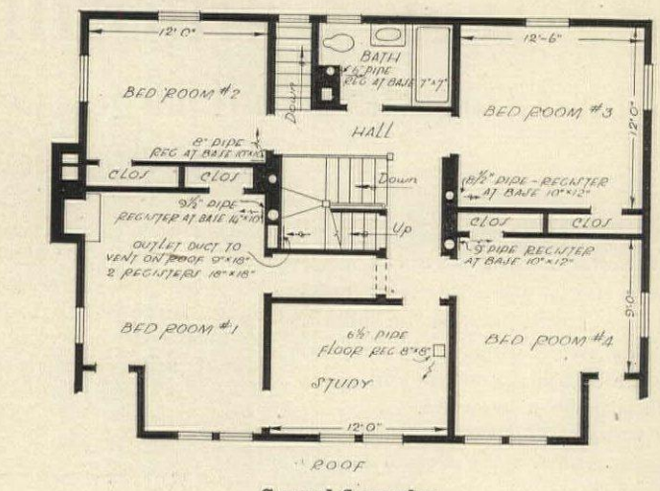
Registers are chosen, wherever practicable, about twice the area of the pipes themselves, so as to cut down velocities of air entering the rooms. Registers are placed in the walls where possible, rather than in the floors, and should be on the opposite sides of rooms from fireplaces and windows.

The method of carrying vertical stacks up in furred spaces is shown in the detailed drawing. By fitting the pipes between studs and using 2 ins. of wire lath and plaster for the furring, and by allowing 2 ins. for pipe covering and to clear woodwork, the total thickness of the furred partition must be 16 ins. to accommodate a 10-in. round pipe.

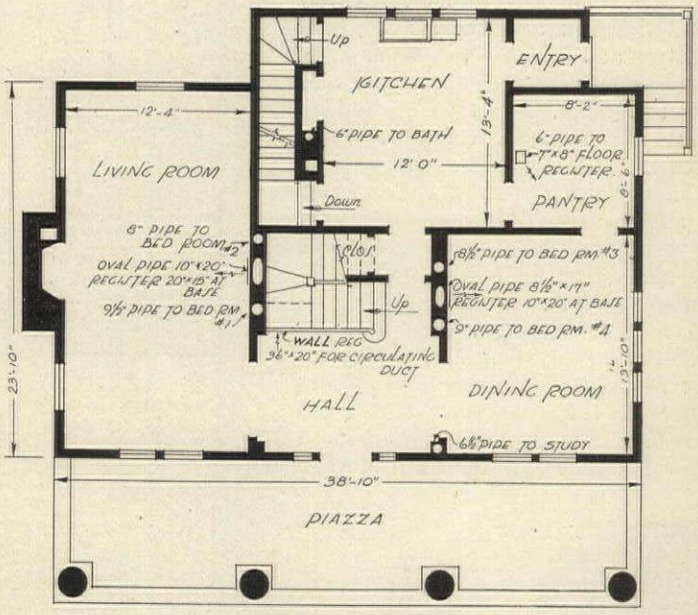
The cold air flue should be ¾ the area of all the hot air pipes combined. In this case the total area will equal 468 sq. ins. or a little less than 2 ft. square. Dimensions are 30 x 16 and it is built under the floor, leading from an opening in the basement wall on the most sheltered side of the house to the space around the furnace. It will be made of concrete with smooth sides and wood top. Connecting with this is a flue 30 x 20, attached to a large re-circulating register in the front hall. A damper at the junction opens one as it closes the other, allowing the use of all fresh air, all air from the house, or a mixture.

The exterior of the furnace should be covered with asbestos air cell covering or, still better, 1-in. magnesia blocks wired on and finished with hard cement. If the outer metal covering of the furnace is double, with an interlining of asbestos, this is not necessary. Leaders in the basement and vertical stacks should be covered with asbestos air cell covering, wired on or held with bands.

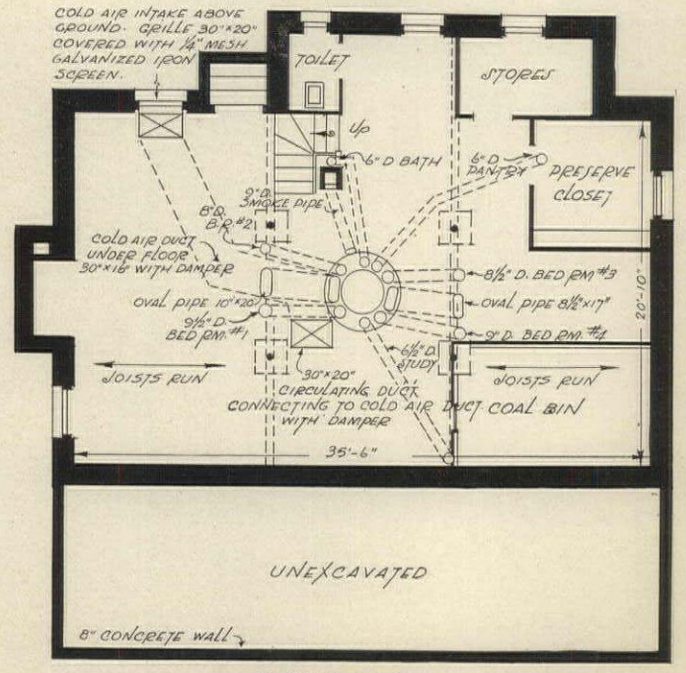
Some provision should be made for the escape of the air entering the rooms, otherwise circulation will not be good when all cold air is being used. Open fireplaces, equipped with proper dampers, take care of this need and where there are only a few fireplaces a vent from the upstairs hall is adequate. This has an opening at the ceiling for summer use, and one at the baseboard for winter use. When air is being recirculated both openings are closed.



Second floor plan



First floor plan



Cellar floor plan

Piping layout for hot air system in a small house

A California House

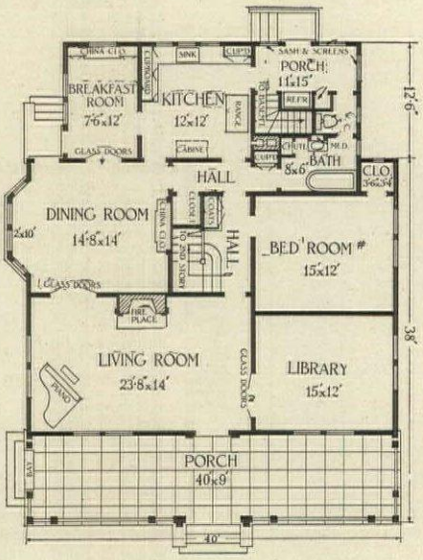
The cottage lines and large open porch give it distinction

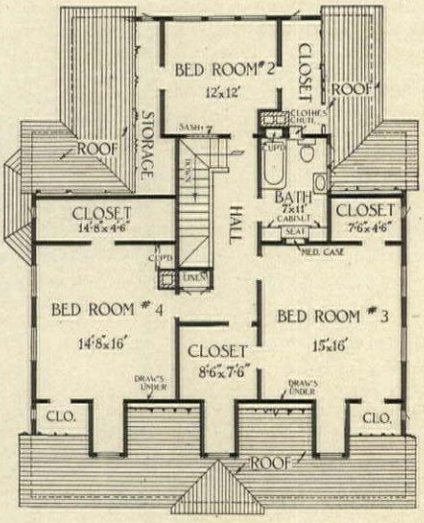
E. W. Stillwell, Architect

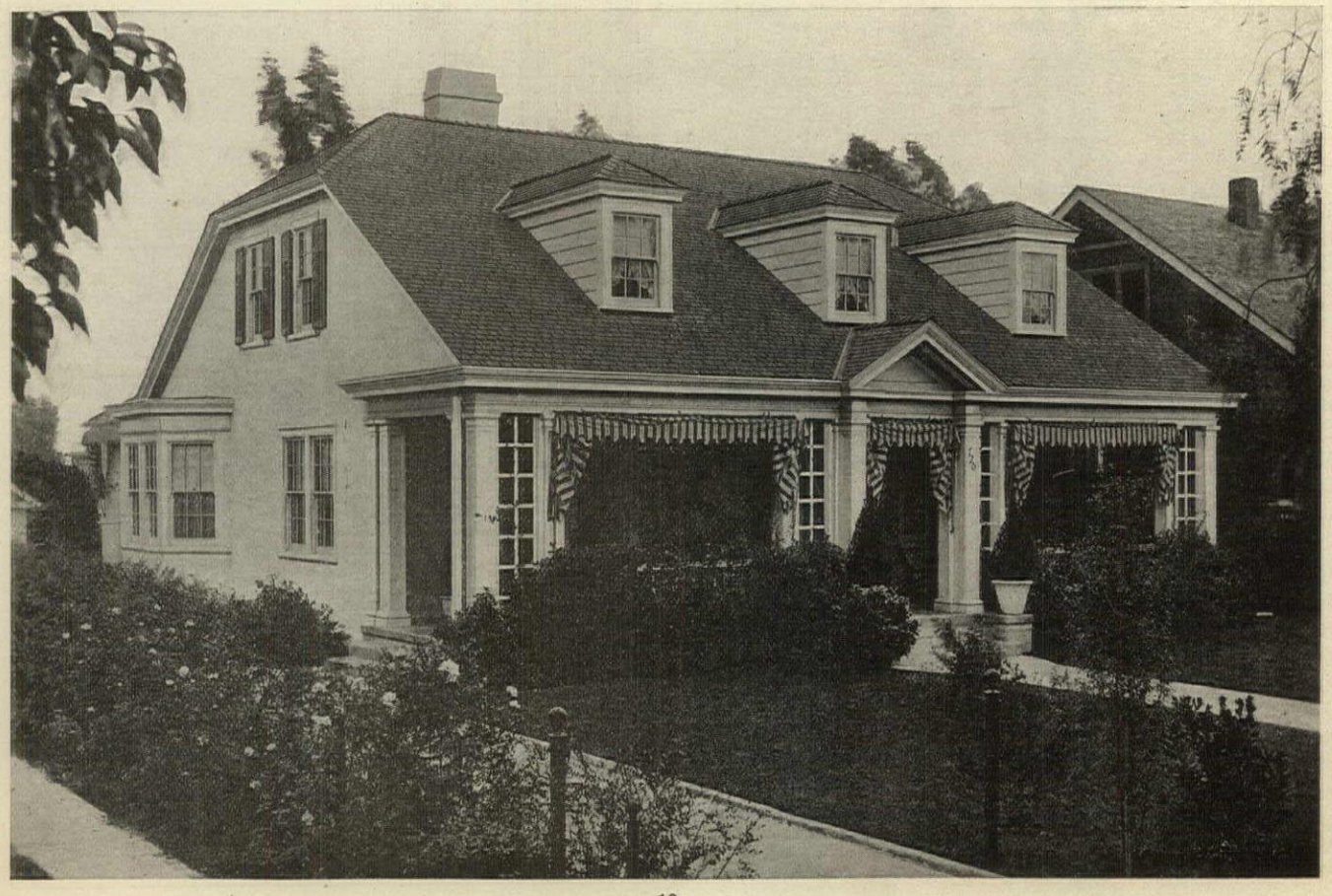
IN studying the exterior view of the house shown here the very attractive porch, which extends across the front, should be noted. Especially interesting is the way in which the columns are used in pairs with lattice work between.

The walls of this house are of hollow tile surfaced with cement stucco which, with all trimming material, is white. The roof is shingled and painted green and there are green shutters at the gable windows. The porch awnings are of white and green stripes. Tasteful planting gives the house a very attractive setting.

The floor plans show the interior arrangement. Glass doors are used between first floor rooms and there are many built-in features and convenient closets. These include, on the first floor, china cupboards in both the dining room and the breakfast room, medicine case and clothes chute in the bathroom, the usual conveniences in the kitchen, and several clothes, linen and storage closets in the hall, rear entry porch and elsewhere. While the house is of the so-called story-and-a-half kind, three good bedrooms and a bathroom of practically full ceiling height are included on the second floor, and many wardrobe and storage closets, built-in drawer cabinets, etc. Hardwood floors are used for the first floor except in kitchen and bathroom. The house has a large basement, reached by an inside stairway, and is equipped with a furnace.







The Builders' Journal Plans

No. 8. A small colonial house with quantity survey of materials for estimating purposes

By Gordon Robb, Architect for The Builders' Journal

THE big outstanding demand today in house construction is for small single-family houses that can be built at a moderate cost in view of today's building conditions. People with a limited amount of money must revise their ideas about the house they want to build; there is only one way to get a house for a moderate price today and that is to plan it so that all necessary features are arranged in the smallest possible space.

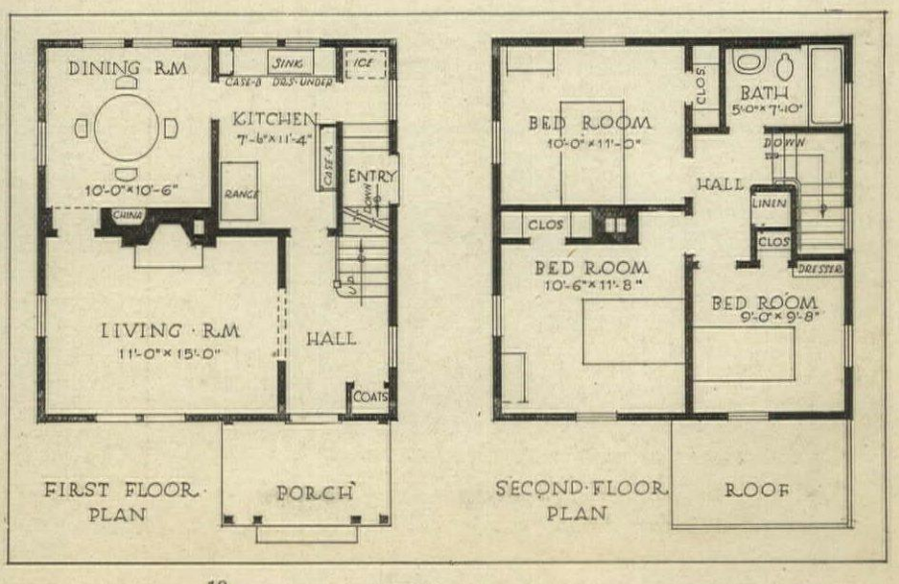
The construction, furthermore, must be simplified so that the labor in building may be cut to the minimum. In a frame house everything should, if at all possible, be contained in a rectangle thus eliminating breaks in foundation walls and framing, the roof should be made up of the fewest planes and it will generally be found that a simply framed, full 2-story house will be cheaper than one where the roof is broken by dormers, because the saving in labor is greater than the cost of the additional material required. Floor framing should be arranged to take standard lengths of joists without cutting. Every effort made in working out the plans to reduce the amount of cutting and fitting on the job will pay in labor cost which is the principal item of expense.

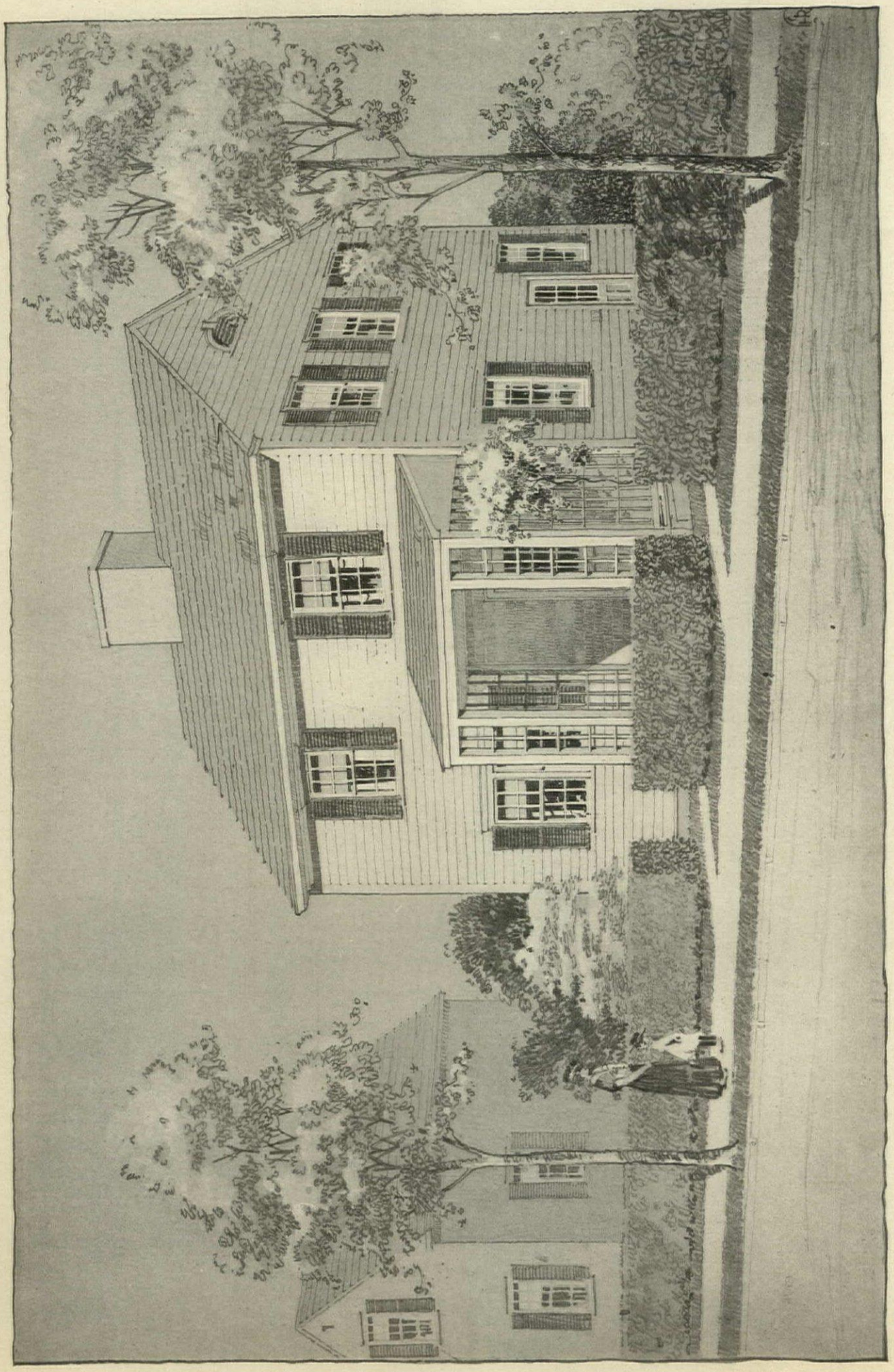
The house shown in this issue of THE BUILDERS' JOURNAL has been designed with these various economies in mind and it should prove a very popular plan for many people who will build in the spring. In the first place its total dimensions are only 23 x 24, yet it has a pleasing arrangement of rooms on both floors and would entirely suit a family particular about its home. The framing is of the simplest type and with short spans which permit the use of 2 x 8 joists and rafters. The floor area of the house is only 552 sq. ft. and it should be built in most sections of the country for about $6500. In many instances builders who are clever in saving expense can do better than this; the fireplace and china closet could be omitted at a saving, but these features are desired by so many people today that they are included in our plans to make them complete. If they were omitted a single flue chimney could be brought up through the second floor in the corner of the rear bedroom near the hall by moving the door to the room nearer the bathroom partition.

Another economy that will be noted is the arrangement of the staircase so that a bulkhead cellar entrance is eliminated; a cellar door at grade opening on a stair landing is the most economical arrangement that can be had, especially when it serves also as the kitchen entrance as in this case. Note should also be made of the place for the refrigerator; it can be reached easily by the ice-man and is equally convenient for the housekeeper. The second floor hall has no waste space but it is not crowded and room is in addition found for a linen closet.

In small houses ingenuity in planning will provide many features that can be fitted into space that would otherwise be wasted. In the small bedroom there is a built-in dresser provided and by extending over the stair well, as far as headroom conditions will permit, a number of useful drawers are included. A detail is shown on drawing No. 6.

The design is based on simple colonial lines and depends entirely for its effect upon good proportions and the grouping of windows. There is no ornament whatever on the exterior and the moulded finish used is of the simplest kind. In selecting this from stock, the builder should examine the details carefully and choose mouldings of the same size and section as shown in so far as possible. The porch is made up of square posts with a shed roof and the lattice gives a decorative touch at a very small cost. Note should be made of the slight projection on the gable ends; this should be followed closely to give the colonial character, because it is in using these simple details that the correct effect will be obtained. The exterior walls may be of clapboards, siding or shingles; in the last case no corner boards would be needed. The walls should be painted white or, in the case of shingles, one of the white shingle stains would be effective. The trim should likewise be white. Doors and shutters should be painted a light, bright green or a grayish green. The roof is designed for slate but where every economy in first cost is necessary gray-green asphalt shingles would look well. The large chimney is desirable to give a homelike look to the house and this can best be accomplished by studding out around it above the roof and covering this framework with metal lath and stucco. The top should be carefully covered with sheet metal to prevent water getting down around the blocking.





No. 8. A Small Colonial House of Six Rooms
By Gordon Robb, Architect for The Builders' Journal

The Builders' Journal Plans

No. 8. A small colonial house of six rooms
Quantity Survey

By Frederick H. Hunter, Quantity Surveyor

THE quantities listed here are for estimate purposes. All measurements are NET unless otherwise noted. Quantities such as sheathing, flooring, roofing, etc., are given by area with no allowance for wastage, matching of lumber, etc. Minor outs are disregarded. No attempt has been made to include all the small items nor such items as clearing the site, drains, supplies, etc., which must be governed by local conditions. Where the word "Item" appears in the quantity column it indicates that the expense of the work in question would probably be set as a lump sum based on data available.

Strip loam: about 10 ft. around site—assuming loam to average 8 ins. deep ..... 47 cu. yds.
Excavation for cellar ..... 156 cu. yds.
Excavation for footings, areas, etc ..... 7 cu. yds.
Concrete for foundations ..... 29 cu. yds.
Forms for same (contact area) ..... 1650 sq. ft.
Form trowel wash for basement sills ..... 12 lin. ft.
Concrete cellar floor ..... 51 sq. yds.
Common brick for chimney, rough fireplace and trimmer arch ..... 134 cu. ft.
(At 20 per ft. this is 2-2/3M)
8 x 12 flue lining ..... 62 lin. ft.
Thimble pieces included in above 2
Metal thimbles for smoke pipe and gas range vent 2
Firestopping: it would require 1½M brick to firestop according to the best requirements ..... Item
Finished fireplace (rough fireplace and trimmer arch included in chimney item)
Damper for 36" opening 1
Mantel bar (unless patent damper which forms lintel is used) 1
Brick for facing, lining and hearth 180
(*See p.* 49)
3" iron basement column with cap and base 1
Cast iron clean out door and frame 1
Framing lumber
There are no especially long lengths needed—no joist over 12'-0". Lengths are scheduled "to the next whole foot." That is, a piece 14'-4" is counted 15'-0". Length allowed for splices in sills, plate, ridge, etc.
(Schedule is for a girt frame)
(*See third cover*)
4 x 6 sill ..... 190 ft. B. M.
6 x 8 girders ..... 60 ft. B. M.
2 x 8 joists ..... 1275 ft. B. M.
Cross bridging of 1 x 2 stock ..... 84 lin. ft.
4 x 6 girt ..... 196 ft. B. M.
2 x 8 rafters, lengths are 15 ft.; this includes ridge, etc. ..... 640 ft. B. M.
2 x 6 ceiling joist ..... 350 ft. B. M.
2 x 6 and misc. for porch floor and roof ..... 175 ft. B. M.
Wall framing 2 x 4, 16" o. c. Include in price for plate of 2 x 4's doubled, usual bracing, etc. No outs taken for windows or doors on account of doubling and trussing ..... 1790 sq. ft.
2 x 4 stud partitions with 3 x 4 Y. P. cap and one row of herring-bone bridging. Lengths measured to girder or partition cap below and no outs deducted ..... 125 sq. ft.
TOTAL CARRIED FORWARD .....

TOTAL BROUGHT FORWARD .....
Non-bearing partitions of 2 x 4 and 2 x 3 studs (include cap, sole and bridging) ..... 1080 sq. ft.
Studding 12" o. c., for false chimney ..... 70 sq. ft.
2 x 10 and smaller stock for stair stringers and framing, including landing ..... 130 ft. B. M.
Wall sheathing ..... 1550 sq. ft.
Roof sheathing ..... 780 sq. ft.
Underfloors, square edged boards ..... 920 sq. ft.
Attic floor, matched boards ..... 440 sq. ft.
Strap furring 1 x 2, 16" o. c. for wood lath (if sized timber is used omit this item) ..... 970 sq. ft.
Furr down for recess in dining room ..... Item
Joist hangers
4 x 8 over 4" 8
Roof shingles ..... 7 sqs.
Ridge (shingled) ..... 19 lin. ft.
Ready roofing for porch roof ..... 1 sq.
Cap and under-flashing around chimney ..... 17 lin. ft.
Flashing over porch roof ..... 11 lin. ft.
Flashing over cornice returns ..... 6 lin. ft.
Flashing over window heads ..... 74 lin. ft.
4" metal gutter for porch ..... 11 lin. ft.
End pieces for same 2
Metal cap for false chimney about 3'-0" x 5'-0" ..... Item
Wood leaders ..... 65 lin. ft.
Goosenecks and bends for same ..... 5 each
Iron or Akron pipe for leader ends ..... 5 lengths
Exterior windows (include frame and sash; note backbands on casings)
(*See pp.* 4, 55 *and cover*)
Cellar windows, 3 lts. 10 x 13 4
12 lts. d. h. 9 x 12 4
Mullion frames with 2 d. h. windows 12 lts. 9 x 12 ..... 2 units
12 lts. d. h. 9 x 11 8
Mullion frame with 2 d. h. windows 2 lts. 24 x 18 ..... 1 unit
Fan light casements in gables 2
Stock blinds for 12 lts. 9 x 12s ..... 8 pr.
Stock blinds for 12 lts. 9 x 11s ..... 8 pr.
Exterior doors (include frames)
(*See pp.* 4, 55 *and cover*)
Front door, 3'-0" x 7'-0", glazed 6 lts., 2 panels under 1
Side door, 2'-8" x 6'-8", glazed 9 lts., 2 panels under 1
Exterior finish
(*See p.* 55 *and third cover*)
Cap mould over 1st story windows ..... 23 lin. ft.
TOTAL CARRIED FORWARD .....

TOTAL BROUGHT FORWARD .....
Rake mouldings for gables ..... 64 lin. ft.
Cornice returns 4
Cornice mouldings (including 3 x 5 gutter) ..... 48 lin. ft.
Corner boards ..... 66 lin. ft.
Water table ..... 84 lin. ft.
Rake strip for porch roof ..... 14 lin. ft.
Fascia for porch cornice ..... 11 lin. ft.
Sheathing for ends of porch ..... 16 sq. ft.
Plain posts for porch, 4½" square, 8'-0" high 4
Half posts at wall 2
Plain box beam for porch ..... 23 lin. ft.
Lattice strips ⅝" x 1⅜" ..... 295 lin. ft.
Bottom rail 4" x 6" ..... 16 lin. ft.
Foot blocks under rail 8
Fascia board for porch about 12" wide ..... 24 lin. ft.
Riser, tread and cheek pieces for steps ..... 7 lin. ft.
Clapboards ..... 1330 sq. ft.
Sheathing for porch ceiling ..... 55 sq. ft.
Y. P. flooring for porch ..... 70 sq. ft.

Interior doors
(*See pp.* 4, 55 *and back cover*)
2'-0" x 6'-8" 2
2'-4" x 6'-8" 3
2'-6" x 6'-8" 6
2'-8" x 6'-8" 1
Frames for single doors 12
Flap door for linen closet 1

Interior finish
(*See p.* 55 *and third cover*)
Trim with mitered angles for doors and windows ..... 725 lin. ft.
Mullion casings ..... 13 lin. ft.
Window stools and aprons ..... 62 lin. ft.
Stop beads ..... 155 lin. ft.
Head stops ..... 50 lin. ft.
Base ..... 350 lin. ft.
Plain plinth blocks ..... 28 pr.
Chair rail ..... 118 lin. ft.
Mantel in living room ..... 1 unit
Jamb casings in living room ..... 20 lin. ft.
Shelves for closets, about 2'-0" long 6
Hook strips ..... 45 lin. ft.
Dresser in bedroom No. 3 ..... 1 unit
Picture moulding ..... 250 lin. ft.
Shelving and drawers for linen closet ..... 1 unit
Lining, shelving and special doors for china closet and cupboard under in dining room ..... 1 unit
Case A and counter with drawers under in kitchen ..... 1 unit
Case B in kitchen ..... 1 unit
Sink frame and drain board in kitchen ..... 1 unit

Stairs to 2nd story and down to entry
Treads with one open end 4
Treads with closed ends 6

TOTAL CARRIED FORWARD .....

TOTAL BROUGHT FORWARD .....
Starting tread with rounded end 1
Special treads next to landing 2
Special nosing on landing 1
Risers 13
Special risers, curved 3
Skirt board at wall ..... 20 lin. ft.
Face string ..... 4 lin. ft.
Stair rail ..... 4 lin. ft.
Newel post and ramp 1
Wall rail on brackets ..... 7 lin. ft.
Starts 2
Ramp and twist 1
Nosing strip at top of stairs 2

Hardwood floors for living room, dining room and hall (include sheathing paper) ..... 340 sq. ft.
Floors for rest of house ..... 525 sq. ft.

Cellar stairs
Plain treads 8
Risers 9
Nosing at entry 1
Batten door at foot of stairs 1
Door frame in sheathed partition 1
Sheathing partition for stairs ..... 30 sq. ft.
Studding for coal bin partition ..... 110 sq. ft.
Sheathing for coal bin partition ..... 70 sq. ft.
Shovel hole and slide for coal bin 1
Frame for 2 laundry trays ..... 1 unit

Plastering interior
(*See p.* 3)
Ceilings ..... 110 yds.
Basement ceiling (if plastered) ..... 53 yds.
Stair soffits ..... 5 yds.
Walls, net ..... 275 yds.
(or half outs, 321 yds.)
Dado in kitchen and bathroom (4 ft. high)
Keene's cement plastered on metal lath ..... 24 yds.
Corner beads ..... 62 lin. ft.

Exterior stucco for chimney on metal lath or patent wood lath ..... 8 yds.
(*See p.* 3)
Form projection for cap (top of cap is metal) ..... 16 lin. ft.

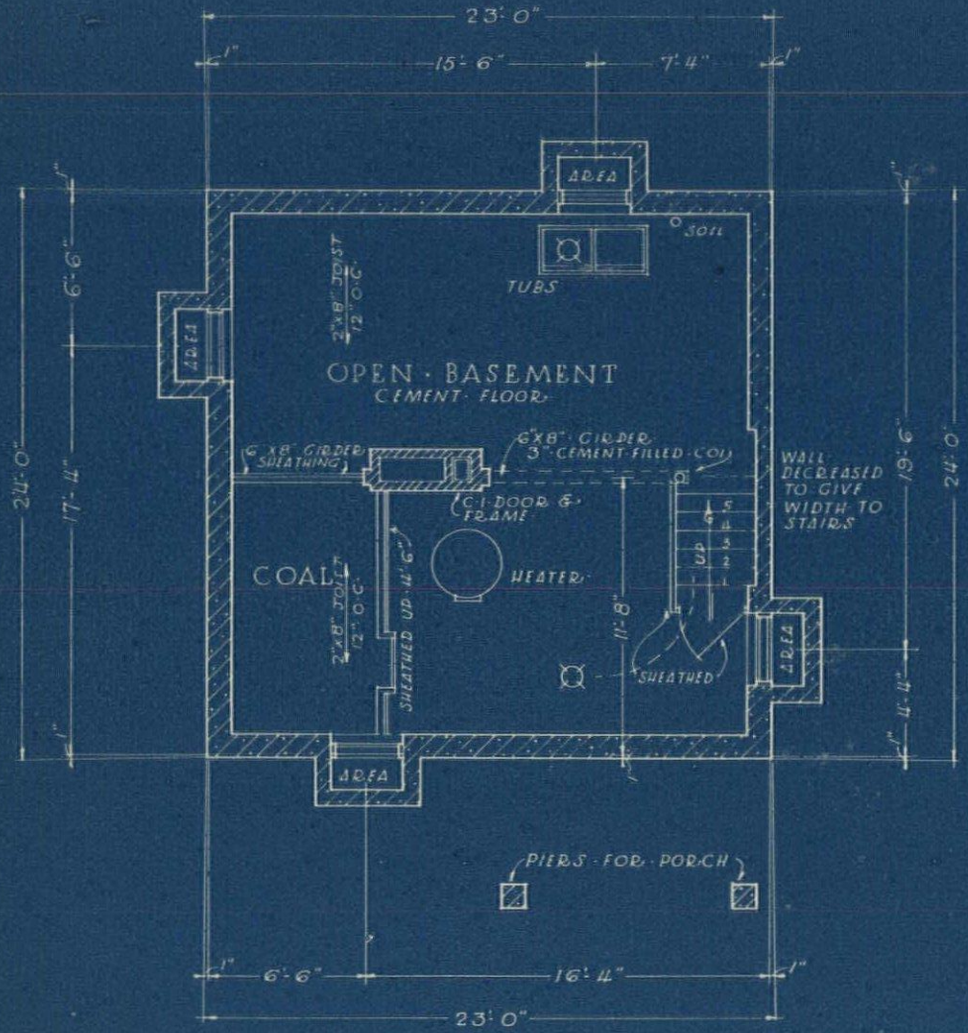
Allow for work not listed in the survey:
General or overhead costs ..... Item
Grading —walks, planting, sodding, etc. ..... Item
Connections for water, sewer, gas, etc. (including trenches) ..... Item

Insert sub-bids for other trades

Hardware .....
(*See p.* 4 *and back cover*)
Allow for setting hardware ..... Item

Painting and papering .....
Plumbing .....
Heating .....
Electric work .....
Fixtures .....

TOTAL AMOUNT .....



PLAN OF BASEMENT

SCALE 1/8" = 1'-0"

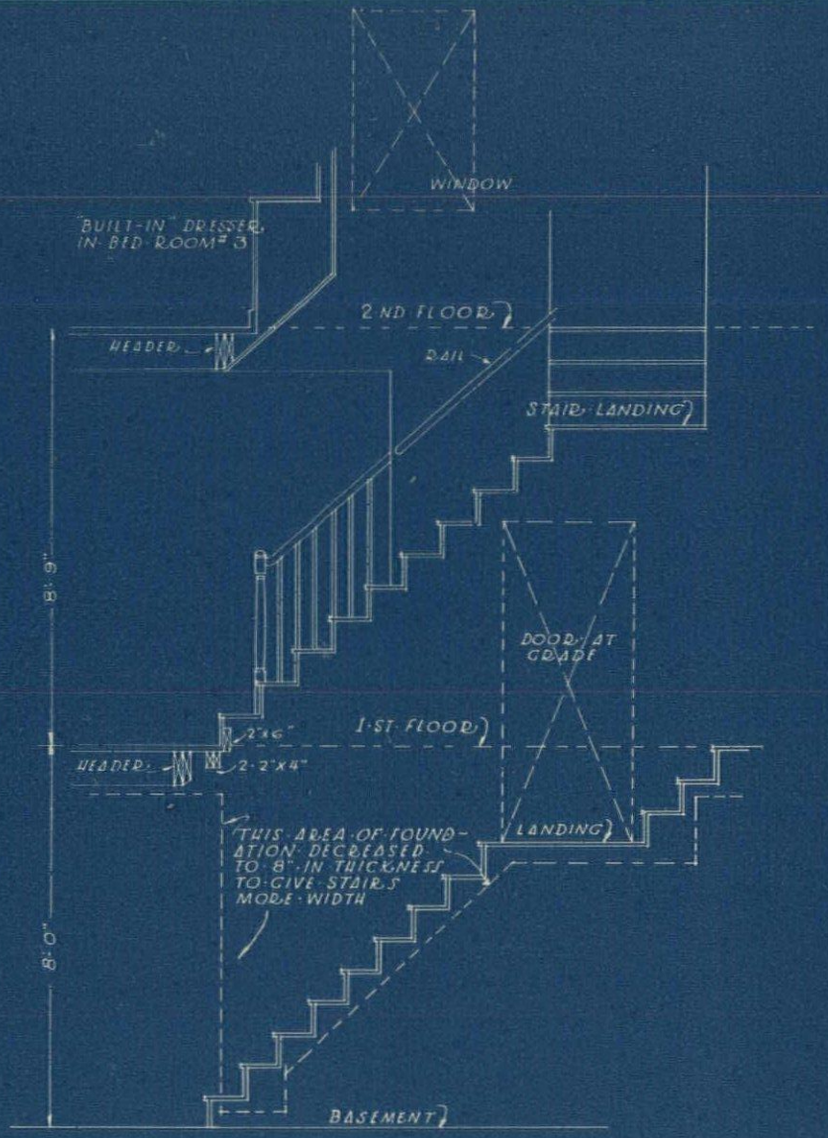
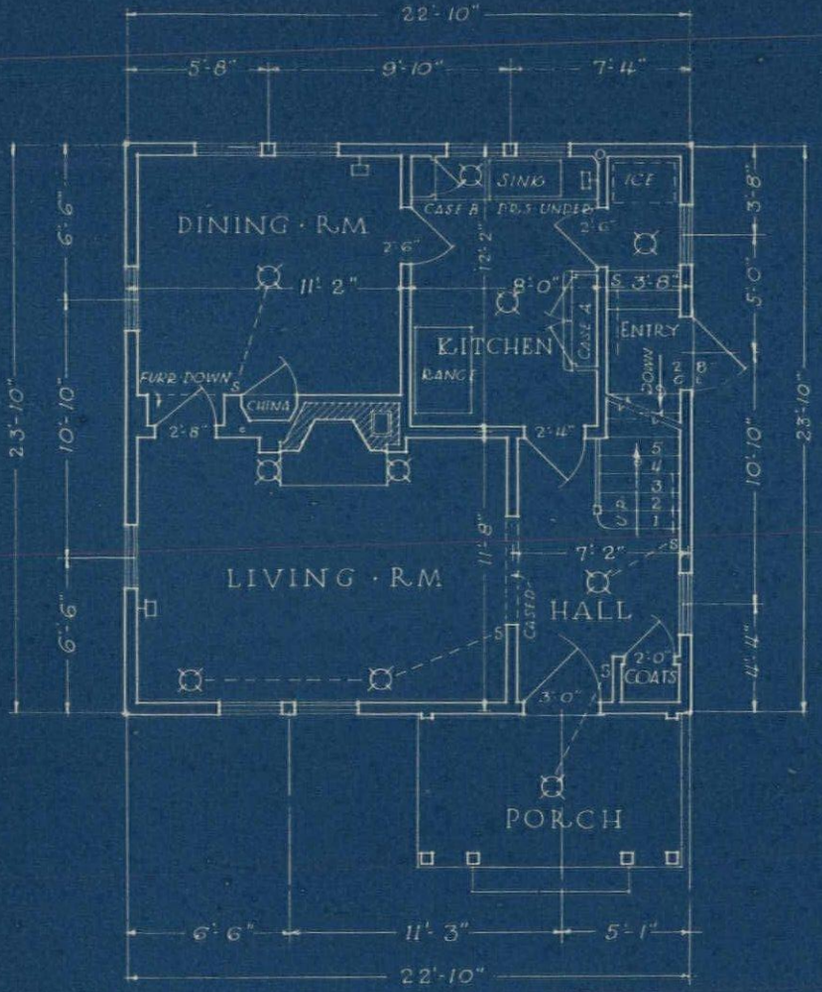


DIAGRAM SECTION OF STAIRS

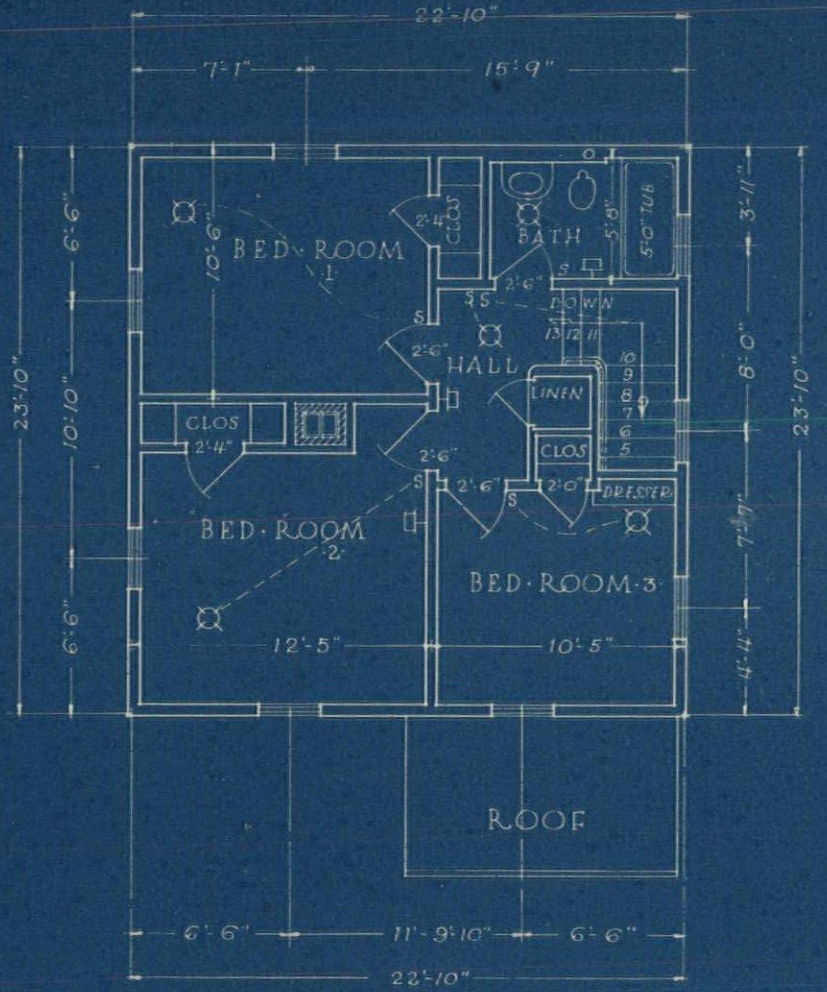
SCALE 1/4" = 1'-0"

DRAWING NO (1)



PLAN · OF · FIRST · FLOOR.

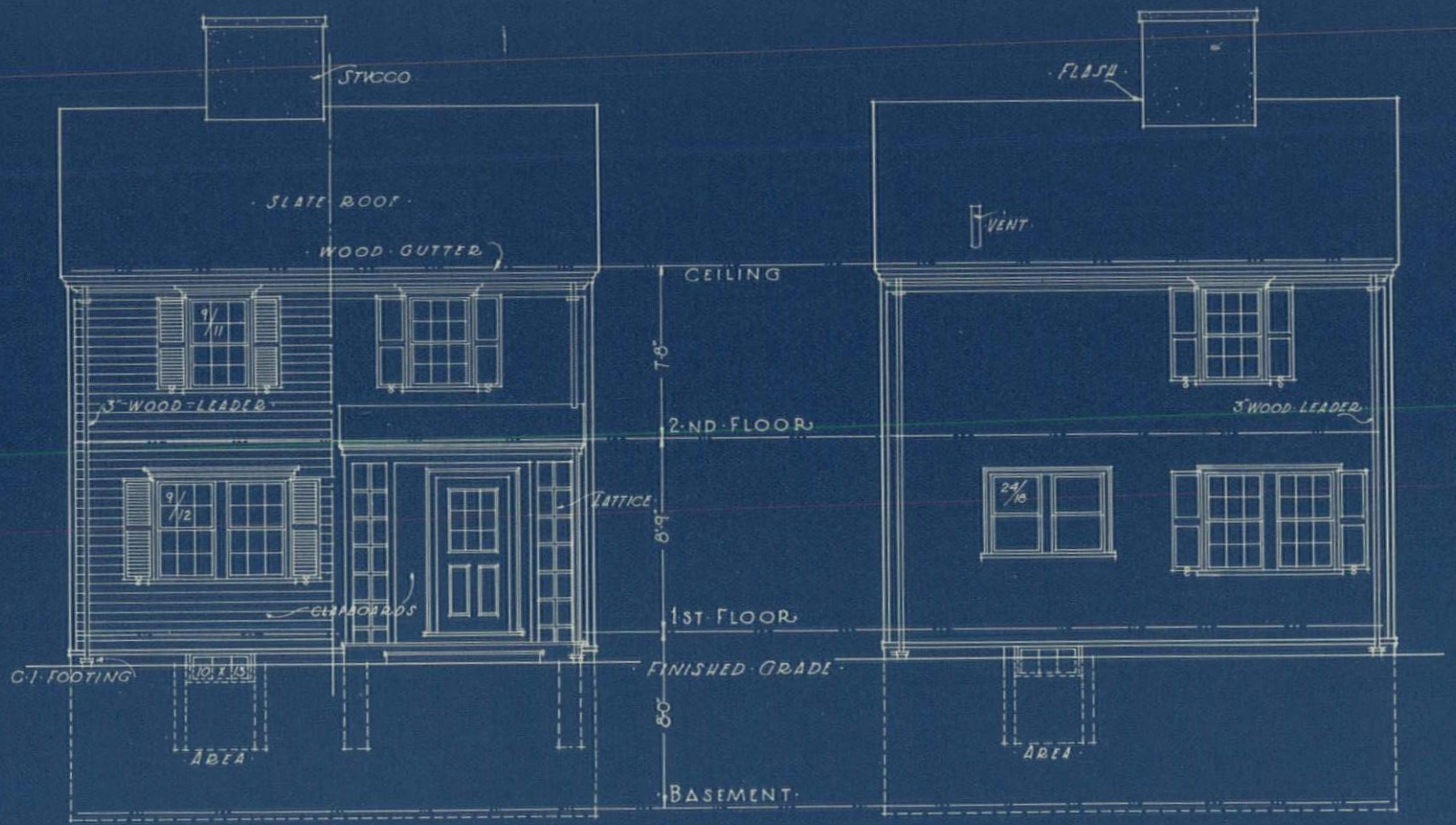
SCALE · 1/8" = 1'-0"



PLAN · OF · SECOND · FLOOR.

DRAWING NO. (2)

A · SIX · ROOM HOUSE ·	The BUILDERS' JOURNAL WORKING DRAWINGS	NO 8 · DEC · 1920 ·



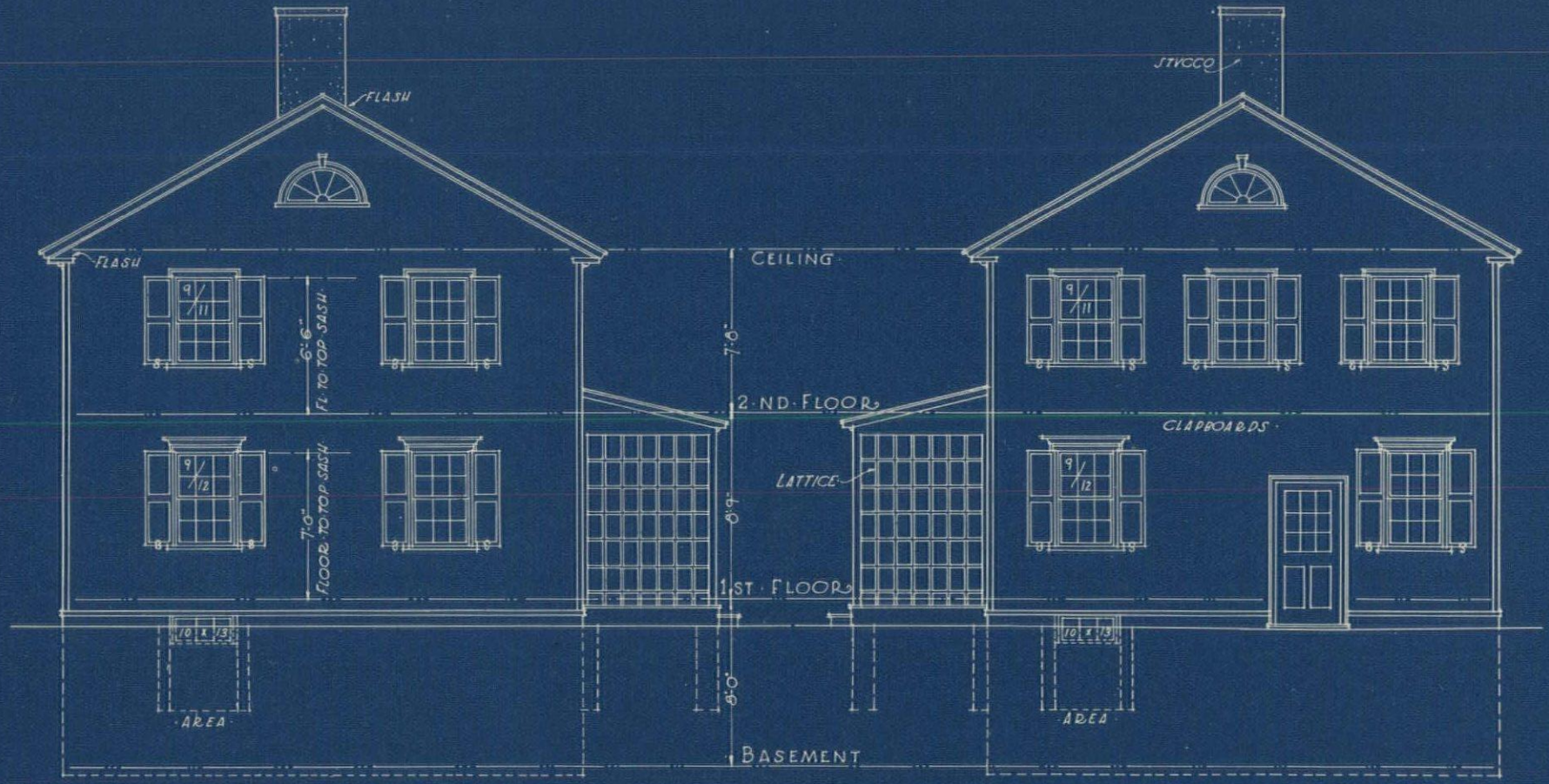
ELEVATION OF FRONT. SCALE 1/8" = 1'0". ELEVATION OF REAR.

DRAWING No. 3

A SIX ROOM HOUSE

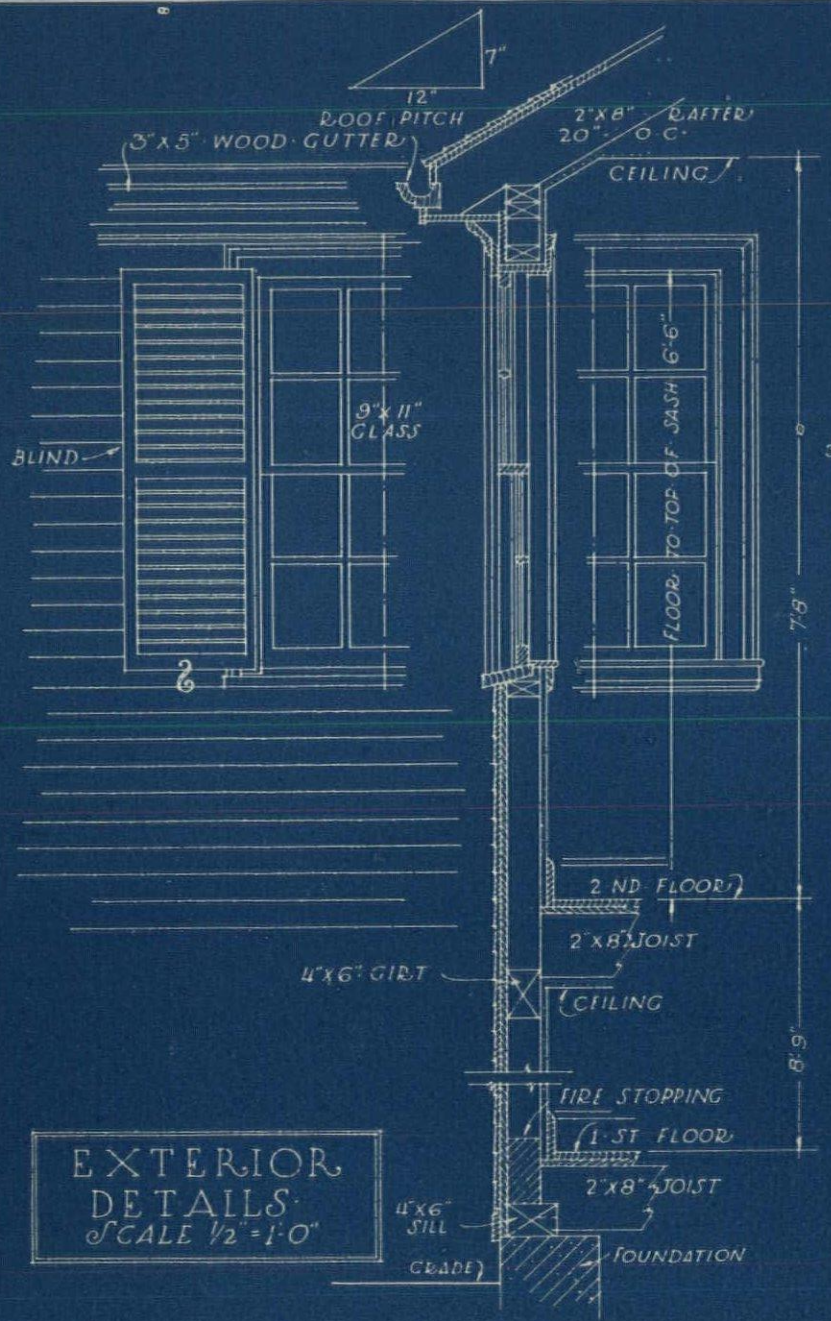
The BUILDERS' JOURNAL WORKING DRAWINGS

NO. 8
DEC 1920



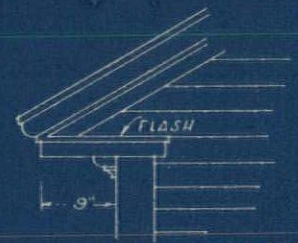
SIDE · ELEVATION · (LEFT) SCALE · 1/8" = 1'-0" · SIDE · ELEVATION (RIGHT)

DRAWING NO. (4)

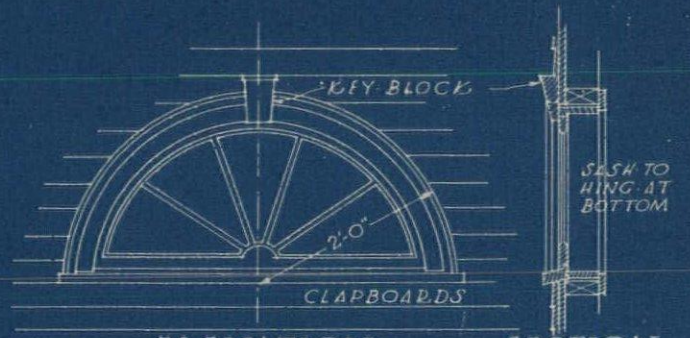


SECTION · CORNICE & · EXTERIOR · WALL

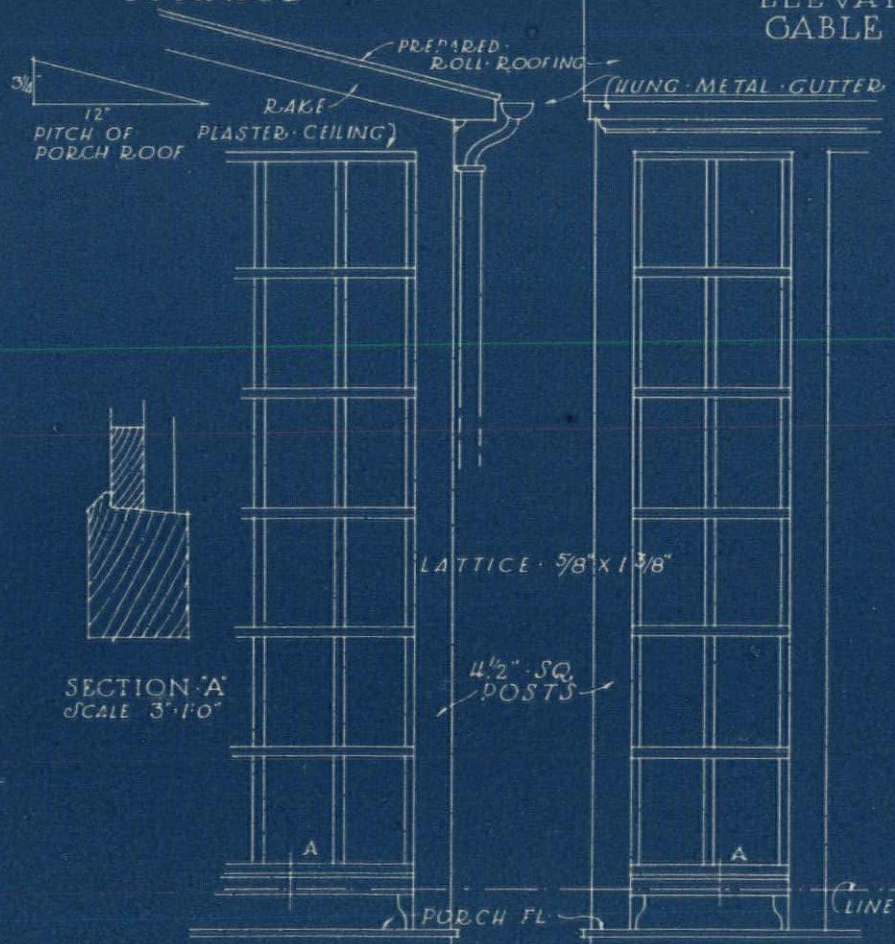
EXTERIOR DETAILS
SCALE 1/2" = 1'-0"



RETURN · OF CORNICE



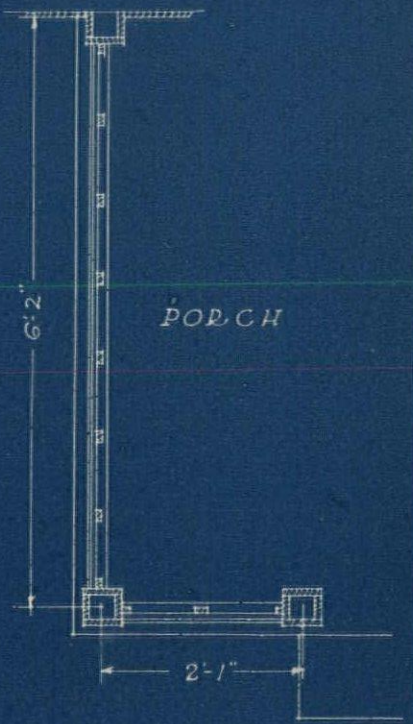
ELEVATION · GABLE · WINDOW · SECTION



SIDE · OF · PORCH

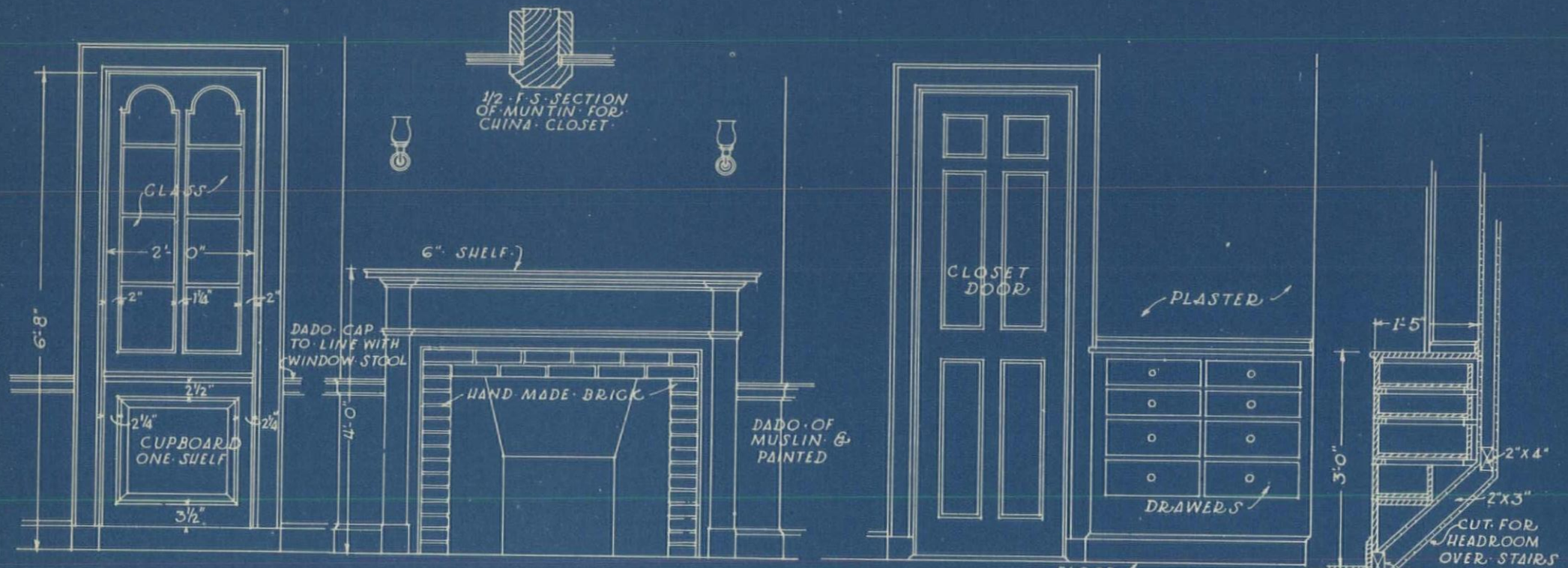
FRONT · OF · PORCH

SECTION "A"
SCALE 3"-1'-0"



PLAN · OF · PORCH

DRAWING NO. 5

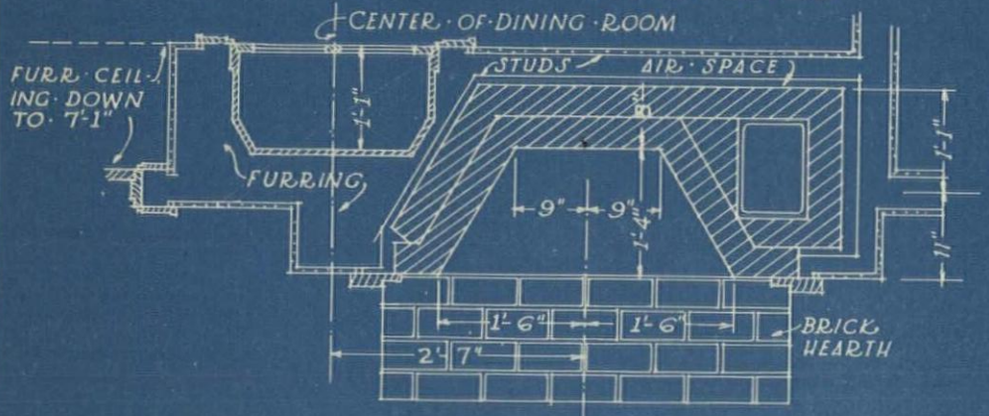


ELEVATION
CHINA · CLOSET

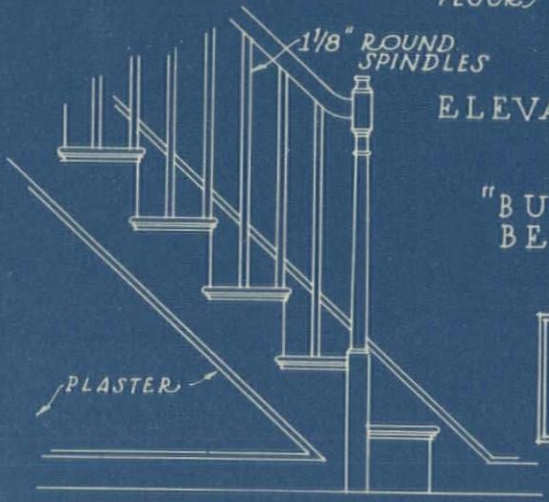
ELEVATION
FIREPLACE

ELEVATION

SECTION



PLAN · · CHINA · CLOSET · & FIRE PLACE ·



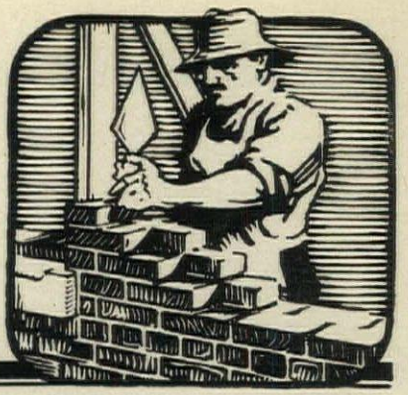
· ELEVATION · STAIRS ·

"BUILT-IN" · DRESSER · IN BED · ROOM # · 3

INTERIOR · DETAILS
SCALE · ½" = 1'-0"

DRAWING NO. (6)

MASONRY
Practical Information on Materials and Latest Construction Methods



Popular Brick Bonds

English and Flemish Types

By William Carver, Architect

WHEN designing a building the architect, after roughly sketching out the plan, conceives the idea of its general outline or mass, the good proportion of which is essential to a pleasing effect. When this has been achieved he proceeds with the design by solving the larger problems, then the lesser, finally working out the details. Every portion of the building must bear its proper relation to, and harmonize with, the general design of which it is a part. Thus, ornament around a window must scale with and be properly placed in its own section of the facade which must, in turn, bear a harmonious relation to the entire composition.

In every architectural scheme the units composing the masonry wall play a part just as important as any other feature of the design. If these units are not pleasing in their proportions they will undo to some extent, and may even spoil entirely, the effect which the designer tried to accomplish, no matter how satisfactory the general lines of the building may be. The units must therefore not only be in scale with the elevation but must, in their own dimensions, bear the correct ratio of length to height. Who has not at some time seen what might have been a cozy little home built of clumsy looking units that were not only entirely too large, but proportioned so badly that they ruined the appearance of the building? Such instances are regrettable and can be avoided by the selection of units which experience has shown will look right in the wall. Brick, with its numerous courses, is always in scale with any elevation, no matter how small or how large the building, and each brick has correct architectural proportions. Universal experience proves that brick, being thus fundamentally right in point of size and having a surface that is alive with interest, harmonizes with any design.

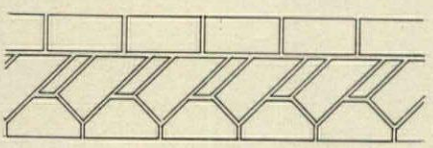


Fig. 1

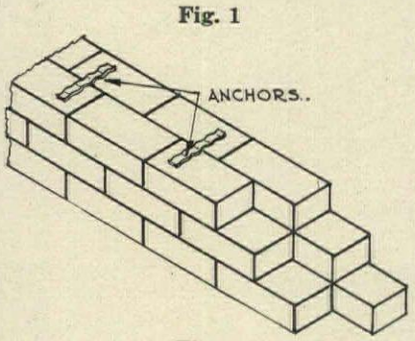


Fig. 2

Diagrams above show two methods of bonding face brick to backing, but they are not first-class construction and in figuring strength of wall only backing can be considered

The last article (October issue) dealt with common bond and the cost of more expensive bonds. Common bond is a variation of one of the three fundamental types of bond —stretcher or running bond.

Stretcher or Running Bond—The exposed surface of running bond consists entirely of stretchers, which fact explains also its weakness, unless built as described later, for a wall must be tied together with headers to develop its proper strength. When the wall is 12 ins. or more thick, sometimes the brick in the center of the wall is laid diagonally every few courses, the tri-

Diagram for Garden Wall bond below. See also finished wall Fig. 10

Diagrams for English bond below, showing two methods of starting corners

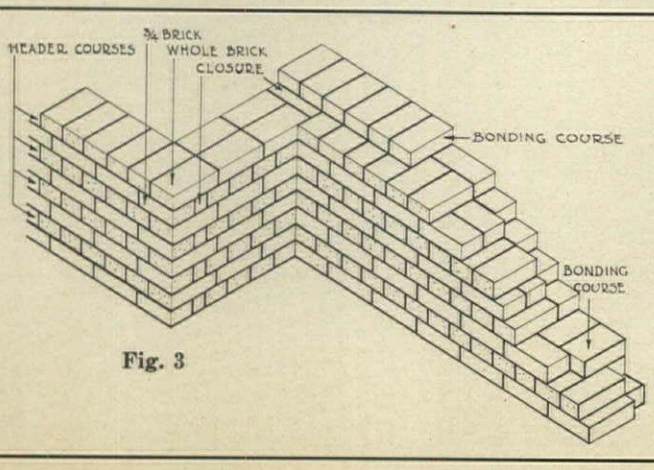


Fig. 3

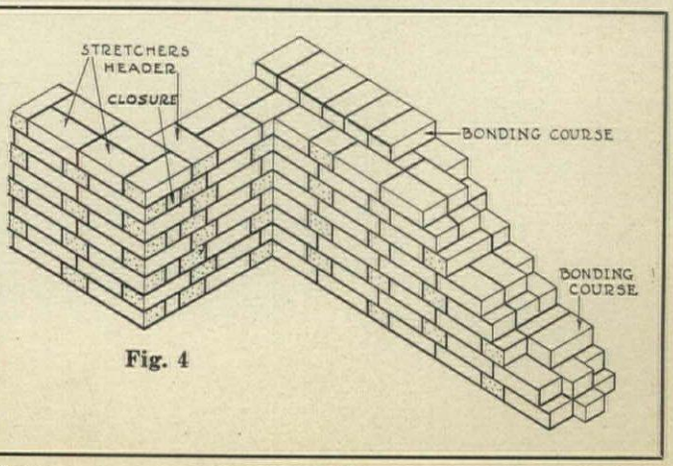


Fig. 4

angular area of the brick which projects beyond the backing thus forming a bond which, although sufficient to tie the facing to the backing, will not permit the facing to be included in the total thickness of the wall when figuring its bearing capacity. Thus the wall here illustrated (Fig. 1) should be classed as an 8-in. wall when figuring its strength, because the bond between the facing and the backing is inadequate. The same objection holds true in the case of walls in which the facing is tied with metal ties (Fig. 2) which, in addition to having uncertain bonding strength, are also liable to rust away. Neither diagonal bonding nor bonding by means of metal wall ties can be classed as first class construction.

The best method of laying a wall in this bond is to build it in a similar manner to common bond, with a few courses of stretchers followed by a course of headers, but with the mortar joint between each pair of headers colored the same shade as the brick, thus forming a "blind" joint that is practically invisible, and giving the effect of a course of stretchers. This is, of course, camouflaged common bond and when using it the facing brick bears its proper portion of the load and such construction is thoroughly sound. It is also obviously cheaper than diagonal bond which requires a great deal of cutting of brick.

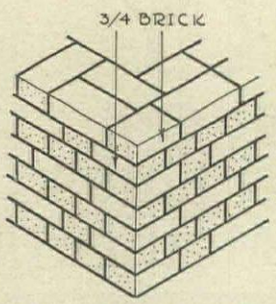


Fig. 5

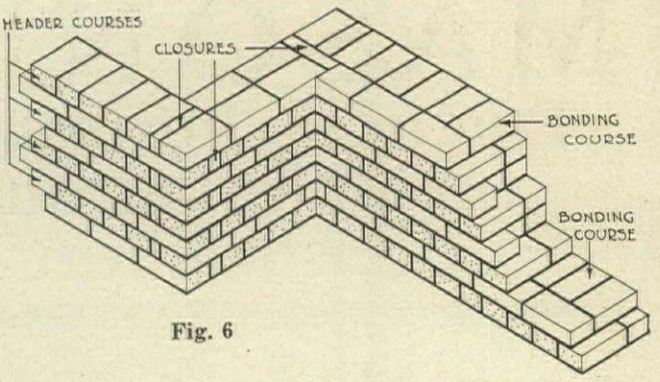


Fig. 6

English Cross or Dutch bond is shown in the diagram above. Note two ways of starting corners

English Bond—English bond is composed of alternate courses of stretchers and headers, the joints in each stretcher course coming vertically over each other. There are two methods of starting and ending English bond at the corners, each being illustrated in Fig. 3. The joints at the ends of the stretchers must, of course, center on the headers above and below. If, starting at the corner, a course of stretchers were laid, and over it a course of headers, the joints would coincide vertically and there would be no bond. The first method of overcoming this, shown on the right of the corner, is to introduce a "closer" (a header clipped in half) in each header course. The other method, shown on the left of the corner, is to omit the closer, but to make each stretcher at the corner a three-quarter brick. Each method is sound structurally, appearance being the deciding factor in making the choice, but some designers feel

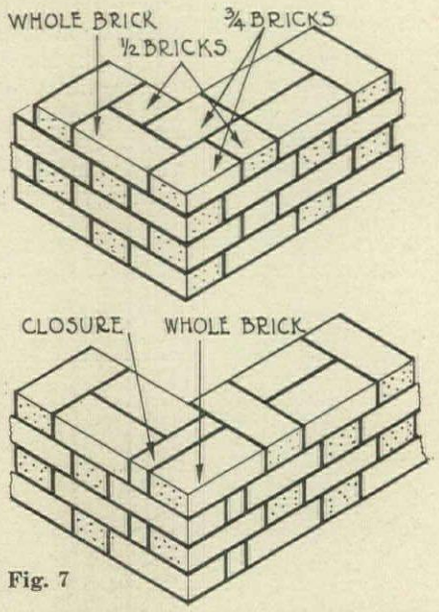


Fig. 7

At left are diagrams for Flemish bond. Below Fig. 9 is double Flemish bond in which the stretchers are doubled with a blind joint between

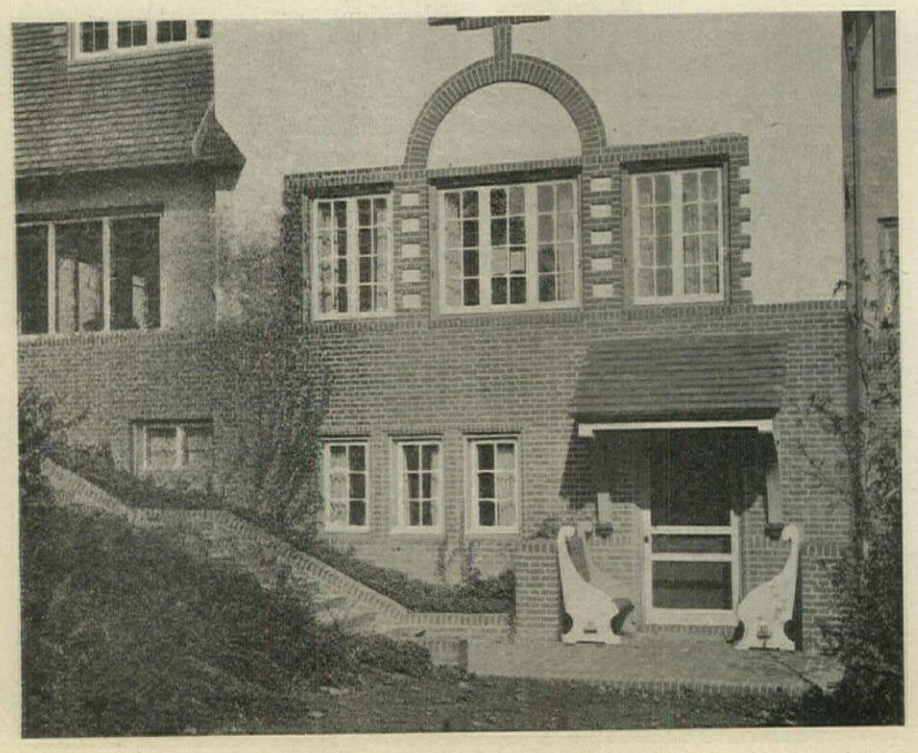
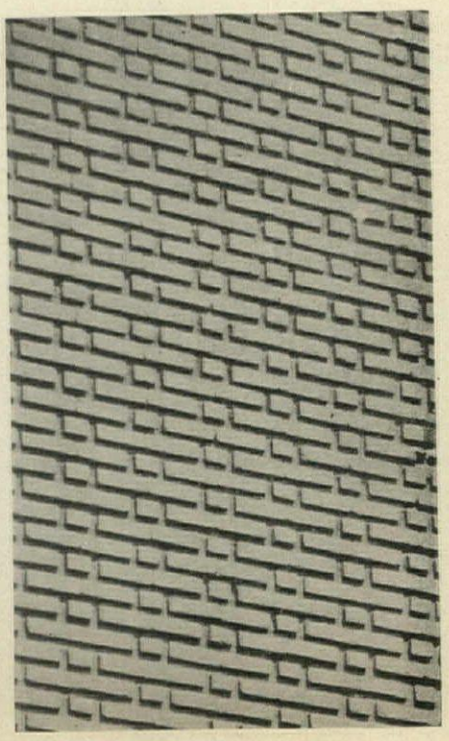
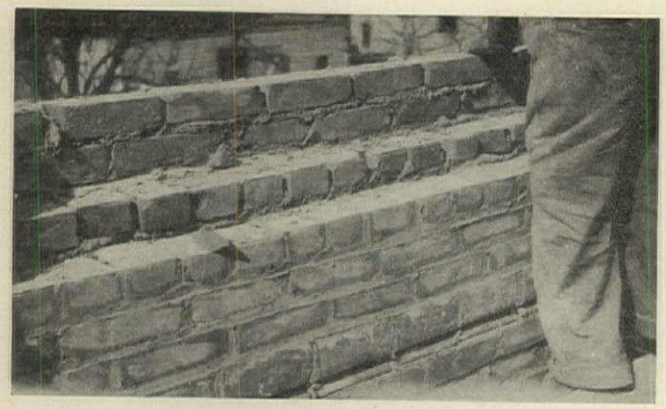


Fig. 8. An attractive combination of brick and stucco. This work is laid in Flemish bond. Edward L. Palmer, architect





Staggered header courses in 12-in. wall at left and raking joints at right. The horizontal joints will be blind, giving long, vertical lines

that the corner without closers makes the strongest looking wall.

English Cross Bond—While English bond, carefully laid, results in a wall of very pleasing and neat appearance, it is possible by a little variation to vastly improve its effect and introduce a patternwork of Greek crosses over its surface by making the stretcher courses break joint, and thus form English Cross or Dutch bond. An examination of the diagram, Fig. 6, will illustrate clearly what is meant, the joints at the ends of the stretchers in the bottom course being found to center on the stretchers in the next stretcher course. There are also two methods of starting this bond at the corner—one method being shown by Fig. 5, and the alternative by Fig. 6. By using the method shown in Fig. 5 all cut brick "closers" are eliminated. A full header closer in each alternate stretcher course is necessary in any case and there is little doubt that the corner gains in appearance by the avoidance of closers in each header course.

According to the method shown in Fig. 5, assuming the first course to be all headers, the next course starts with a three-quarter brick, followed by a full header, the remainder of the course being all stretchers until the other corner is reached. The next course is an all header course, followed by a course of stretchers, but starting with a three-quarter brick on the corner. In other words, every stretcher course starts with a three-quarter brick placed at the corner and in every *alternate* stretcher course the three-quarter brick is followed by a full header placed as a closer.

By the second method, shown in Fig. 6, again assuming the first course to be a header course, a header is placed at the corner, followed by a "closer" and continued as a regular header course. The next course starts off with a full stretcher, followed by a full header used as a closer, the remainder of the course being stretchers. The next course is composed of headers with a closer as before, and is followed by a course of stretchers without a closer. In this method every header course contains a closer, and every stretcher course starts off with a full stretcher, which is followed in alternate stretcher courses with a header used as a closer.

Flemish Bond—This is a deservedly popular bond among builders, easy to lay, and having a very artistic appearance as shown in Fig. 8. It is formed by laying headers and stretchers alternately in each course, the headers centering on the stretchers in the courses above and below. In this bond also it is possible to start the corners so that the use of closers may be avoided. The upper part of Fig. 7 illustrates this clearly. Starting to the right of the corner, a header is first laid, fol-

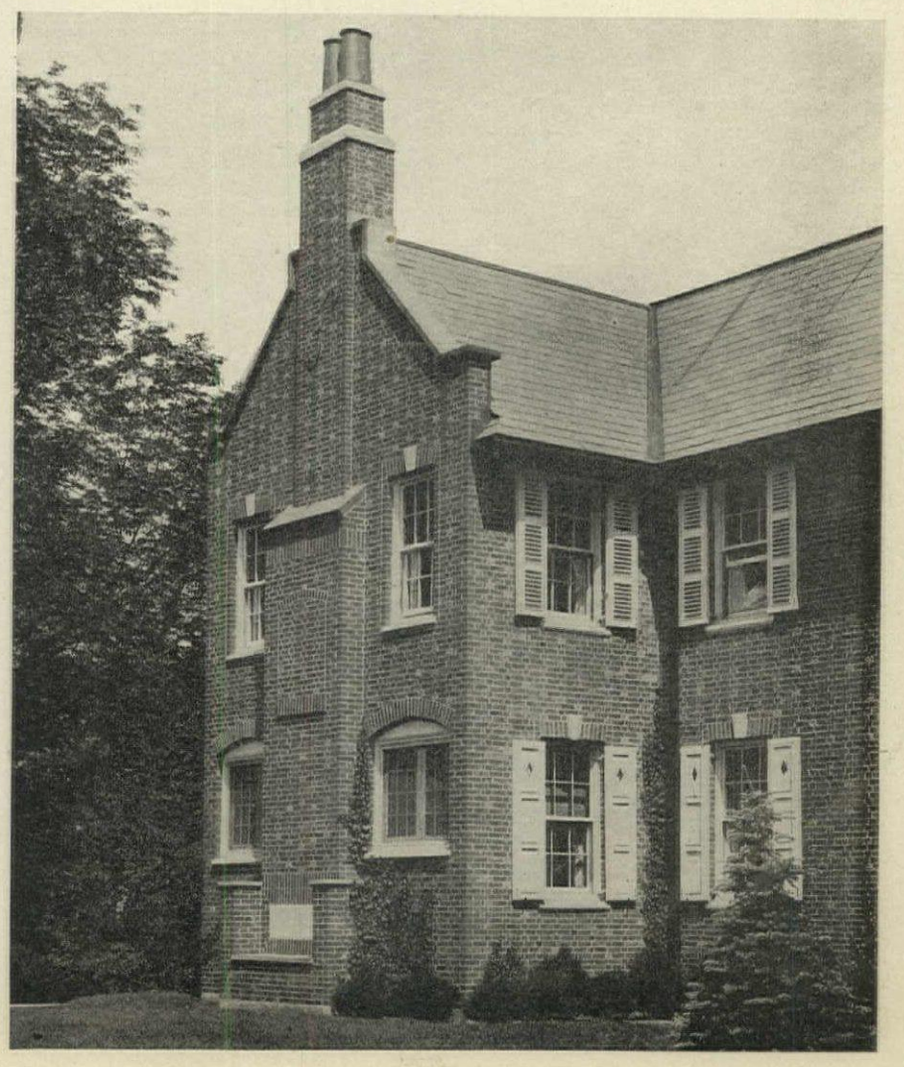


Fig. 10. Note pleasing effect of Garden Wall bond. Headers are dark and two stretchers come between them. Frank Chouteau Brown, architect

lowed by a stretcher, then a header, etc. The next course is started with a three-quarter brick, followed by a header, then a stretcher, etc. In the lower example the bottom course starts with a header, then follow closer, stretcher, header, stretcher, etc. The next course starts with a full stretcher, then a header, stretcher, header, etc.

It will be noted that with all the bonds here illustrated the back of a 12-in. wall is laid in common bond. The three bonds just described—

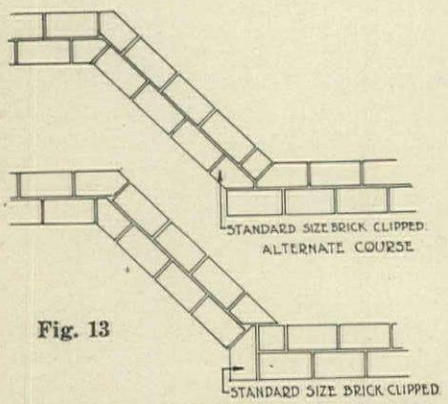


Fig. 13

The best method for an obtuse angle

Running, English and Flemish bonds —are the three fundamental bonds in which all brick are laid. Endless variations can, however, be worked out, using these bonds as a basis, but the builder cannot go wrong if he sticks to the bonds described. One caution is necessary—never put a closer right on the corner with any bond. To do so is not only structurally incorrect but makes a weak looking corner. A three-quarter brick is permissible, but use nothing less than a full header.

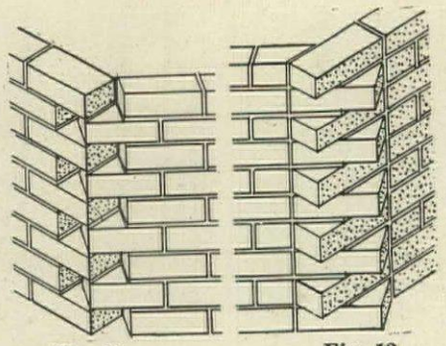


Fig. 11 Fig. 12

Methods of building angles—the one on the right shows better practice

Double Flemish Bond—This term was in years past used to describe a wall with each side exposed, each face showing Flemish bond. Latterly it has been used to describe a variation of the ordinary Flemish bond shown here which, instead of having a single stretcher between headers, has two stretchers in that position, but with a blind joint between them. This is shown in Fig. 9. The blind joint between the stretchers constitutes the sole difference between Double Flemish bond and Garden Wall bond.

Garden Wall Bond is a variation of Flemish bond, but has from two to four stretchers between headers, the vertical joints being typical joints, not "blind" joints. This is shown in diagram Fig. 4 and in illustration in Fig. 10.

Angles and Corners—These are rather expensive to form and most builders nowadays avoid features which tend to increase costs. The type of angle shown by Fig. 11 which involves the leaving of "pigeon holes" in the wall, should be avoided as such openings allow the lodgement of dirt which may streak down the wall after rain. Of the two, we recommend the detail shown by Fig. 12. A better detail is shown by Fig. 13. A method of forming an acute corner is shown by Fig. 14. This applies to any bond.

Bands—Bands and trim of stone are often used effectively with brick, but should be selected with some care and strongly contrasting effects

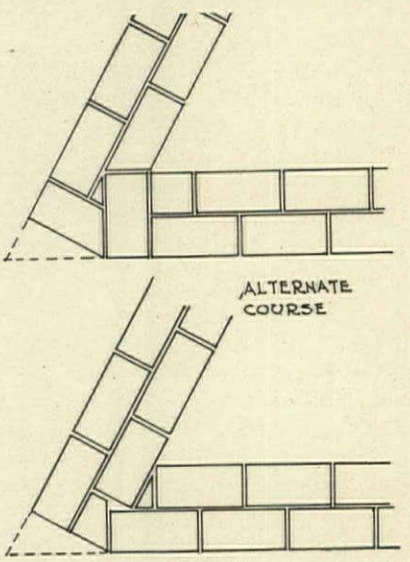
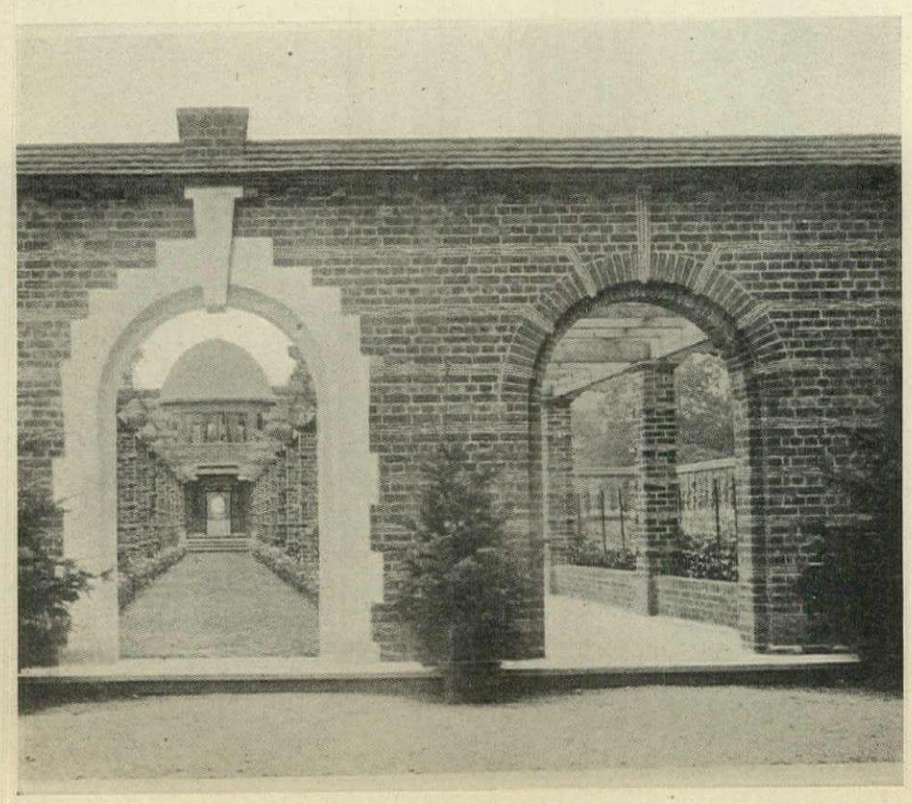


Fig. 14

Best construction for acute angles

avoided. It is possible to spoil a design by selecting a stone that stands out too strongly, thus making the building too "spotty." With a dark brick especially a very light stone should not be selected. A type of band or "string course" much used in Europe but seldom if ever seen here, consists of using pieces of broken roofing tile set in mortar joints the same width as used for the brick, here illustrated. This makes a very agreeable and appropriate trim for brickwork, recalling in its texture something of the brick itself. Such bands are rather expensive to lay, however, which fact will be appreciated when it is remembered that each piece of broken tile takes almost as long to lay as a brick.

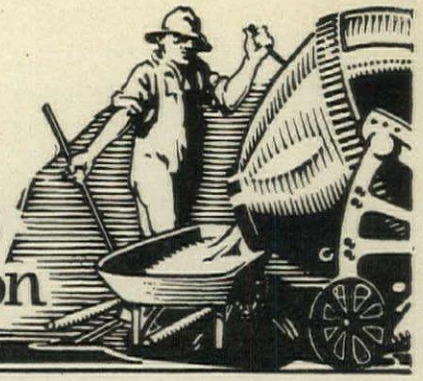


Courses of tile laid flat-wise make interesting decoration as in this English garden wall

NOTE: Figs. 1, 2, 3, 6, 7, 11, 12, 13, 14 are reproduced from "A Manual of Face Brick Construction," by the courtesy of the American Face Brick Association.

CONCRETE

Form Work-Reinforcing Methods Monolithic and Block Construction



Light Weight Concrete Roofs without Forms

By a Member of the Staff

TELEPHONES, automobiles, wireless, aeroplanes—these are the things that occur to most people as symbolic of rapid strides made in modern life. Yet there are other fields which have had developments just as extraordinary though possibly not so spectacular.

The prosaic building industry, which gets scant attention from the average man, has probably brought out more new ideas and improvements in the last quarter of a century than in all the years of its long previous history. The mere suggestion of what some of these are will confirm the truth of this statement — skyscrapers, sanitary plumbing, reinforced concrete, daylight factories, standardization, elevators, fireproof construction, steam heat and modern lighting. One need only go through the districts constructed a generation ago to realize the radical changes that have taken place in building methods and results.

As indicated, reinforced concrete belongs strictly to the modern age of construction. Two decades ago reinforced concrete was practically unknown for general use. Today hardly a job of construction goes on without using it, more or less, from the small reinforced concrete porch in the home to the immense industrial plant built entirely of it. In this specialized field many systems and products have been developed to meet most efficiently and economically certain requirements and our purpose here is to tell of one of these interesting developments.

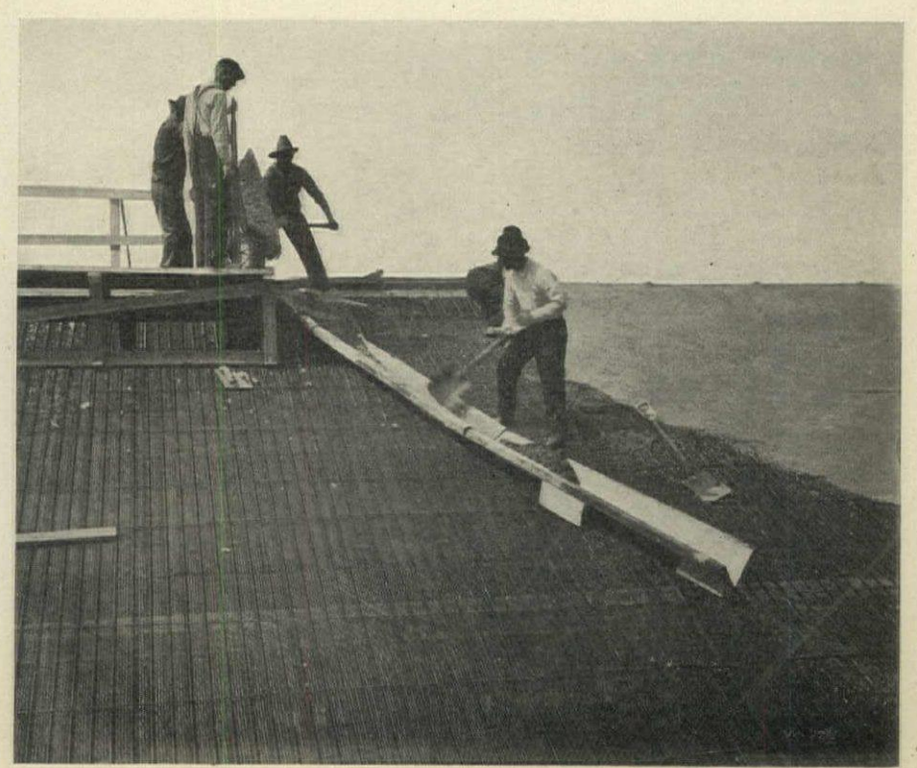
As is generally known, the ordinary types of reinforced concrete are built with forms which are left in place until the concrete has properly set. Such construction is of course ideal for general types of buildings, but there are many cases where the difficulty of providing forms makes the expense of the construction almost prohibitive. Take, for instance, the case of a roof located 20 or 30 ft. above the floor, such as frequently occurs in factory buildings. The expense of providing suitable false work to build a concrete roof would of course be very great. Other cases occur in roofs of all kinds, including those which have irregular angles, dormers, etc., which would make the necessary form work very complicated.

An additional requirement of roofs is comparatively light weight. The ordinary types of reinforced concrete are built with slabs 4 ins. in thickness and upwards. Now, the actual loads of wind and snow coming on a roof are never figured over from 30 to 40 lbs. per sq. ft. It is unnecessary, therefore, to provide a heavy construction of which the dead weight alone is 50 lbs. and upwards. This dead weight, in fact, is more than the live load it is required to carry.

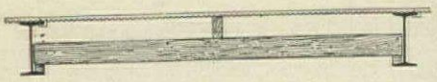
Elimination of forms and light weight, combined with fireproofness and permanence, were the urgent demands in roof construction. Naturally specialists in this field saw the need and manufacturers worked on products to meet it. Probably the first material of this kind developed was a product consisting of deep ribs spaced about 4 ins. on centers with an expanded metal lath between them. Ribs and lath are manufactured and formed from the same sheet of steel and there are now many products of this nature on the market.

The ribs in these products are usually about 5/8 in. to 1 in. in height and give great stiffness.

The use of metal mesh eliminates the danger of misplacing reinforcement when concreting



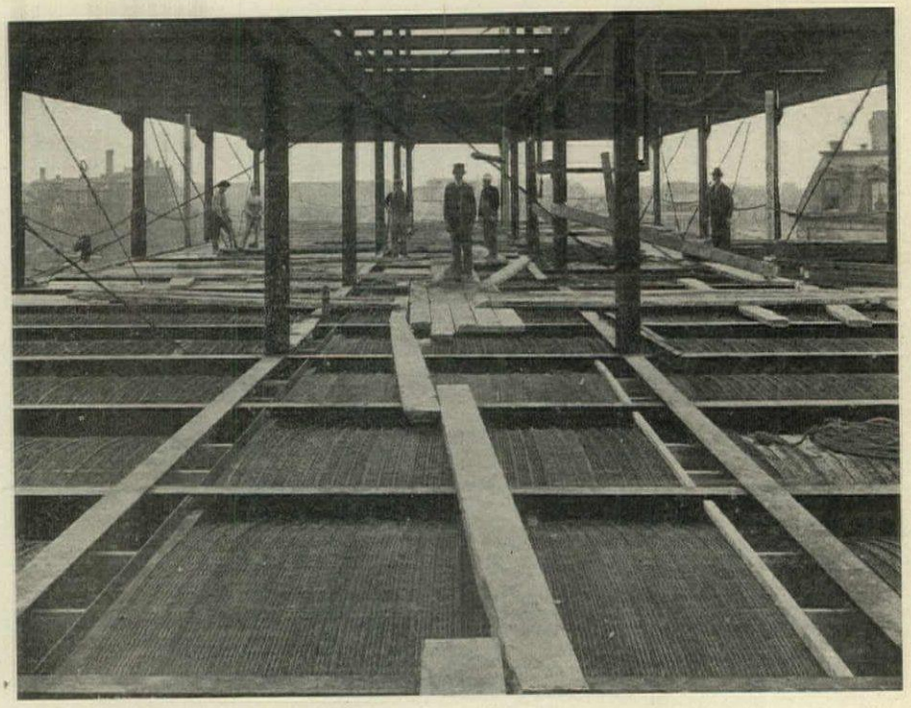
When these sheets are laid over the purlins they will carry the weight of the wet concrete over a considerable span, the ribs giving the requisite strength and the mesh holding the concrete and preventing it from falling through. When the concrete has set the ribs and mesh reinforce the slab, making a complete reinforced concrete construction. The under side of the slab can



In long spans a temporary wood support between beams is needed

then be readily plastered for fire protection and finishing. We thus have in these materials a combined reinforcement and forms. The thickness of the concrete is comparatively thin, assuring light weight. Thus are met the essential requirements of a permanent, fireproof roof construction—the elimination of forms and light weight.

The building of a roof of this kind is so simple as to be almost self-evident from the accompanying illustrations. The materials are usually furnished in large sheets which are easily handled, usually about 24 ins. wide and in standard lengths of from 6 to 12 ft. These sheets are merely laid over the purlins or roof members. In the case of structural steel they are fastened by means of special clips furnished by the manufacturer; to wooden members they are nailed, and with reinforced concrete they are an integral part of the construction.

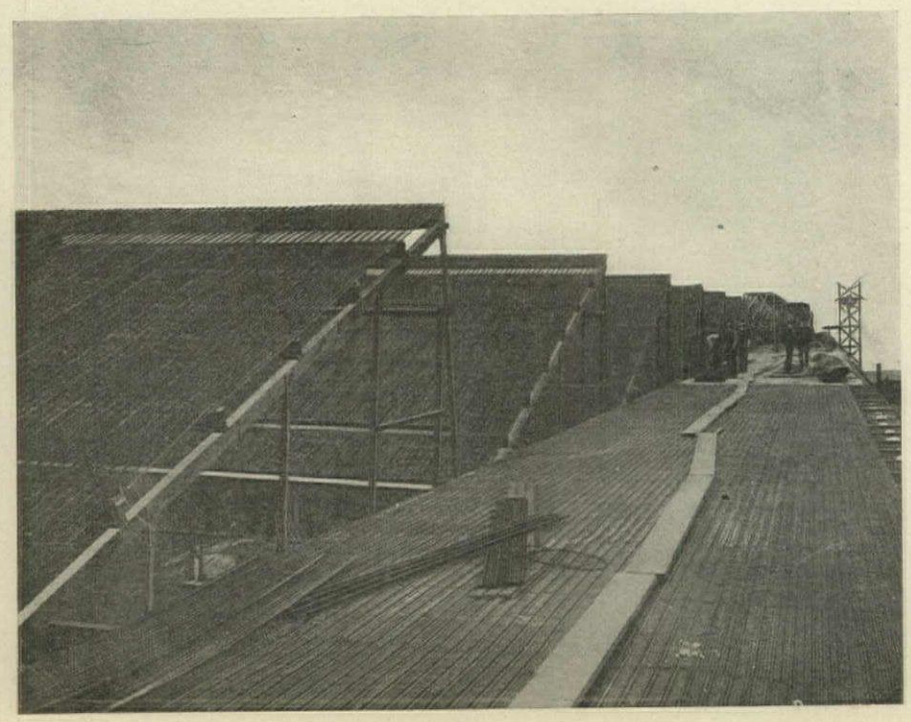


Simple form of concrete floor where metal reinforcing mesh spans without forms the distance between beams. The metal sheets are supplied bent to any degree and their edges rest on the flanges of the steel beams

The sheets interlock along their sides and ends, making a continuous reinforcement of uniform strength in all directions. The interlocked ribs are wired together every 24 ins. along the sides and at each rib at the ends. Sheets should be lapped 2 ins. where splices occur over the supports, otherwise every 8 ins. The attachment to the roof framing should be ample to hold the construction in place, and of course depends somewhat on the slope of the roof. However, attachments should occur at the interlocking side splices every 8 to 16 ins. apart.

The ribbed materials will span a reasonable distance as centering without any support. However, they are quite frequently used on roof spans of greater length. In such cases a temporary support should be provided in the span. The illustration indicates one method of providing this temporary support, which is readily seen to be of the simplest kind. In the tables there are also noted the maximum span on which these materials will carry various thicknesses of concrete. Carrying capacities of the slabs after the concrete has set are indicated. Of course it is self-evident to anyone that these same materials can be used with equal success for carrying greater loads, and in fact have been used very extensively, in floor construction.

An interesting development in these ribbed materials is the fact that they can also be furnished in curved sheets. This permits of arched construction which may be desired either for architectural effect or additional strength. Not only are the ordinary segments of circles furnished but the sheets can also be provided with the center part flat and the ends curved. This latter construction often works out very



For roofs with light loads such as factory saw-tooths expanded metal reinforcing with light steel framework enables construction to proceed rapidly. The mesh supports the wet concrete without forms

CARPENTRY

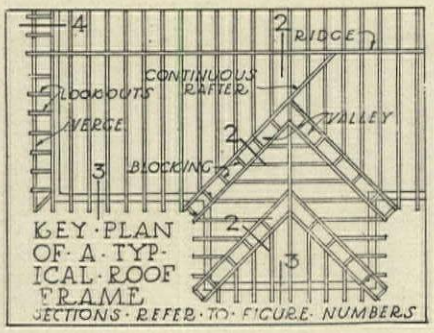
Good Practice in Frame Construction and Finish

"Thatched Roof Effects" with Shingles

By a Member of the Staff

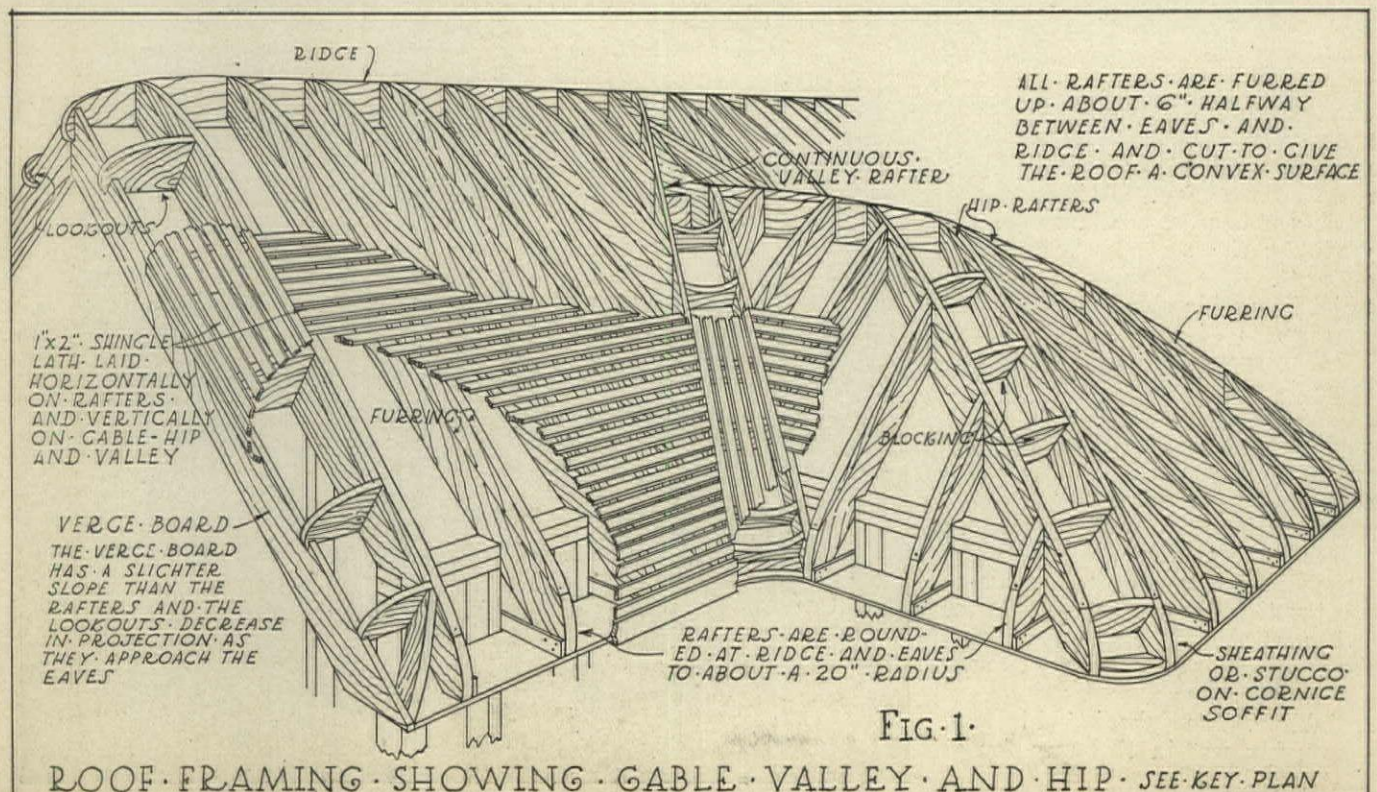
USING shingles to produce what is sometimes called a "thatched roof effect" is not done with the idea of making a modern shingle roof look like a 16th century thatched roof but to secure, by a means quite legitimate, something of the picturesque irregularity of outline and surface which makes the thatched roofs of old English cottages so attractive. There is no idea of making one material look like something else for no one could possibly mistake a shingle roof for one of thatch.

To use shingles in this way is not particularly difficult when once the method of treatment is thoroughly understood. To begin with, the entire surface of the roof must be given a slightly convex surface which



is best done by furring the top of each rafter from 4 to 6 ins. in height at the center of the rafter, gradually diminishing the furring until it disappears entirely at the eaves and at the ridge. Shingle lath are then applied horizontally at about 3 ins. on centers.

Especial care must be taken with the furring at the gable ends of a roof by using 1 x 2 shingle lath running with the roof rafters which will carry the generally convex lines of the roof to meet the hanging verge board. At the rounding of the gable the furring is brought well forward over the verge board and then returned against it by forming, in section, the arc of a circle (Fig. 4). This rounding of the edges of the roof at the gables is greatest at the apex of the roof and diminishes gradually toward the eaves. Sometimes, when it is desirable to have a decided softening of the gable, the roof rafters are set lower at the ridge for a distance of 3 or 4 ft. back from the verge board. To get the best results in such instances the curve at the verge boards should be sudden or abrupt. The valleys and hips are constructed with two rafters blocked apart. This blocking is cut



FIG·1·

ROOF·FRAMING·SHOWING·GABLE·VALLEY·AND·HIP·SEE·KEY·PLAN

Safe Loads in Pounds per Square Foot for Slabs Reinforced with 15/16" Material

(Safe loads include weight of slab. For safe live loads, deduct weight of slab.)

Thickness of Slabs above Base of Material	Gauge No. 15/16" Material	Moment of resistance per foot of width	SPAN IN FEET								
			3	4	5	6	7	8	9	10	11
2" thick slab Wt. =24 lbs. per sq. ft.	28	3533	327	185	117	82					
	26	4241	392	221	141	97					
	24	5647	522	294	188	132					
2½" thick slab Wt. =30 lbs. per sq. ft.	28	4590	424	239	153	106	78	59			
	26	5513	510	287	183	127	93	71			
	24	7346	681	383	245	171	125	95			
3" thick slab Wt. =36 lbs. per sq. ft.	28	5648	522	294	187	131	96	73			
	26	6773	627	353	225	158	115	87	69		
	24	9023	835	469	300	209	153	117	91		
3½" thick slab Wt. =42 lbs. per sq. ft.	28	6705	620	349	220	155	113	87			
	26	8044	742	417	268	186	137	104	82		
	24	10721	992	558	356	249	182	140	110	89	
4" thick slab Wt. =48 lbs. per sq. ft.	28	7763	718	403	259	180	132	101	80		
	26	9304	864	485	310	216	158	121	97	77	
	24	12409		644	413	288	212	162	128	103	86

B. M. = $\frac{1}{16}$ wl². For B. M. = $\frac{1}{12}$ wl², add 20% to above loads. For B. M. = $\frac{1}{18}$ wl², deduct 20% from above loads.

Maximum Spans for 15/16" Material as Centering to Support Wet Concrete

Maximum Spans for Centering	Gauge No. 15/16" Material	Thickness of Slabs above Material.
3'-3"	28	2" thick slab Wt. =24 lbs. per sq. ft.
3'-6"	26	
4'-0"	24	
3'-0"	28	2½" thick slab Wt. =30 lbs. per sq. ft.
3'-3"	26	
3'-8"	24	
2'-9"	28	3" thick slab Wt. =36 lbs. per sq. ft.
3'-0"	26	
3'-4"	24	
2'-6"	28	3½" thick slab Wt. =42 lbs. per sq. ft.
2'-9"	26	
3'-0"	24	
2'-4"	28	4" thick slab Wt. =48 lbs. per sq. ft.
2'-6"	26	
2'-10"	24	

For greater spans use temporary supports.

Safe Loads in Pounds per Square Foot for Slabs Reinforced with 13/16" Material

(Safe loads include weight of slab. For safe live loads, deduct weight of slab.)

Thickness of Slabs above Base of Material	Gauge No. 13/16" Material	Moment of resistance per foot of width	SPAN IN FEET								
			3	4	5	6	7	8	9	10	11
2" thick slab Wt. =24 lbs. per sq. ft.	28	3000	277	156	100	69					
	26	3625	356	189	122	84	61				
	24	4775	441	249	159	110	81	63			
2½" thick slab Wt. =30 lbs. per sq. ft.	28	4000	371	209	134	93	68				
	26	4750	440	248	159	110	80	60			
	24	6550	578	325	209	145	106	82			
3" thick slab Wt. = 36 lbs. per sq. ft.	28	4925	455	255	164	104	84	64			
	26	5790	545	305	196	135	100	76	60		
	24	7750		402	257	179	131	101	79	64	
3½" thick slab Wt. =42 lbs. per sq. ft.	28	5800	546	307	196	137	102	78	61		
	26	7000	644	365	234	163	109	92	73		
	24	9210		481	308	214	157	120	95	76	
4" thick slab Wt. =48 lbs. per sq. ft.	28	6845	632	355	228	158	116	89	70		
	26	8125		422	270	188	138	105	84	68	
	24	10750		562	359	250	183	140	101	90	

Maximum Spans for 13/16" Material as Centering to Support Wet Concrete.

Maximum Spans for Centering	Gauge No. 13/16" Material	Thickness of Slabs above Base of Material
2'-9"	28	2" thick slab Wt. =24 lbs. per sq. ft.
3'-0"	26	
3'-6"	24	
2'-6"	28	2½" thick slab Wt. =30 lbs. per sq. ft.
2'-9"	26	
3'-3"	24	
2'-4"	28	3" thick slab Wt. =36 lbs. per sq. ft.
2'-8"	26	
3'-0"	24	
2'-2"	28	3½" thick slab Wt. =42 lbs. per sq. ft.
2'-6"	26	
2'-10"	24	
2'-0"	28	4" thick slab Wt. =48 lbs. per sq. ft.
2'-3"	26	
2'-8"	24	

satisfactorily with either structural steel or reinforced concrete beams. The ends of the sheet curve down so as to form the sides of the beams. In this way the only form work necessary for the entire floor construction is the boards required at the bottom of the beams. Economy and speed of construction are assured. The curved materials are fabricated in the factory, thus eliminating all field work and saving expensive curved forms.

The operation of concreting itself does not differ from ordinary concrete construction. Runways, consisting of boards, are laid over the mesh for the use of wheelbarrows or carts. The stiffness of the material is considerable, presenting all the aspects of a sheathed job. A 1:2:4 mixture of cement, sand and stone is used, with stones not exceeding 1/2 in. in diameter. A medium wet mixture is used; not the sloppy wetness that is often seen on a job nor too dry but just wet enough so that water will come to the surface when the concrete is tamped. As in all good concrete construction, the concrete work after it has set should be protected from too rapid drying by means of damp burlap or canvas or by frequent sprinkling. The slabs should be kept thoroughly wet in this way for at least two days.

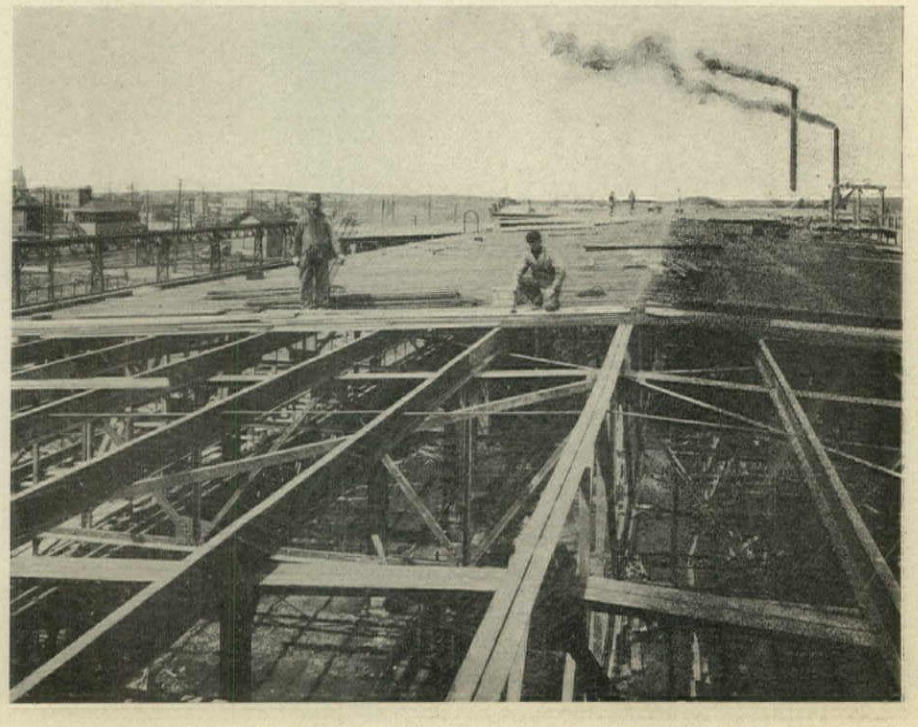
It will be found that just enough of the concrete has bulged through the mesh to provide a perfect surface and key for the plastering of the under side. This can be done any time after the concrete has set.

Any of the standard types of plastering materials may be used. We would recommend, in this connection, the use of the standard mixture of Portland cement 1 part, sand 3 parts and lime paste 1/10 part. The cement and hydrated lime, after being thoroughly mixed dry to a uniform color, should be added to the dry sand and the whole manipulated until evenly mixed. Add enough water to secure proper working consistency and sufficient long cow hair for key. This mortar should be applied within 30 minutes from the time of mixing.

Where the construction is used on roofs over 200 ft. in length, at right angles to the main ribs, expansion rods should be placed over the ribs and at right angles to them. 7/32-in. or 1/4-in. round rods are satisfactory for this purpose and should be spaced 30 ins. on centers.

The use of this light weight, formless, concrete roof construction is not limited to any type of building. It has been used for large areas of industrial plants, as indicated in the illustrations, and it has proven equally satisfactory in the smallest bungalow or garage. The extreme flexibility and simplicity of the material make it a product of practically universal usefulness. Furthermore, these materials are being stocked locally in all principal distributing centers so that it is a simple matter for the builder to secure either large or small quantities as he may desire. This method of construction has a record of successful use for over a decade, so that the builder can use it with entire confidence of success.

Factory roof showing metal mesh being applied to steel purlins

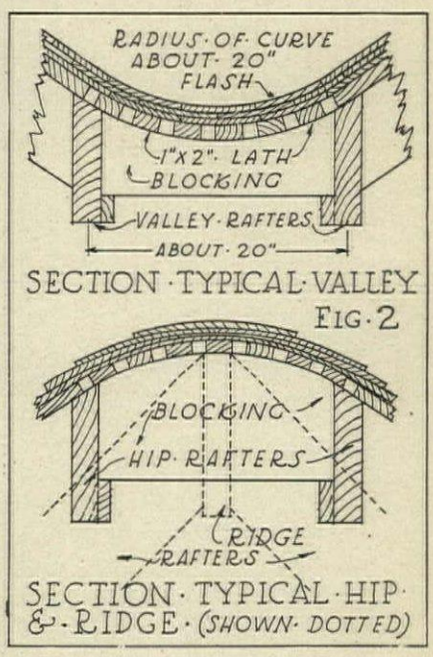


A thatched roof effect with mineral surfaced asphalt shingles. Note the texture given by the torn edges

to form a concave surface in the case of the valley and a rounded surface in the case of the hips. The construction for a typical roof is shown in Fig. 1 and for the valley, hip and ridge in Fig. 2, while the construction for cornice or eaves is shown in Fig. 3.

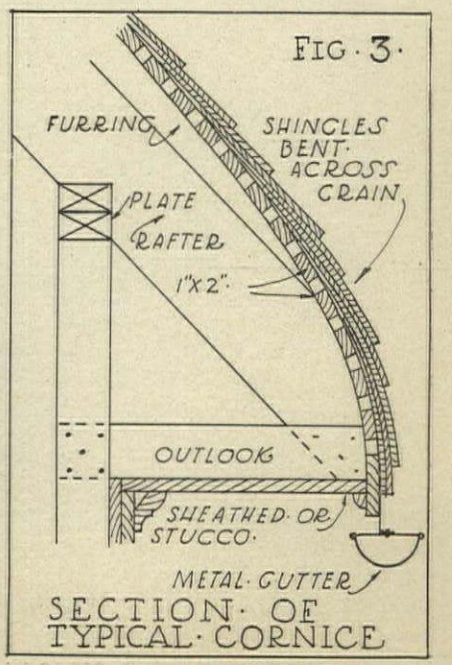
Instead of following long horizontal lines the shingles must be laid out of the horizontal in long and irregular "waves" so that the exposed courses will vary in width from 1 in. to 5 or 6 ins. The edges of the butts should be cut to a curve and matched one to another so that these long, sweeping curves may be evenly laid. In laying shingles in this way the best effect is had when the "wave crests" and "hollows" come, to some extent, in a diagonal instead of in a vertical axis. It is generally unwise to leave such laying of shingles entirely to the workmen unless they are well trained, so when two courses of shingles have been started at the eaves with their butts together the foreman or the builder himself should use a soft pencil to draw the long, sweeping, curving lines to which the shingles should be laid.

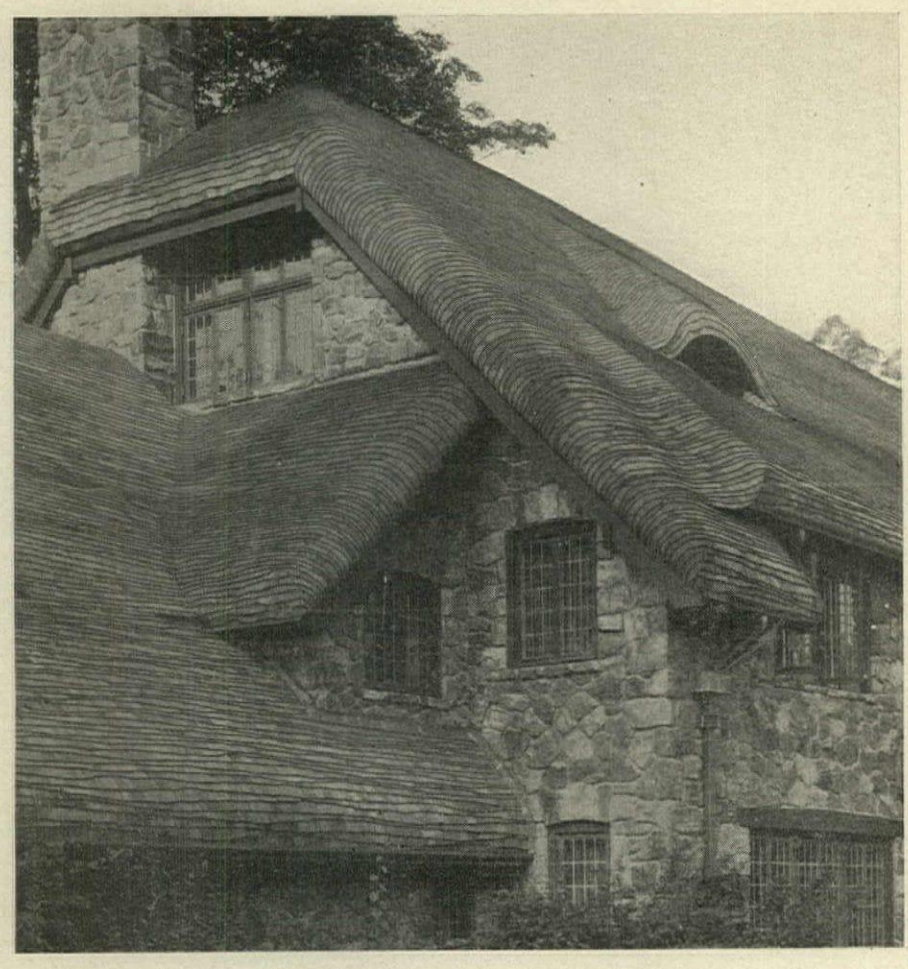
Wooden shingles need be steamed or wet only when laying the rounding at the gables or for sudden turns



A roof with dormers breaking the plate in the manner of English cottages. W. Stanwood Phillips, architect

Gable showing sharp curve to verge board diminishing as it reaches the eaves. W. D. Austin, architect





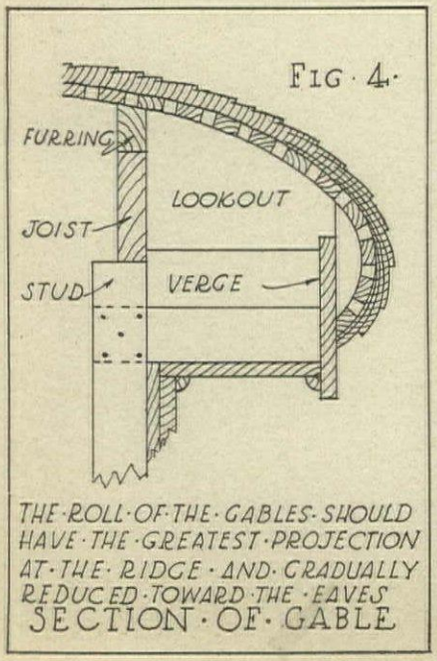
A complicated roof which shows methods to fit various conditions. W. Stanwood Phillips, architect

in the angles between the side walls of a dormer and the surface of a roof. Most wooden shingles are brittle when dry but when wet or steamed can be made to bend to almost any extent likely to be required. The demand for roofs of this character has led to the making of shingles which may be had already bent to almost any degree likely to be needed and with the edges of the butts properly cut. When wooden shingles are being used care must be taken to nail the shingles thoroughly in place so that when they become dry their tendency to straighten out will not pull the nails out of place. Mineral surfaced asphalt shingles have lately been used with good effect on these roofs and because of their being more flexible than wood they present little difficulty. In using them added interest is given the roof if the edges are torn as shown in one of the illustrations which can be easily done in a clamp.

There are several methods of treating the ridge cap when wood shingles are used but perhaps the best method is to cover the cap with metal, carried down at gable ends to within about 2 ft. of the verge board. The objection may be made that metal will weather to a color different from the shingles but the flattening out of the ridge will make the metal covering practically invisible from the ground. Another method of covering the ridge is to use shingles bent *with* the grain. This, of course, requires considerable care in nailing the shingles into place.

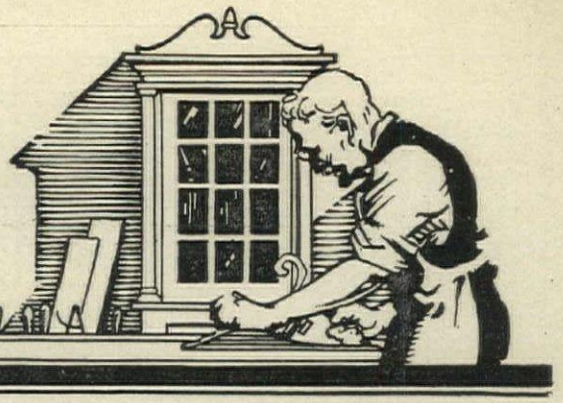
A roof shingled in this way requires the use of more shingles than if they were laid in the usual manner, usually from 50 to 60% more, but, apart from its decided advantages in the way of appearance, a credit item should be entered on the ledger in favor of the thatched roof method by reason of the longer wear of the shingles. When laid in the customary way a shingle is exposed to the weather for about 5 ins. so it is self-evident that a far longer term of service may be obtained from a roof in which the shingles have an average exposure of only about 3 ins. to the weather. It is claimed that a shingle roof of a good quality of shingles and laid in this manner should give good service for 40 years.

A hip roof in which a modified form is used. The curves are slight and the shingles spaced wider for economy. Alfred Busselle, architect



SHOPWORK *and* FURNITURE

Designs for the Finish Man



China Cupboard with Case of Drawers

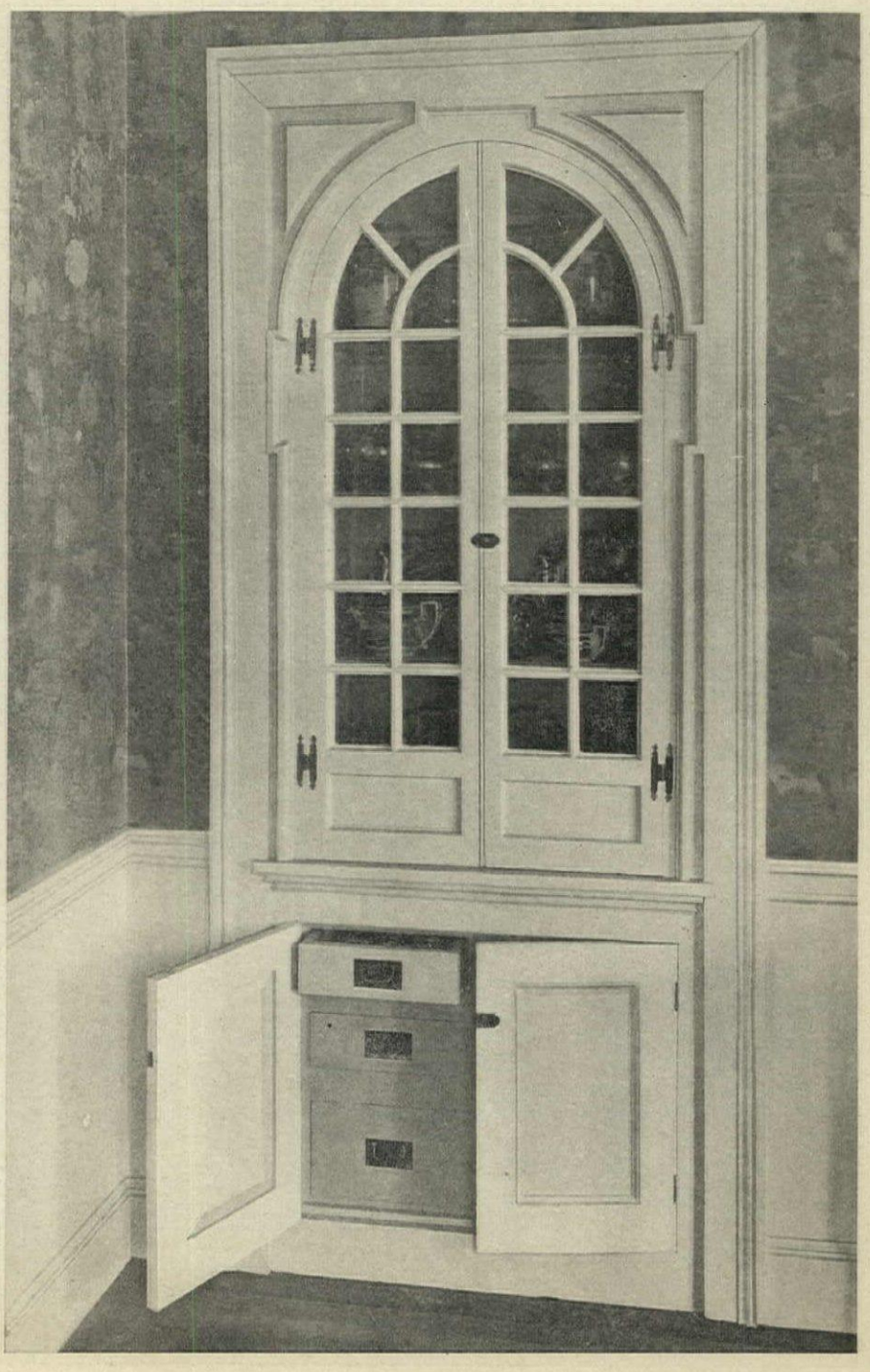
With special drawings from design by
Grandgent & Elwell, Architects

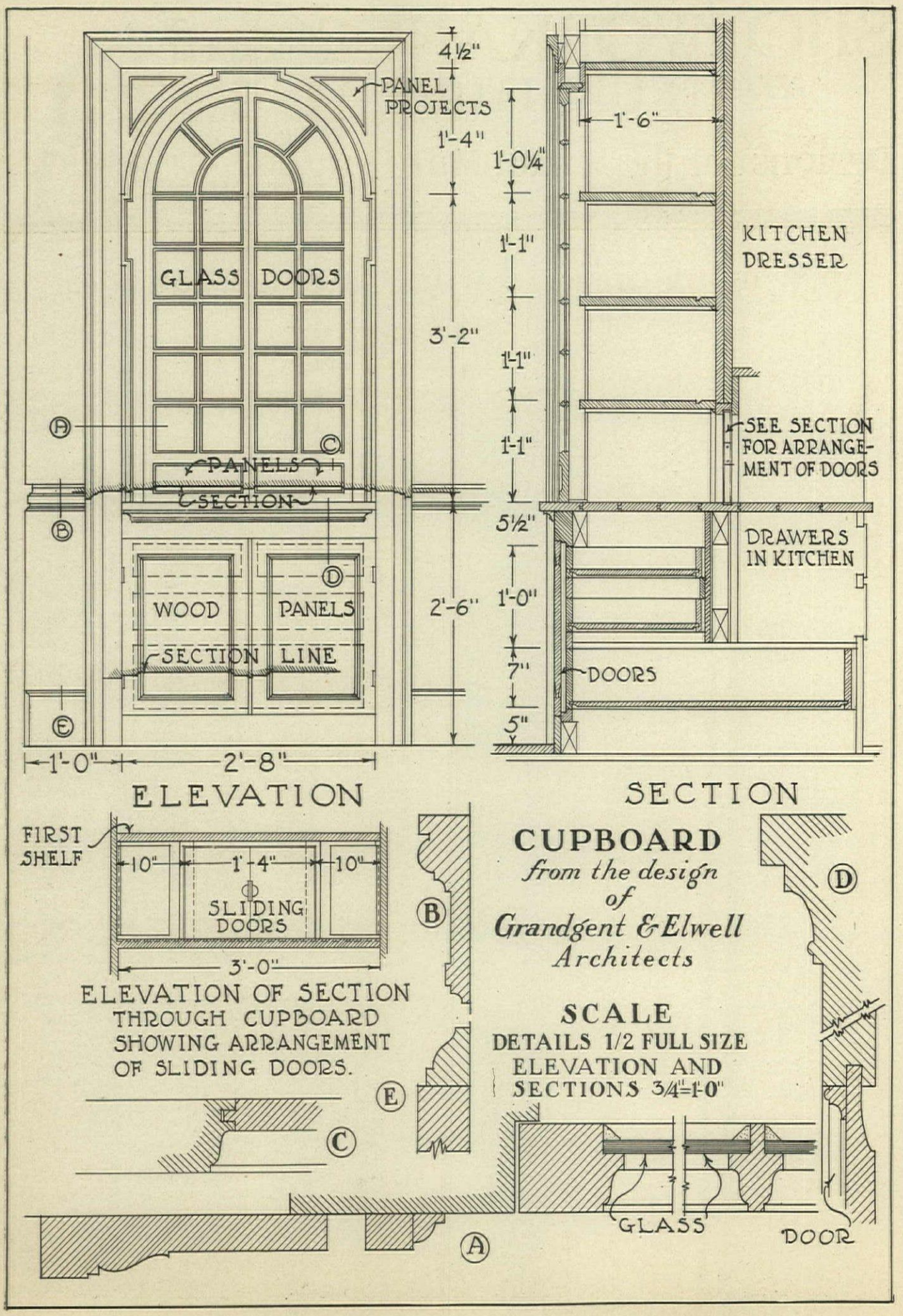
A CHINA closet is today a necessary feature of the well equipped dining room. In addition to providing an attractive note to the room it is of practical use and in small houses often takes the place of a sideboard, particularly when it is fitted with drawers for the storage of linen.

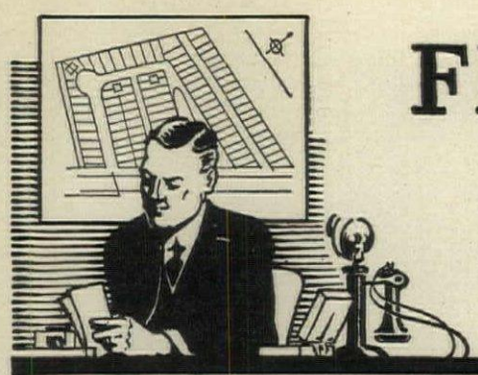
The cupboard illustrated here is unique in that it has been built in connection with a kitchen dresser, both cupboards being placed back to back. It is simply constructed with the regular room trim enclosing it; a single moulding placed near the jamb of the doors follows the curved top of the doors and breaks into "ears" to give a decorative touch. Note that the shelves and muntins are arranged to come at the same levels. A sliding door in the partition between the cupboards makes it possible to pass dishes through from the kitchen.

This would make such a cupboard particularly valuable where, for the sake of economy, a pantry has been omitted.

The construction of drawers is an important detail and a word here about good methods to use may not be amiss. In the first place the cases containing them should be made so there is only sufficient contact with the drawers to support and guide them. A flat frame is built in the case on which each drawer rests and slides. The bottom of the drawer should be let into the sides so that there is a space between it and the bottom edge of the sides. A strip of wood about an inch square is nailed to this frame at each end so that the drawer will fit between them. In a long drawer it is well to have a guide strip also in the center. The bottom should have the grain running across the drawer and should extend beyond the back to allow for shrinkage.




4½"
PANEL PROJECTS
1'-4"
3'-2"
2'-6"
GLASS DOORS
PANELS
SECTION
WOOD PANELS
SECTION LINE
A
B
C
D
E
1'-0"
2'-8"
ELEVATION
1'-6"
1'-0¼"
1'-1"
1'-1"
1'-1"
5½"
1'-0"
7"
5"
KITCHEN DRESSER
SEE SECTION FOR ARRANGEMENT OF DOORS
DRAWERS IN KITCHEN
DOORS
SECTION
FIRST SHELF
10"
1'-4"
10"
SLIDING DOORS
3'-0"
ELEVATION OF SECTION THROUGH CUPBOARD SHOWING ARRANGEMENT OF SLIDING DOORS.
CUPBOARD
from the design
of
Grandgent & Elwell
Architects
SCALE
DETAILS 1/2 FULL SIZE
ELEVATION AND
SECTIONS 3/4"=1'-0"
GLASS
DOOR



FINANCE and REAL ESTATE

Helpful Data for the Builder Who Builds to Sell

The Building Loan and Mortgage Situation

By C. Stanley Taylor, Associate Editor

AS MANY builders probably know, the United States Senate Committee of Reconstruction, of which Senator William M. Calder is Chairman, has been traveling throughout the United States visiting various important points on an investigation of housing and building conditions, particularly in the chief industrial centers. Investigation has been made in St. Louis, Kansas City, Denver, Omaha, Des Moines, Chicago, Cleveland, Baltimore, Philadelphia, Boston and Washington. Practically all of these hearings have been held in response to appeals for assistance through chambers of commerce and other civic bodies and have involved questions of material cost and supply, transportation, labor cost and supply, coal supply and mortgage money. The most important finding of this committee, applicable at every point, has been the fact that there can be no great resumption of building operations until there is a liberal supply of money provided for first mortgages.

Just when a definite release of mortgage money may be expected is problematical, but it is interesting and encouraging to note that there is a definite tendency toward the development of a condition where mortgage money will be more easily obtainable. One of the most important movements which has been made recently to release considerable money for mortgage purposes has been the concerted attempt by the National Association of Real Estate Boards and through the recommendation of various important committees to have Congress exempt from tax the income derived from real estate mortgages during the next five years.

Walter Stabler, Comptroller of the Metropolitan Life Insurance Company, in discussing this recommendation, says:

Mr. Taylor is in touch with men promoting building enterprises. Write him for information on any problem of Real Estate or promotion you may have and he will take the matter up by correspondence.

"Undoubtedly the most serious shortage in the entire situation is the shortage of money for mortgage loans to finance building operations. There is plenty of money in the country, but it has been taxed out of the mortgage market into other channels, in which the chances of profit are greater or the income taxes less, or where securities are tax exempt.

"Mortgage money has heretofore come very largely from individuals and estates, very many of whom preferred this very safe and sure form of investment to other securities of fluctuating values. Formerly, very many conservative men of large means directed their executors to invest the funds of their estates in bonds and mortgages. I doubt if this practice will be continued so long as the income taxes on large incomes remain as high as now.

"When a gross interest rate of 6% is reduced by income taxes to a net of 2 to 3% the non-taxable municipal or State or county or school or even road bonds paying 4½ to 5% net are naturally preferred.

"What is the result? Untold millions of money are being entirely removed from the real estate mortgage market and this process will continue unless the income tax laws are so modified that investors will feel justified in again putting their funds into mortgages. They surely cannot be expected to leave their money in highly taxed mortgages or make new investments of this kind when there are many other perfectly safe securities which will pay twice as much because of tax exemption.

"Many of our largest real estate owners have been selling their holdings and requiring payment in full in cash. The replacement of these mortgages and the cash needed to pay all cash for such real estate purchases must be and has been obtained from the savings banks and life insurance companies, which are not so heavily taxed or are practically tax exempt. This removes from the mortgage market just so much money that could have been used for the production of new buildings.

"The life insurance companies, not being subject to taxation in the same way as individuals, can and are lending to the limit of their ability; but life insurance loans must be divided between city loans and farm loans, and farm loans do not increase housing to any extent.

"If all the life insurance funds went into the building of places to live, they would be only a drop in the bucket to what is needed. The savings banks are in much the same position, and they are doing their full duty, but these two great sources of money are and will be totally unable even to begin to meet the necessary demands.

"These being facts beyond dispute, should we not face the issue squarely? Few of the buildings of all kinds that are so much needed can be built unless mortgage money can be obtained in very large amounts. It is imperative that the funds of individual investors and estates be induced to return to the mortgage market if we are to have any resumption of building that will begin to relieve the present serious situation.

"How can this situation be improved? What will bring these vanishing funds back into real estate loans? Manifestly by relieving this best of all investments from income

taxes for a period of years long enough to enable us to build what we must have and what we cannot get without this relief.

"There should be Federal and State exemption of all interest on real estate mortgages from the provisions of the income tax, for a period of five years, by which time we should be again in normal condition and our people so well supplied with houses that the fear of lack of shelter and exorbitant rents would be removed; and this should be done at the earliest moment practicable."

Another encouraging feature regarding the building loan situation is the fact that opportunities for investment carrying unusually high interest returns or special features of speculative profit are not now being offered to the public as frequently as in the past two years. The price index of the bond market is gradually climbing which means that standard bonds are offering a decreasing appeal from the investor's viewpoint. The types of promotion activities involving stock sales are not as sound or as interesting as many which have been offered since the war period. Consequently we find that the interest of the public is returning again to the possibilities of building loan and real estate mortgages as a sound investment.

It is evident, therefore, that a turn for the better may be expected in building financing. Every builder should actively support any movement which tends to increase the supply of mortgage money. Recent experience at various points in the country shows that direct pressure by the builder has in some instances resulted in the provision of mortgage money from savings banks and from local institutions. Through the concerted activity on the part of every person interested in any phase of the housing and moderate cost building situation the pressure may be made continually greater until the demand results in a definite increase of money available for financing the construction of dwellings and moderate cost utility buildings.

Good Design a Selling Feature

Realty company recognizes interest of public in attractive houses and secures unique elevations

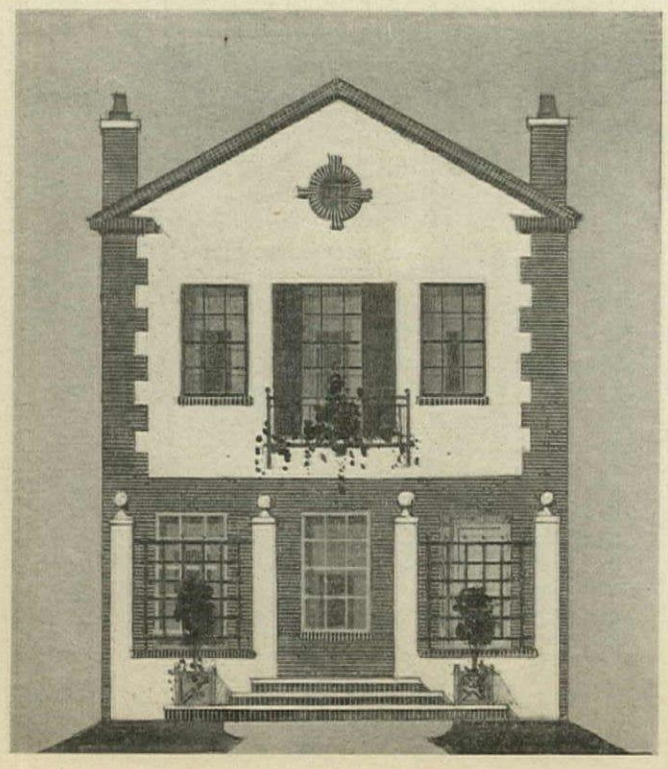
Walter Hopkins, Architect

IN the November issue we illustrated a group housing development in Long Island City which met with exceptional success from the standpoint of sales owing to the careful manner in which the developers, the Rickert-Brown Realty Company, had studied the requirements of the buying public.

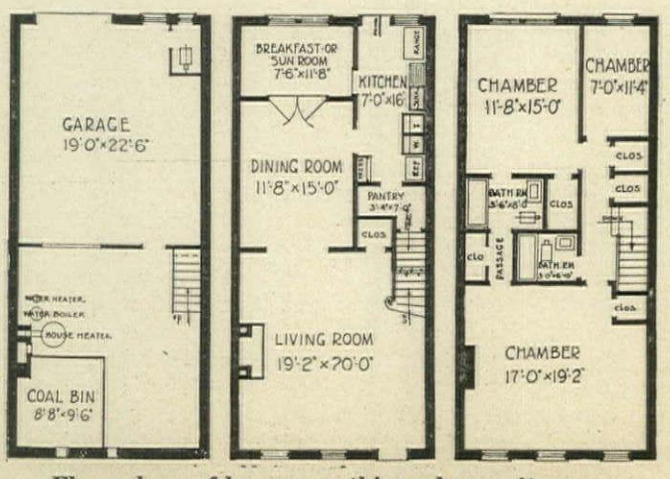
These houses were well arranged in their plans and in their interior finish and equipment they showed response to approved modern ideas. The exterior designs, however, left something to be desired. The long series of front porches and the false tile roofs held up by heavy cornice brackets did not distinguish them from many other row houses.

It is interesting to note that this company, in spite of the success attending the sale of these houses, has recognized this defect and in a second development now under construction it has secured the services of Walter Hopkins to design a number of distinctive elevations.

It will be seen from our reproductions that the unusual effect of these houses is obtained by simple and inexpensive means. Combinations of stucco with brick and tile, trim and shutters painted in different and pleasing colors, and the occasional use of a gable between houses with flat tile copings give a variety that will make the block of houses appear practically as individual designs, which is a feature that the home buyer considers a big asset and is willing to pay for.



These houses have a frontage of 20 ft. and are arranged in rows made up of various combinations of the three elevations shown here. The exterior designs show the modern way of obtaining distinctive appearance by tasteful use of materials, color and simple ornament



Floor plans of houses on this and opposite page

Practical Development Project

This proves that progressiveness stimulates business

A LETTER recently received by the Editor of this department outlines a constructive method of developing a home building operation which may prove of interest to others similarly situated. The letter is quoted approximately as follows:

"I have read with much interest your statement of 'How One Builder Developed a Large Job' (September issue) and relate my experience in a similar development. For the past 20 years I have been agent for an estate which held an attractive piece of property located in a residential town in New Jersey, about three minutes from the railroad station and adjoining a beautiful park. This land comprised the entire center of a block with a 52-ft. strip for a road and also 1200 ft. on an adjoining street. As the estate wished to sell this property I organized a corporation consisting of an architect, a mason builder, a boss carpenter, another real estate man and myself.

"We had the property surveyed and laid out exactly as your description outlined except that we expected to build ten 6-room houses around a circle to cost a purchaser (with land 40 x 150 ft.) about $9,000. Also two houses on 60 x 150 ft. to cost $15,000 each. Having purchased the land, laid it out and designed the houses, we were ready to start and had a promise from an insurance company to make a permanent loan of $5,000 each on the small houses. We have, however, been unable as yet to get building loans anywhere as all the building loan companies seem to be loaned up and private capital was not interested, claiming that money was worth 7 or 8%.

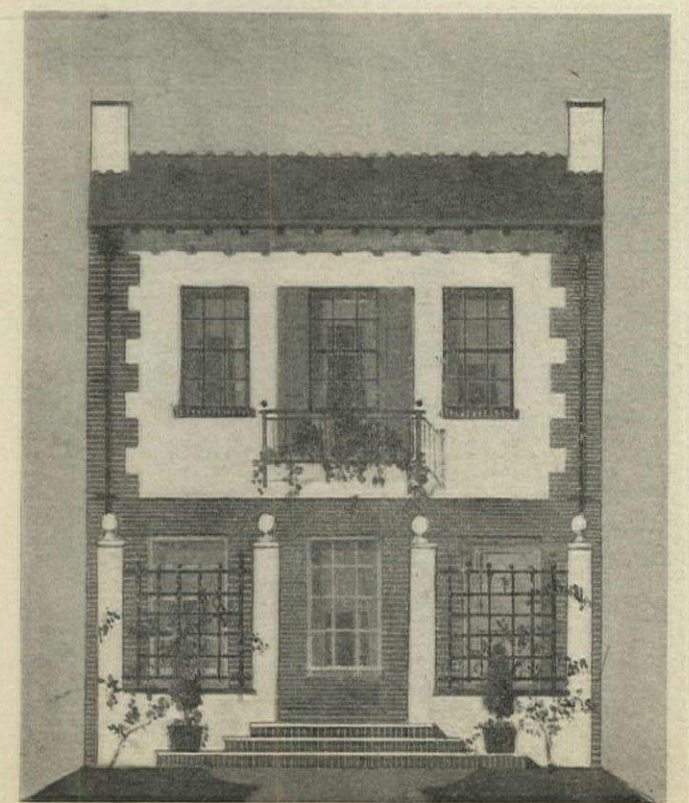
"My plan now is to get ten families who will agree to buy the houses when completed to advance at least $3,000 on each and take the finished houses subject to a first mortgage of $5,000 and a second of $1,000."

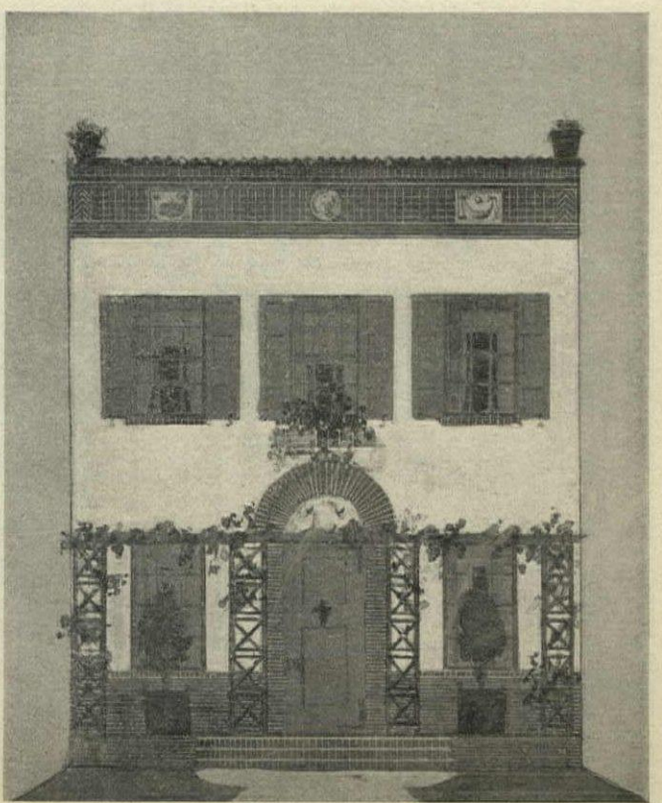
The method of financing indicated in the above letter is unusually interesting: first, because the owners of the new company are experts in the various necessary lines involved in such a development; and second, because the president of the development company, not being able to get building loan money, but having arranged for permanent loans, is seeking in a practical manner to raise the necessary funds.

Home Sites Demand Continues

EVERY builder knows that activity in the sale of lots for home building purposes represents a valuable indication as to future building activity. In every section of the country, particularly in important industrial centers, the sale of lots on a speculative basis, where the purchaser expects to turn over a lot of the profit, is cut to a minimum. On the other hand, it is evident that the sale of lots, the use of which is directly intended for the construction of homes, continues with almost no decreasing interest. This fact has been demonstrated recently in a number of important cities at auction sales of lots where, if the land is available for home building, the public interest has been intense and no trouble has been experienced in selling lots on a reasonable price basis.

Another interesting indication of the developing interest in home owning is shown by the records of a number of real estate concerns which have sold home sites on an easy payment plan. In spite of the depression in the industrial field, which has resulted in decreased wages and increasing unemployment, payments on lots which have been purchased for home building are not falling behind. In every instance where information was requested from real estate concerns which had sold on this basis it has been found that the purchasers are continuing their payments and seem determined to hold





the lots until such times as they may be able to build homes. It is found also that there is a considerably increased interest in building loan associations and that many lot owners are turning to this method of financing their future homes. These indications are all healthy and tend to show that there will be within a comparatively short time an active resumption of home building for the individual owner. Naturally, at this time a period of interesting activity will develop for the speculative builder.

A further analysis of the business of real estate developers shows that those subdivisions on which a number of houses have already been constructed, either by the individual owner or by the developer on a speculative basis, still continue to show considerable activity in the sale of lots. In the Business Getting Department of this issue there will be found a discussion of the possibilities offered here for developing business in connection with realty developing. It will be worth while for any builder to analyze for himself local conditions in connection with the sale of lots for home building purposes. Determination of owners of a number of lots which have been sold through real estate offices together with the continued interest in such purchases and the continuation of payments on lots may serve to indicate locally what interest may be expected in home building.

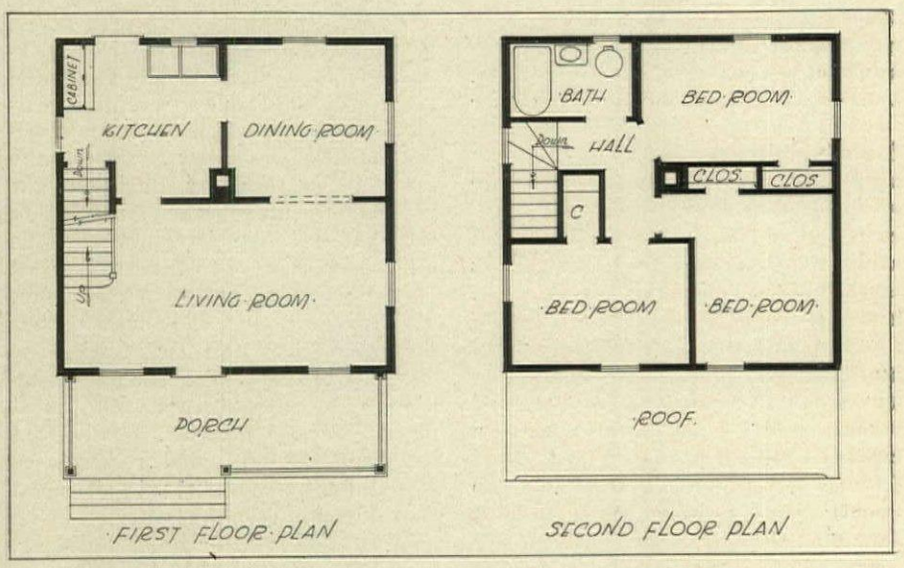
Attractive Small Houses

Attention to plan and design reduces cost to $3500 each

THE industrial housing division of Lockwood, Greene & Company, engineers, has proved in the design of these houses that careful planning will largely offset the high cost of construction. A group of 10 of these houses has just been completed at Newton Upper Falls, Mass., for the Saco-Lowell Shops at an approximate cost of $3,500 each.

The plans shown here indicate the attractive and economical arrangement of rooms without any waste space. The houses are grouped about a curving roadway and are all of the same design, although variety has been gained by placing some with gable ends toward the street and others with the ridges parallel to the street, the positions of the porches being changed to correspond.

The houses are complete with good plumbing, furnaces, electric wiring and combination sinks and laundry trays in the kitchens. The foundations are concrete.



BUSINESS GETTING METHODS

Ideas that have worked for others

Building Contractor's Relations with Architect

By C. Stanley Taylor, Associate Editor

IN recent discussions with a number of building contractors it was found that there seems to be no well-defined opinion as to architectural service and a builder's relations with an architect. There can be no doubt that a better mutual understanding of the activities and responsibilities of the architectural and building contracting field will prove of value in developing closer and more helpful relations between the architect and the builder. The very fact that an increasing number of architects are developing a knowledge of the construction field to a point where they are placing subcontracts direct for the owner would seem to indicate that the average general contractor in moderate cost construction has not continuously demonstrated the value of his services in a proper manner to the architect. The principal reason for this condition is, we believe, a lack of understanding on the part of the builder as to the exact progress of a job through an architect's office, and what assistance he may be to the architect in rendering a proper service to the owner.

Perhaps the most practical manner in which such information may be given is to trace the course of a job through an architect's office showing his service and responsibilities to the owner. Of course many building jobs, particularly where the construction is simple and does not call for architectural design, are placed directly with the builder; in almost every instance, however, where the project is to be of an investment or speculative type, the value of good architectural service is definite in that it provides better selling and renting features. It is usually found, therefore, that the owner who is to invest his money in a good dwelling, store group, theater, automobile sales building or structures of similar types will retain the services of an architectural firm in order that his building may have merit in design and that the plans and specifications may call for the best modern ideas in utility installation.

The architect is, therefore, called upon to prepare the sketch plans of a building which can be built at an approximate price designated by the owner. Sketch plans consist simply of an elevation or perspective drawing together with floor plans showing the general layout of the building and any special installations necessary for its character of service. These sketch plans are submitted to the owner, together with a general estimate of cost and upon his approval and authorization working drawings and specifications, together with detail cost estimates, are then prepared.

The first responsibility of the architect, therefore, involves at least two very important points: (*a*) to make certain that the building is designed to eliminate waste space and to provide the best possible application to the purposes of the owner; (*b*) to limit in cubic footage and general specifications so that the ultimate cost of the building will not exceed the amount stipulated by the client. Here immediately may be seen an interesting possibility for the builder to render practical service to the architect. The wise architect will call in a practical builder at this point in order to get his opinion regarding layout and cost as closely as may be estimated from sketch plans.

During the past two years it has been very difficult to estimate building costs and many architects have found, to their sorrow, that the sketch plans they have made call for buildings costing two or three times as much as the owner has signified his willingness to pay. Those architects who have worked with practical builders in preparing general preliminary costs have been more successful in limiting the allowance of building space to the possible expenditure. This constitutes a point which the builder may well take up with any architect to aid him in determining the number of cubic feet he can allow in sketch plans for the expenditure which the owner is willing to make. This can be determined by getting an average cubic foot cost on buildings of a similar nature built under like conditions.

After working drawings and specifications have been completed, there are three ways in which the architect may direct the carrying out of the work on behalf of the owner. The first is to place the plans in the hands of several contractors for lump sum bids; the second is to select a reputable contractor and give the work to him on a cost-plus-a-fixed-fee basis; the third is to ignore the general contractor and to place sub-contracts directly along these general lines:—

1—Excavation, foundation, masonry and plastering
2—All carpentry work, including roofing
3—Electrical installation
4—Plumbing and heating installation
5—Painting and decorating

Usually the architect will choose the first method of letting out the work but it is often found that, because of the uncertainty of the market, the bids from reputable contractors are unusually high. There is also to be considered the fact that the relations between the architect, owner and contractor, where a straight contract is let, are usually strained from the beginning of the operation.

The method of letting jobs on a basis of cost plus a fixed fee is undoubtedly the best, provided the contractor selected has sufficient experience and interest in the work to proceed along lines of the greatest economy to the owner. Unfortunately, the attitude of the average contractor has not been conducive to the establishment of this method

of doing business in moderate cost construction. There are certain contractors who have done work under this arrangement and given such satisfaction that they may expect a steady line of business. On the other hand, many contractors have undertaken work and have strained their relations with the architect and the owner because they have not felt that definite responsibility which is usually the result only of a straight contract arrangement. If any builder can carry out work on a cost-plus-fixed-fee basis in such a manner that he gains the favor of the architect and owner, he may be certain of a constantly increasing line of business.

Where the architect is interested in letting sub-contracts direct, the general contractor is, of course, eliminated unless he wishes to take certain portions of the work where he will be called upon to compete with sub-contractors bidding.

Many building projects which are going ahead at this time have been the result of active promotion work carried out through the co-operation of an architect and a builder. The builder will find it a wise course to give some thoughtful consideration to the actual work performed by the architect not only in developing contact with future owners, but in the introduction of good design and the use of quality methods and materials. What can be more valuable than a proper co-ordination of the experience of both architect and builder, combining the best service of design, selection of material and actual construction in order that the owner may feel that he has received real service?

Some builders have an impression of architects in general which they would do well to eradicate from their minds. This is the thought that the architect is only an artist and as a result is impractical and without business or building knowledge. It is true that many architects are hampered by lack of knowledge of actual field conditions. On the other hand, their attention is directed toward gaining more practical field experience or developing the service of a practical builder in co-operation with their own organizations.

In almost every phase of the development of a job through the architect's office he has need either of practical, direct knowledge of actual construction or of the consulting service of a practical builder. In rendering this service the builder must give due consideration to the demands of good design and at times must be ready to sacrifice what he may consider the most economical construction in order to meet a definite requirement of design which may be an important factor in the entire plan which has been developed by the architect. It will therefore pay any builder well to give more thoughtful consideration to the architect's place in the construction field and to strive to understand and know him better.

In many cases considerable friction develops when the job is going ahead and the architect or his representative is in the field supervising and checking the work according to plans and specifications. If the builder will take pains to present his difficulties in the proper light and will be slower in resenting what he considers interference on the part of the architect, much of this friction can be avoided and the job will proceed in a smoother and quicker manner. We find that the spirit of architects today shows a wish for closer co-operation and better understanding with building contractors and it is certainly up to the contractor to take advantage of the possibility of closer relations.

Co-operating with Subdivision Developers

WE have recently had occasion to receive considerable information from developers of real estate subdivisions in various sections of the country. Some of the points brought to our attention in this analysis are of direct constructive interest to the builder and will be briefly outlined in this article.

The first interesting point is that invariably where subdivisions have been laid out and lots offered for sale greater success has resulted when a number of houses have been constructed on the property. In fact, the alert realty developer is giving serious thought today to the practicability of building some dwellings on each section of property laid out for sale. The benefit from a selling viewpoint is obvious. Where land is laid out and offered for sale in the form of lots for home building it is evident that greater interest attaches when a number of houses have been constructed on the property showing the residential type which may be expected to develop. At the same time lot purchasers always like to see signs of development and an indication of the type of neighbors with whom they will come in contact if they build on the property.

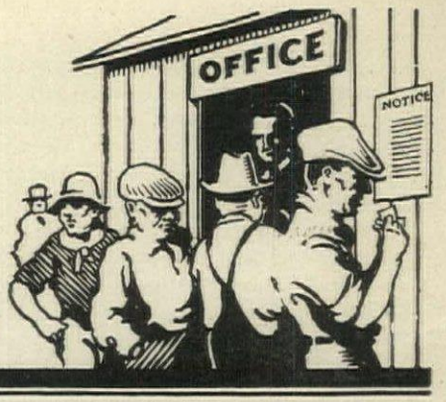
In the case of one large subdivision project in an industrial town of Ohio, a builder was the first to make such a suggestion to the realty developer. Noting that an attractive piece of land had been subdivided and was offered for sale, he went to the agents and offered to build several houses on the following basis: 1, that they provide the necessary lots free and clear of all mortgage taking in payment a second mortgage on the houses payable in easy installments; 2, that they make use of their credit to assist him in obtaining necessary time on building materials.

This part of the transaction having been arranged, the builder immediately erected ten moderate cost dwellings which were offered for sale at a reasonable profit on the building and subject to a first mortgage obtained from the local bank, with second mortgage as described in the last paragraph. These houses were sold quickly as the terms offered were attractive, and the result from the viewpoint of the real estate developer was a greatly increased interest in purchasing lots in that subdivision. So well did this idea work out that the realty company itself decided to build about thirty houses. The services of the builder who had first suggested the plan were naturally retained to carry out this construction and a definite percentage of profit was arranged to cover his work. At the present writing these houses have all been constructed and sold and every lot in the subdivision was sold readily at a good price. The fact that the same company owns a large undeveloped piece of land adjoining that offered to the public constituted an added incentive to the rapid development of the first tract. Incidentally for this acreage the company has already been offered over twice what they paid. This was the result of the interesting development of the adjoining property which provided a definite increment in land value.

Many instances have been brought to our attention where a builder, either speculative or direct, has been able to work with realty development companies on partnership lines which have proven valuable to both parties. One real estate company recently informed us that they planned to build on one of their properties a number of dwellings to be sold at actual cost or even at a small loss in order to stabilize values in that particular subdivision and to increase public interest.

OFFICE and JOB MANAGEMENT

Things the other man has found out that save money



Methods in Quantity Estimating

Part VII. Estimating and Pricing Brickwork

By Frederick H. Hunter, Quantity Surveyor

IN considering excavation and concrete or stone foundations in the previous articles we have been dealing with matters about which there is little difference of opinion among builders as to how the units for estimating are to be handled. Occasionally a contractor does not take the trouble to separate his open excavation and his trench excavation, and some do not even take the time, in estimating concrete foundations, to figure out the area of the forms but make their price per cubic yard for concrete include the cost of the forms. Such practices save time in estimating but are less accurate than the more detailed methods which we have described. In the hands of an experienced man they can be made to serve almost as well, but are not to be recommended for use except by men who are thoroughly familiar with the subject. On work that varies very much from the usual, any contractor is much safer in having the details that we have outlined to guide him in setting prices. For instance, if a job has foundations that go well below the basement grade or if the concrete walls are much thinner or thicker than usual the man who trusts too much to averaging his excavation and concrete prices may fool himself badly as to the proportion of trench excavation to open digging or the average amount of forms per cubic yard of concrete.

When we turn to brickwork, however, we take up a subject where there are many differences of opinion as to how the units for pricing should be handled. One man figures his brick by the thousand, and another by the cubic foot or cubic yard. One man figures all the brick on the job as common brick and then allows an "extra only" price for the face brick—while another man figures his common brick net and then prices his face brick for the entire cost. It would be a long and tedious matter to attempt to decide which of these methods is better in either case. The Boston report referred to in the first article of this series recommends that brickwork be reported and priced by the cubic foot and that face brick and common brick be reported separately and each kind priced for the entire cost. The writer's personal experience leads him to agree with this report in the first recommendation, but not in the second. On a brick job we think it better to price the face brick as an "extra only" item after having included them in the common brick. Most masons look at the quantity of common brick to get a general idea as to the extent of the job, and if this quantity covers all the brick in the building, except paving brick, it is a much better guide than if one has to hunt through a number of items to get an idea of the whole brick proposition. Again, if we take the face brick as a separate item a certain proportion of them extend into the common brick as bonders and these must be deducted from the common brick quantity and added to the face brick to get each item exact.

AN old fashioned practice in measuring brickwork which is fast dying out is to take the corners "double" and to deduct the window openings at only two-thirds of their actual size. The theory of this is that the extra quantity included in this way will make up for the extra labor cost of laying up the leads at the corners of the building and the jambs at the openings. On this basis the unit price for brick would be a price for a unit of plain wall without any ends and there would be a considerable excess in the brick quantity to represent the extra labor over such a plain wall and not a quantity of material. Any brick job would have to have some leads laid up and almost any building job would have at least some openings for windows and doors. An experienced man will have little trouble in sizing up a job from a general inspection of the plans and getting an idea, sufficiently accurate, as to the frequency of openings, corners, etc., so that he can set a price for the average run of the brickwork in the building rather than for an imaginary piece of plain wall without corners or openings. His brick quantity would then be an accurate guide as to the amount of brick, mortar, etc., that he would need in order to do the job—should he get it.

SOME masons do not take any outs for the stonework that comes within the body of the brick wall on the theory that the quantity of brick you figure in will pay for the cost of setting the stone. This is a crude way of handling stone setting because, in most cases, it does not allow a proper amount for setting the stone, and also because it makes the quantity of brick inaccurate just, as has already been explained, the practice of "doubling the corners" does. We know of some masons who, after leaving in

the volume of the stone in their brick quantity, add an additional price for setting the stone representing the "extra cost" of doing this over what they already have in as imaginary brickwork.

The procedure in getting at the quantities of brick would not differ essentially were use made of any of the methods noted and the estimator who knows how to take off the cubic feet of brick can easily adjust his quantities to suit the contractor he may be working for. We shall proceed on the basis that the entire quantity of brickwork will be computed in one item and that the face brick will then either be deducted or priced as an "extra only" item. This really makes a difference only in the final figuring.

The man who prices "by the thousand" figures his brick in cubic feet and then multiplies by whatever number of brick he is in the habit of using. Below is given a table of comparative prices of brick "per cubic foot" and "per thousand." This table has been worked out to suit the contractor who figures anywhere from 19 to 24 brick per cubic foot. We have occasionally met a contractor who figures even higher or lower than the range we have covered, but the majority of builders use a number covered in the table. It should be noted that it makes considerable difference as to how many brick are figured as there is a range of about 25% between the man who figures 19 brick per foot and the one who figures 24 brick and sets the same price per thousand. From the prices given in the table it will be easy to work out intermediate prices or to extend the figures to cover the prices beyond those we have included.

Comparative Prices for Common Brick per Thousand and per Cubic Foot

Price per M	equals	at	19 brick per cu. ft.	20 brick per cu. ft.	21 brick per cu. ft.	22 brick per cu. ft.	23 brick per cu. ft.	24 brick per cu. ft.
$40	"	"	76c	80c	84c	88c	92c	96c
45	"	"	85½c	90c	94½c	99c	1.03½	1.08
50	"	"	95c	1.00	1.05	1.10	1.15	1.20
55	"	"	1.04½	1.10	1.15½	1.21	1.26½	1.32
60	"	"	1.14	1.20	1.26	1.32	1.38	1.44
65	"	"	1.23½	1.30	1.36½	1.43	1.49½	1.56
70	"	"	1.33	1.40	1.47	1.54	1.61	1.68
75	"	"	1.42½	1.50	1.57½	1.65	1.72½	1.80
80	"	"	1.52	1.60	1.68	1.76	1.84	1.92

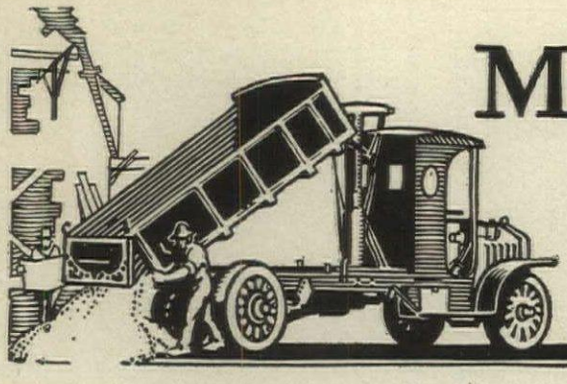
IN measuring brick it is best to take the exterior walls of the building first and then the interior. It is also advisable to take the walls one story at a time, as the thickness of the walls, location of "outs," etc., will show on the floor plan for the story you are considering and there is less danger of making a mistake than if you try to take two or more stories at once. Occasionally in a plain building, such as a factory, you will get two or three stories with the same wall thickness and the same arrangement of openings, and it is easy to take these in one lump. In the modern steel frame office building or apartment house, where the brick walls are supported on the steel frame at each story and in reality are only a jacket for the building, the walls will usually be the same thickness and have the same outs for a number of typical stories, and much time can then be saved by taking these several stories in one operation. Frequently, for such buildings, one floor plan covers these typical stories. Occasionally also where a building is a plain box one can save time by taking the two opposite walls in one operation, but this should not be done if there are any considerable differences as the extra time of taking off each wall by itself is usually good insurance against errors. Sometimes on a simple building time can be saved by taking all the exterior walls for a story at one measurement. This, of course, is only where the story height is the same throughout the building, and the walls of the same thickness and openings, in general, of the same size.

If a portion of the exterior basement walls is of brick these should be taken off very carefully up to the first floor level. Sometimes there is more detail in the work of taking off the walls for the basement story than there is for the entire work above. If the building is on a sloping site the grade at which the brickwork starts may change several times in the length of one wall and it is necessary to take a series of items, the length of each being the distance the wall runs at a certain grade and when it steps down or up, a new measurement must be begun. If the steps are of even height and evenly spaced you can figure nearly enough by taking an average height for several steps, but the inexperienced estimator had best go slowly in this matter of striking averages.

AS shown on the estimate sheets in the September number a sheet with two columns for extensions is most desirable in taking off brickwork. The "outs" which belong with each "in" item should be set down as soon as the "in" is recorded. In this way there will be much less danger of making a mistake than if all the "ins" are taken off first and then the "outs." Also, the work will be much easier to check over in case it has to be verified or any subsequent changes adjusted, because the number and size of the "outs" which accompany each will help identify the items.

In taking the exterior walls of a building it is best to start at some corner measuring, say, the front of the building from "out to out," then taking the left side wall, beginning the measurement for length at the inside face of the front wall so as not to include the corners in both walls. Then carry this measurement to the outer face of the rear wall so as to include the corner, and so on around the building, taking the last wall measure only from the inner face of the rear wall to the inner face of the front wall because the corner where the side wall meets the front wall has already been included in the measurement of the front. This method of "taking the corner ahead of you" is the safest habit for the estimator.

Occasionally you will find a building that has panels in the walls, the face of the brick being set back 2, 4 or even 8 ins. between the pilasters. In such a case it is best to take the wall as an in for the entire thickness at the pilasters and then take an out for the area of the panel or panels by 1/3 ft. or whatever the panel depth may be. Remember, however, in taking the window openings, which come in these panels, that the thickness of these outs will be only the dimension from the face of the panel to the inside of the wall and not the full depth of the wall, as it appeared in the in.



MOTOR TRUCKS

Efficient Methods in their Use and Upkeep

Saving the Tires in Bad Weather

By H. F. Blanchard, Associate Editor

THE builder who needs new tires for his truck is probably hesitating because of the price situation. He is afraid that if he buys now prices will come tumbling down soon afterward and he will therefore lose the amount of the reduction. It is difficult to say what will happen in the tire industry. Some time ago one maker cut his tires 10 to 15% but none of the others has followed although it was confidently expected that they would. Usually the big tire companies raise or lower prices in concert and the smaller concerns follow suit, but not this time. One of the largest tire manufacturers, who was expected to follow the lead of the maker just mentioned, did make a reduction on the wholesale list of 3%. Retail prices, however, were unaffected.

The conclusion is that tire prices are not coming down much, nor generally; at least not until wages and costs of raw material are reduced. That time is coming, but until that time prices are likely to remain about where they are.

What has been said just now about the tire situation also applies with fair accuracy to the truck business. A few manufacturers have reduced their prices a little, but the price cut, by and large, has been very small. It is not probable that there will be any considerable shrinkage in truck prices until labor and material come down. Therefore the builder who is considering whether to buy a truck now or to wait another month or so will be little or no money out of pocket if he buys now.

Saving on Tires

Truck owners should not attempt to get the last mile out of their solid tires at the expense of repairs to truck power plant, springs and other parts. Tires should not be allowed to wear down so close to the edge of the steel tire base rim that the rim is liable to come into contact with stones on the road.

In this connection the practice of a fleet owner operating forty-seven trucks is illuminating. A tire is removed when it has worn down evenly to a line across the tire drawn at a point 1 inch above the edge or top of the steel tire base. The depth of the rubber of the tire when worn down to the point when it is desirable to remove it is measured from the top edge of the steel base instead of from the line joining the resilient rubber and the hard rubber base because the former measurement can be made more readily. When the 1-inch line has been reached approximately two-thirds of the tire has been used.

Closer attention should be paid to the tires on the front wheels than to those on the rear ones because of the fact that the engine with all its delicate mechanism is carried by the front tires. In no case should a front tire be permitted to run after it has worn below this point although in emergencies rear tires may be permitted to wear a trifle more. If dual tires are used in the rear more chances may be taken because if one tire should go to pieces unexpectedly the other half of the dual may be used to get the truck home.

The rear wheel of the average truck is so heavy that its removal, when necessary, is a problem to anyone who has not had experience. The rear wheel on a large truck may weigh a thousand pounds or more and so it is an awkward thing to handle. The axle should be jacked up prior to removal so that the wheel clears the floor by just a hair. Then

A four-wheel drive truck with pneumatics and trailer. This combination insures power and capacity

It is not well to overload the truck. Note how flat the rear springs are

the floor under the wheel and for a distance to one side should be copiously greased. After the nuts are removed it is then an easy matter to slide the wheel off because of the slippery surface.

Winter Time Precautions

Now is the time to prepare for snow-covered street and roads. Non-skid equipment should be procured for the rear wheels and carried in the truck so that it will be ready when needed.

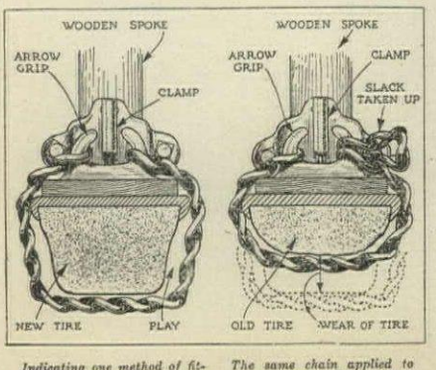
When the streets are covered with snow or ice or where mud is deep non-skid chains are desirable in order to secure sufficient traction. Non-skid chains similar to those used on passenger cars may be used on pneumatically tired trucks but these will not serve on solid tired trucks. There are many designs of non-skid chains and cleats and one of the most common consists of several cross-chain units each one of which is securely anchored in place on the wheel, as illustrated. Where the truck wheels are of the wooden spoke variety the chains should never be simply run between two spokes and over the tread and then the ends fastened together. This method will give the required traction but the recurrent jerk as the chain comes in contact with the ground pulls the chain sharply against the spoke and injures and wears it away. The chains should be fastened securely, either to the spokes or to the felloes to avoid this friction. There are many devices of this nature, one of which is illustrated here.

It should be remembered that chains designed and of a length to fit a new solid tire will have too much play when applied to an older tire that has become worn. The chain is then taken up a link or two to reduce the play. To prevent the loose links from slapping about, the end link should be threaded on the bolt or other holding device before finally securing the chain.

Care should be taken in all cases, when applying chains, that they have some play; otherwise they will wear grooves in the tread of the tire.

On a freezing cold day even such a simple thing as lack of gasolene has been known to cause serious trouble, with a big repair bill resulting. There was a driver last winter who found, when his engine stopped abruptly, that he was out of gasolene. In his haste to remedy the difficulty he rushed off to the nearest garage which proved to be about a mile away. When he returned with the gasolene he found

A shovel will often get a truck out of a snowbank when nothing else will do. Below—Motor trucks enable the steam shovel to deliver full capacity



Indicating one method of fitting non-skid chains. Note that considerable play is left to prevent wear on the tire

The same chain applied to an older tire. In this case the slack has been taken up by looping the loose end

that his cooling system had frozen solid in the short interim and that the cylinder casting was cracked from end to end. The moral is to remember to drain the water from the radiator as soon as the engine stops, regardless of why it stops. Or better yet use anti-freezing liquid in the radiator. That is the real moral. It is a precaution that is sure to pay handsomely.

These anti-freezing mixtures are recommended:

1. For temperatures below 32° and not lower than 5° above zero:

Alcohol	15%
Glycerine	15%
Water	70%

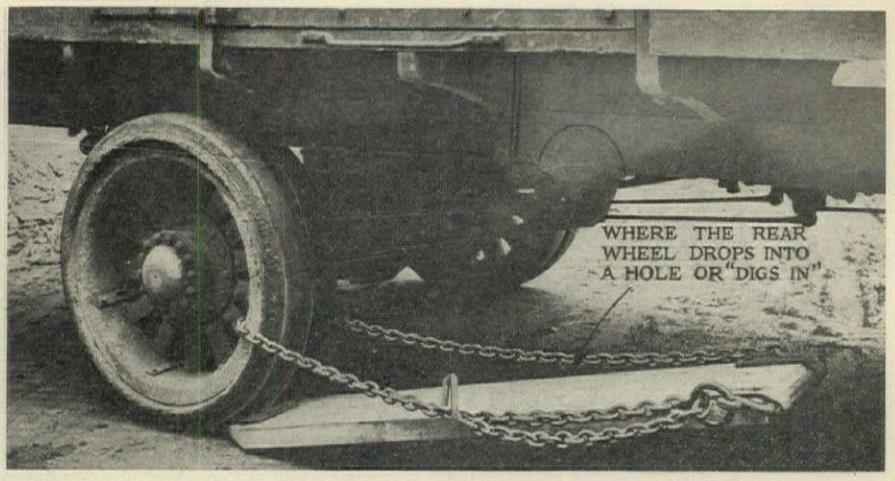
2. For more intense cold another mixture is advised and is satisfactory down to 15° below zero:

Alcohol	17%
Glycerine	17%
Water	66%

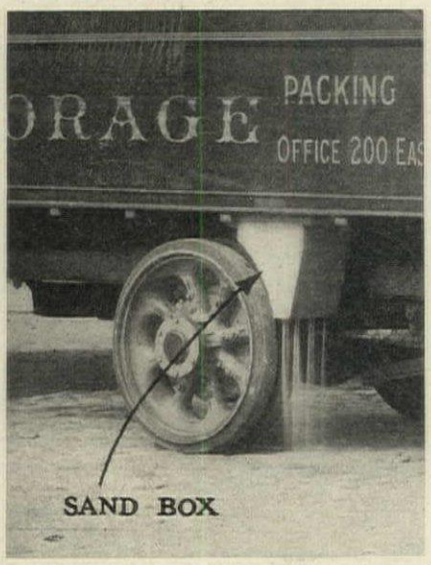
Alcohol should be added occasionally to make up for evaporation. Glycerine does not evaporate.

In summer the oil used in transmission and rear axles should be heavy. When cold weather comes this oil may congeal to such an extent that it fails to lubricate satisfactorily. Therefore it is a good plan to dilute it with cylinder oil, using a half and half mixture of cylinder oil and heavy oil.

If the builder has a place to keep it, it will pay to buy cylinder oil by the barrel. In this quantity the standard grades of oil may be obtained for 50 or 60 cts. per gallon whereas the retail price is $1 to $1.25 per gallon.

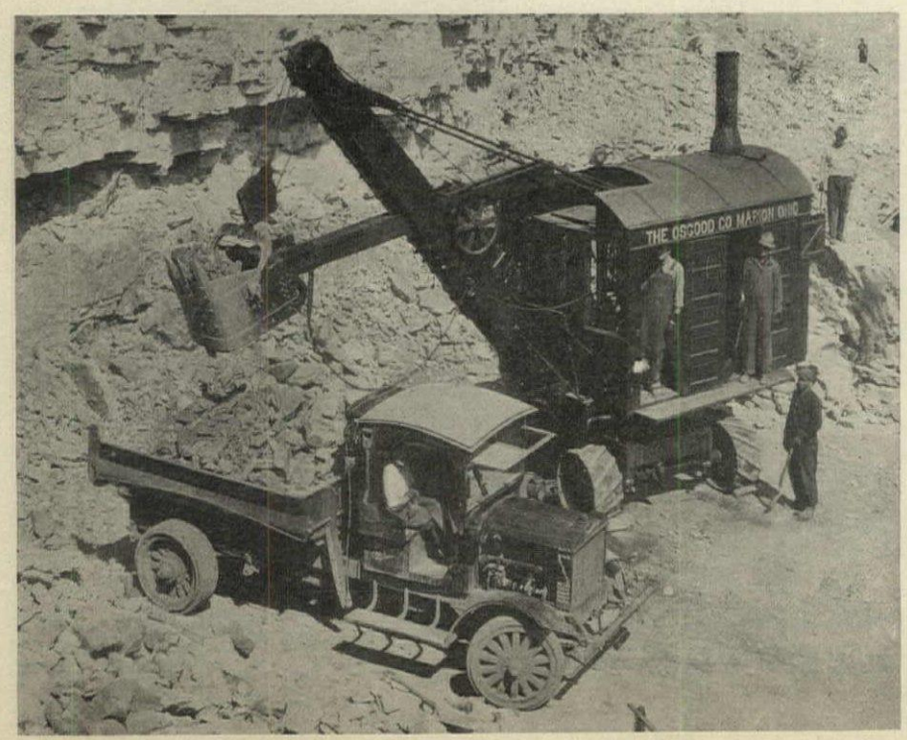


A simple device for pulling a truck out of a soft hole. The chain winds on the wheel so that it is forced to mount the plank



A sanding device for slippery streets controlled from the driver's seat

Below—The motor truck and the steam shovel are good partners



It is a good plan to carry a shovel in snowy weather for there are times when a shovel and nothing else can be used to clear away the snow under the rear wheel to give traction to a wheel that is slipping.

The Fifth Avenue Coach Co. has two good rules that are worth remembering when driving in snowy weather:

1. When coming to a stop the brakes should be released just an instant before the vehicle comes to rest allowing it to roll free for the last six inches or so. This will prevent the wheels from sliding and glazing the surface causing them to spin when the vehicle is started.

2. When the truck is to be started the clutch should be engaged with the utmost gentleness and the truck should be rolling nicely before it is fully engaged. This will avoid any tendency to spin the wheels.

When the engine refuses to start the cause of its balkiness may be any one of the following, arranged about in the order of their importance:

Lack of gasolene.

Magneto wire to switch short circuited; switch short circuited or not working. Remedy, find the short.

Battery weak; battery wires corroded; wires short circuited; loose or dirty connection at some point.

Breaker points worn or out of adjustment.

Water in gasolene.

Vacuum tank empty or out of order.

Moisture on spark plugs or on spark plug points.

Wet high-tension wiring.

Dirty distributor; worn or broken distributor brush.

Moisture on spark gap.

CONTRACTING EQUIPMENT

Reliable Information on Time and Labor Saving Devices

Air Compressors and Rock Drilling

By Harold C. Bond

Sec. Waldo Brothers and Bond Company, Boston

ROCK drilling constitutes an important and often costly part of many classes of contracts. Trench work, road building, grading and foundation excavating are all operations where rock is likely to be encountered and where the methods with which it is handled may make all the difference between profit and loss on the entire job. It is the purpose of this article to deal chiefly with methods and equipment suitable for use in general contracting rather than with machinery of the types required by massed operations in quarries, ledges and mines.

Like most other forms of construction work, rock drilling has undergone several phases of development, and many important improvements both in machinery and in methods have been made in recent years. Only a decade ago the steam tripod drill was in almost universal use. These drills are cumbersome, ranging in weight from 300 to 800 lbs. (including the tripod and weights), and it takes time and men to set them up for operation. Valuable time is lost every time the drill is moved. A boiler is required to furnish the steam and this means fuel and water—both obstacles to easy portability. While the old tripod drill is still used by many contractors, and has its undoubted fields of usefulness in quarry installations and under conditions requiring deep drilling, its popularity on most forms of rock excavation passed with the introduction of the jackhammer. This met with such general approval that practically all drill manufacturers soon brought out machines of this type.

The great appeal of the jackhammer type of drill lies in the fact that it is essentially a one-man machine, carried by hand and ready for work at a moment's notice anywhere. The style most commonly used weighs about 40 lbs., operates by steam or air, and has a range of drilling depth up to 10 or 12 ft.

This self-contained unit furnishes air as motive power; complete with gas engine, compressor and air tank

The light weight compressor is specially fitted for road work. Inexpensive to operate and provides flexibility of plant

depending upon conditions encountered. It is equipped with a rotating mechanism which revolves the steels so that the operator has only to keep his drill up against its work to successfully handle horizontal holes as well as vertical drilling. Drill steels with holes down the center are used which permit a portion of the exhaust to pass down through the steel, blowing out the dust and keeping the drill hole clean.

The advantages of such a light, handy drill in general construction work as compared with the heavy tripod drills can be readily appreciated. In trenches, tunnels and caissons, where quarters are often cramped, their economy is particularly marked. Steam shovel owners were quick to adopt them for drilling in front of the shovel, steam being taken from the shovel boiler. In road building, where the cuts are comparatively shallow but frequent, they have demonstrated their efficiency over and over again, with the ever-present roller usually furnishing the steam supply.

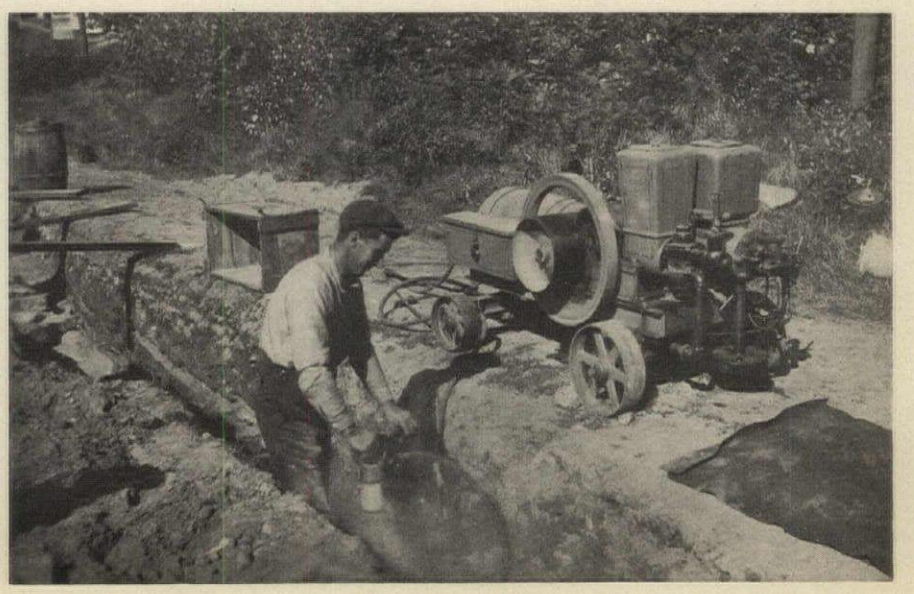
Because of the fact that jackhammers operate with less discomfort to the drill runner and are also somewhat more efficient when air is used than when steam furnishes the motive power, the increased call for air-driven drills soon brought about a noticeable increase in the demand for air compressors. To fulfil the requirements of the general contractor it is necessary that his equipment should be as far as possible self-contained. In connection with rock drilling a gasolene-driven machine which combines the compressor with the engine to run it, together with the air tank, all mounted on a four-wheeled truck for portability, is generally found most desirable.

The earlier outfits were all large, heavy and expensive. Everyone wanted a compressor capable of furnishing sufficient air to run two jackhammers which, because of the fact that in designing jackhammers power rather than economy of air has been the chief consideration, means approximately 150 cu. ft. of air per minute and a 20 to 25 H. P. engine. These machines have been very successful, as far as operation goes, from the first and a large number of them have been and still are being sold. In fact a contractor who does a considerable volume of rock work can scarcely make a better investment than is offered by one of these powerful plants. $3000 is the approximate amount required at present to purchase a 25 H. P. compressor with the jackhammers, hose, steels and usual appurtenances.

But not every contractor can afford big machines like these and it takes a job of some magnitude to justify such an outlay. In addition, their operating expense is necessarily rather high and their weight places limitations upon their portability particularly over rough ground. The very success and popularity of the large machines have, therefore, paved the way for the introduction of smaller compressors which will perform, in a measure, the same classes of work—less powerful, it is true, but at only a fraction of the first cost and with the advantages of greater portability and lower cost of upkeep.

There is a great deal to be said in behalf of the small compressor. That it has met with prompt and general favor in the eyes of the contracting trade is attested by the steadily increasing number of them which have been sold within the past three or four years. Its adoption by the trade and the effective way in which it has demonstrated its usefulness and reliability constitute, in the writer's opinion, the most significant development yet made in the rock drilling field. Not only has it made possible the use of modern and efficient methods on small operations, where hitherto the drilling has been done slowly and laboriously by hand, but it has also taught the big contractor a good deal about flexibility of plant—a subject which is wisely receiving

No long lines of air hose required; the compressor can be placed alongside a trench or other convenient point



Unit A	Unit B	Unit C
1 3½-5 H. P. gasolene-driven compressor, complete with air tank, all mounted on 4 wheels	1 6-10 H. P. gasolene-driven compressor, complete with air tank, all mounted on 4 wheels	1 6-10 H. P. gasolene-driven compressor, complete with air tank, all mounted on 4 wheels
1 non-rotating drill	1 jackhammer rotating drill	2 non-rotating drills
2 sets drill steels	2 sets drill steels	4 sets drill steels
1 sharpening tool for steels	1 sharpening tool for steels	1 sharpening tool for steels
1 50-ft. length of air hose	1 50-ft. length of air hose	2 50-ft. lengths of air hose
1 set quick-detachable couplings	1 set quick-detachable couplings	2 sets quick-detachable couplings
Approx. price, complete unit, $600	Approx. price, complete unit, $1,000—$1,500	Approx. price, complete unit, $1,000—$1,500

more and more thought from progressive contractors every day.

The up-to-date dealer in equipment has learned to emphasize the work which his machines will do rather than technicalities of their construction. The contractor is really interested in performance, in rock actually excavated and not in piston displacement or similar mechanical details. He has encountered rock which he must drill and he looks to his dealer to supply him with an outfit which will satisfy his requirements. As a result there has grown up a tendency among equipment houses to group compressors, drills and other accessories into standardized rock drilling units, each including everything necessary to make up a complete outfit. The component parts of the units are carefully co-ordinated to insure their functioning properly and the fact that the selection is the dealer's recommendation, based upon his experience, affords the contractor assurance of satisfactory operation. Typical units are made up usually somewhat as the table at the top of the page shows.

Units of the A type will drill holes large enough for a stick of dynamite to a depth of from 4 to 6 ft. They are unexcelled for trench work, road building, breaking up boulders and other detached work where quick, easy portability is an important factor. The compressors weigh about 1200 lbs., and, being mounted on trucks, can be transported almost anywhere. These units exemplify most strikingly the opportunity for flexibility previously referred to. Notice that two type A units can be bought for practically the price of one B unit. Five A units cost about the same as one of the large compressor outfits described earlier. Consider what that means to the builder of roads or sewers whose work is often miles in length. These light, inexpensive units can be placed at intervals along the job, run up alongside when drilling is to be done, quickly started and stopped, whisked from one operation to another, with only such of them in use and at such times as they are required. Long pipe or hose lines with their inevitable leakage of air are done away with. When heavy drilling is encountered they can readily be marshalled into phalanxes and worked en masse. This is what is meant by flexibility of plant, and its advantages are even more apparent when the same contractor has several widely separated jobs going on simultaneously.

Type B units will drill holes large enough for a stick of dynamite to a depth of from 6 to 10 ft. They are suited for the same general classes of operation as the type A just described but are somewhat heavier to handle as the compressors range in weight from 1 to over 2 tons, and they are of course considerably more expensive. On the other hand, the rotating jackhammer drill penetrates faster and deeper than the non-rotating type which the drill runner has to turn with his wrist. It is usually the nature of the work to be done which determines whether one type B or two type A units would be the better investment.

The type C unit is practically a combination of the two preceding types. There is less portability and flexibility than would be offered by two type A units, but where these two factors need not be considered it has the advantage of having only a single power plant to be looked after and kept running. The number of type C units sold is, however, very much smaller than of the other two kinds.

City and town departments, state highway commissions, industrial plants and contractors large and small are numbered among the users of light rock drilling units. Many of them find supplementary uses for their compressors in furnishing air for riveting, calking, chipping, boiler cleaning and numerous other operations requiring a moderate air supply.

Taking into consideration their reasonable first cost, their low cost of upkeep, their economy as compared with hand labor on small jobs and their flexibility on large work, these light units may well commend themselves to everyone who has rock drilling to do.

The small compressor outfit has a great variety of uses; it is light in weight and may be set up anywhere

WHAT'S NEW

New Materials and Equipment that Keep Your Work Up to Date

Manufacturers of building materials and equipment are invited to contribute to this department brief descriptions accompanied by single-column illustrations of new products which will be published without charge.

Readers are advised that the data presented is accepted from the manufacturer without any responsibility on the part of the publishers for statements made.

A Light Steel Construction for Plaster Board

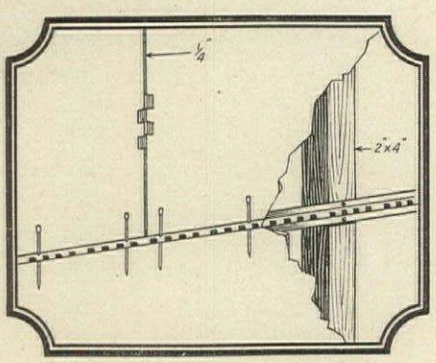
THE Burson System, originated by the Dennos Products Co., Chicago, offers a method of construction which will greatly promote the use of plaster board. The wide possibilities of this useful material are just beginning to be realized.

Use of plaster board with the Burson System is particularly successful for outside and inside walls, for ceilings and for interior non-bearing partitions. The important feature

of the system consists in the use of specially prepared steel furring and ceiling runners which hold securely in place the sections of plaster board upon which exterior stucco covering or interior plaster is applied.

For exterior walls use is made of steel furring nailed horizontally to 2 x 4 wooden studs. To this steel furring sections of plaster board are attached, locked in place with 8d nails which fit into holes provided in the noses or projecting edges of the steel furring. These nails do not penetrate the plaster board but merely hold it securely in place against the steel furring. Steel clips are set between the vertical edges of the plaster board to separate them sufficiently to allow for mortar joints between the sections. Exterior stucco is applied directly on this plaster board foundation. Inner walls are treated in much the same way; steel furring is attached horizontally to the upright studs and plaster board is used as a basis for interior plaster.

This system is particularly well adapted for ceilings and for dividing partitions. Steel ceiling runners

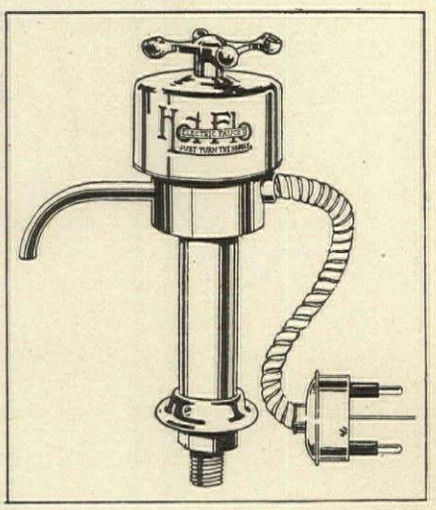


are used, in the same manner as steel furring, and for dividing partitions Burson steel studs are placed vertically to hold the steel furring which carries the plaster board and the interior plastering on both sides.

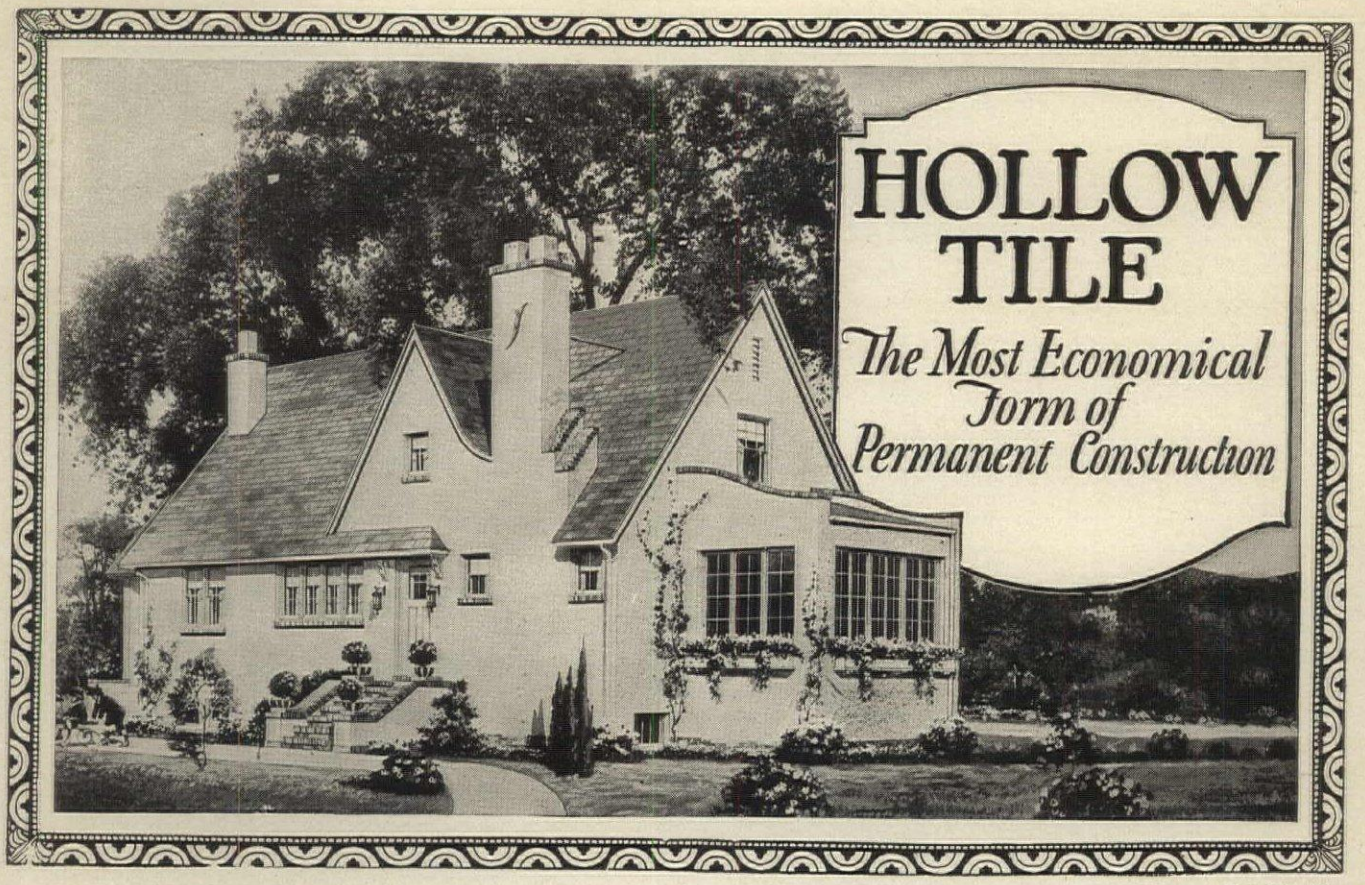
In building more than 100 houses in the middle West this method of construction proved of great value in completing the work in record time and at minimum cost.

An Electric Faucet

The "Hot-Flo" Faucet Corporation of New York have produced an electric faucet. It consists of a cylinder of cast brass through which the water to be heated rises, flowing in its passage upward through the coils of a heater which is connected to an electric circuit. The admission of water to the bottom of the cylinder is controlled by a needle valve operated through a long rod with two toggle-joints. At the upper joint the rod, which is in

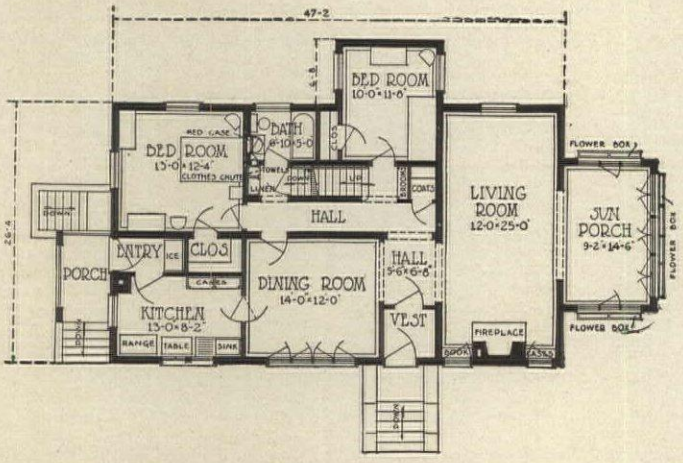


reality a valve stem, is connected to a snap switch which thereby controls not only the electric current but also the flow of water. The snap switch has four positions; in only one of these is the heater coil connected to the electric circuit. In two of the positions the water is turned off, while in the other two water can flow. The arrangement is such that the electric circuit cannot be completed unless the water is flowing. There is sufficient play in the toggle-joints to permit adjustment of the rate of flow within certain limits, thereby regulating the temperature attained by the water before it issues from the spout.



English House
Design No. 1174

Take this Job!



Three booklets, "Hollow Building Tile Manual," "Hollow Tile for the Home," and "Hollow Tile Farm Buildings," give practical suggestions and facts of value to every contractor or builder. We will be glad to send you any or all of these books along with a folder describing this English house. Address Department 1812

MASTERTILE

THE TRADE-MARK OF THE HOLLOW BUILDING TILE ASSOCIATION AND YOUR GUARANTEE OF A PRODUCT MADE IN ACCORDANCE WITH ASSOCIATION STANDARDS

HERE is an enticing English home which you can build and sell readily. The architect has been particularly fortunate in securing perfect lines and proportions, an altogether delightful exterior, and a convenient arrangement of rooms.

The plans are ready. The house, with plan service, will be featured in our January national advertising. With a set of plans on hand in your office, you will have little difficulty in securing a contract for its construction.

Your building material or lumber dealer will supply you with the plans at $10.00 a set, including detailed working drawings, building specifications, and bills of material. Ask for Design No. 1174. If not able to obtain them locally, you can order direct, giving your dealer's name.

More and more, builders are asking for information on Hollow Tile. The comfort and healthfulness afforded by the insulating air cells, the economy of building with the large tile units, the fire safety, permanence, and low upkeep are rapidly becoming recognized universally, increasing the demand for Hollow Tile construction.

THE HOLLOW BUILDING TILE ASSOCIATION

REPRESENTING AMERICA'S LEADING MANUFACTURERS

CONWAY BUILDING, CHICAGO

Selected List of Manufacturers' Literature

FOR THE SERVICE OF BUILDERS, CONTRACTORS, ARCHITECTS AND ENGINEERS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to The Builders' Journal, 142 Berkeley Street, Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of $5 per listing per month.

BOILERS—See Heating Equipment

BRICK

American Enameled Brick and Tile Co., 52 Vanderbilt Avenue, New York.
Enameled Brick. Circular. Illustrated.
Fire Brick. Circular. Illustrated.

American Face Brick Association, Dept., B. J. 11, 110 South Dearborn St., Chicago, Ill.
The Story of Brick. Booklet. 7 x 9¼ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints. Tables of comparative costs.
The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect.

Bradford Brick Co., 2 Main Street, Bradford, Pa.
"Red" Catalog. 7 5/16 x 5 in. 30 pp. Illustrated. Covers dry pressed and impervious smooth-faced brick.

Common Brick Manufacturers Association of America, 1312 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available Price $1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 48 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone Building

CEMENT

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

Muller, Franklyn R. Co., Waukegan, Ill.
Everlastic Magnesite Stucco. Booklet. 8½ x 11 in.

Sandusky Cement Co., Dept. F, Cleveland, Ohio.
Medusa White Portland Cement, Stainless. Booklet. 8½ x 11 in. 48 pp. Illustrated.
Medusa Waterproof White Portland Cement. Booklet. 6 x 9 in. 32 pp. Illustrated.
Medusa Review. 6 x 9 in. 18 pp. Illustrated. House organ issued bi-monthly.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

Bostwick Steel Lath Co., The, Niles, Ohio.
After The Fire. Booklet. 6 x 9 in. 13 pp. Illustrated. Showing the fire-resistance of Bostwick "Truss-Loop."

General Fireproofing Co., The, Youngstown, Ohio.
Fireproofing Handbook. Catalog. 6 x 9 in. 112 pp. A book dealing with the problems of fireproof construction, using as a basis the reinforcing materials—Self-Sentering, Trusset and Expanded Metal.
General Fireproofing. 8½ x 11 in. 16 pp. House organ issued monthly.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemco Expanded Metal Lath.
Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

Republic Fireproofing Co., 26 Cortlandt Street, New York.
Republic Fireproofing Construction for Buildings. Booklet. 8½ x 11 in. 28 pp. Illustrated. A complete description on the two-way construction, its lightness, distribution of loads, saving of loads, saving in structural steel or concrete and its general adaptability to Fireproof Construction.

DAMPPROOFING

Truscon Laboratories, The, Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Truscon Stonetex. Booklet. 5 x 8 in. 36 pp. Illustrated. A booklet telling of methods to decorate and make brick, stucco and masonry free from stains by the application of a cement coating.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.
Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.
Architectural Portfolio. 14 x 18 in. 30 pp. Illustrated. Portfolio of various designs and types of Dahlstrom doors. Drawings and details of each style or type. This is only sent free to reliable architects.

Merchant & Evans Co., 2019 Washington Avenue, Philadelphia, Pa.
Evans "Almetl" Fire Doors and Shutters. Catalog. 8½ x 10¾ in. 24 pp. Describes the entire line including "Star" Ventilators.

DOORS, WINDOWS AND TRIM, WOOD

Curtis Service Bureau, 6034–7034 S. Second Street, Clinton, Iowa.
Architectural Exterior and Interior Woodwork, Standardized. Catalog. 9 x 11½ in. 238 pp. Illustrated. Covers a complete line of architectural woodwork, standardized both as to designs and sizes. Builders are requested to apply through their dealer.

Reliance Fireproof Door Co., 47 Milton Street, Brooklyn, N. Y.
Reliance Fireproof Doors. Catalog. 6¼ x 9¼ in. 44 pp. Illustrated. Contains details of door and window construction, including molding and trim dies.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp.

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

Habirshaw Electric Cable Company, Inc., 10 East 43d Street, New York.
Plans and Specifications for the Home Electrical. Catalog. 11 x 14 in. 20 pp. Rubber, oiled paper, varnished cambric insulated wires and cables for every condition of service.

Hart & Hegeman Mfg. Co., The, 342 Capitol Avenue, Hartford, Conn.
Catalog "P." 4¾ x 6¼ in. 183 pp. Illustrated. H. & H. Switches and Paiste Wiring Materials.

Prometheus Electric Co., 511 West 42nd Street, New York.
Electrical Equipment. Booklet. 6 x 9 in. 5 pp. Illustrated. Electric plate warmers, sterilizers and mechanical heating devices.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.
Simplex Manual. Catalog and reference book. 6¾ x 4¼ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Western Electric Co., 195 Broadway, New York.
Western Electric Electrical Supply Year Book. Catalog. 6½ x 9½ in. 1248 pp. Illustrated. Listing equipment for every electrical need for homes, institutions, office buildings and industrial plants. Prices for estimating included.
Western Electric Flip Switches. Folders. Illustrated. Listing a complete line of lighting switches operated by levers thrown up or down.
Western Electric Decorations for Duplexalites. Bulletin L-1. 6½ x 9½ in. 8 pp. Illustrated. Listing a great variety of shades and decorations in parchment, silk, etc., for standard Duplexalites.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.
Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.
Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.
Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.
Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.
Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 52*

ELEVATORS — Continued

Sedgwick Machine Works, 151 West 15th Street, New York.
Catalog and descriptive pamphlets. 4¼ x 8¾ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

FENCES

American Fence Construction Co., 106 Church Street, New York.
Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.
Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs, productions and brief descriptions.

FIRE DOORS—See Doors, Windows and Trim, Metal

FLOORING

Armstrong Cork & Insulation Co., 132 24th Street, Pittsburgh, Pa.
Linotile Floors. Catalog. 6 x 9 in. 40 pp. Color plates. Describes Linotile, a composition of ground cork, wood flour, linseed oil and various gums and pigments in tile form.
The Ten-Point Cork Floor. Booklet. 3½ x 6 in. 16 pp. Shows design panels in color for Cork Tile floors.

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog. 8½ x 11 in. 54 pp. Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
The Artistic Possibilities of Armstrong's Linoleum Floors. Booklet. 11¼ x 16½ in. 12 pp. Color plates.
Armstrong's Linoleum Pattern Book, 1920. Catalog. 3½ x 6 in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book. Three books. 3½ x 5¾ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Johns-Manville Co., H. W., New York City.
A Flooring That's "Made to Fit." Booklet. 3½ x 6 in. 14 pp. Illustrated. Descriptive of Johns-Manville Asphalt Mastic Flooring.

Muller Co., Franklyn R., Waukegan, Ill.
Asbestone Composition Flooring. Circulars. 8½ x 11 in. Description and Specifications.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
Modern Oak Floors. Booklet. 6⅛ x 9¼ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
Oak Flooring, How and When to Use it. Booklet. 3½ x 6¼ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thicknesses and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

Anti-Hydro Waterproofing Co., 299 Broadway, New York.
Floor Hardening. Circular. 6½ x 8½ in. 4 pp. Describes an inexpensive method for producing permanently smooth, dustless and wearproof floors.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
Concrete and Lapidolith. Booklet. 5⅜ x 8⅛ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
Why Lapidolize? Booklet. 8½ x 11 in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
Lapidolith Specifications. Circular. 8½ x 10¾ in. 2 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Agatex and Its Performances. Booklet. 8½ x 11 in. Describes the methods of hardening concrete floors by the application of a chemical which forms a new surface as hard as agate.

FURNACES—See Heating Equipment

FURNITURE

Leavens Co., Inc., The William, 32 Canal Street, Boston, Mass.
Catalog. 7 x 9 in. 200 loose leaved pp. Illustrated with wood cuts.

GARAGE CONSTRUCTION

Ramp Buildings Corporation, 50 Church Street, New York, N. Y.
The d'Humy Motoramp System of Building Design. Booklet. 8½ x 11 in. 20 pp. Illustrated. Describing the d'Humy system of ramp construction for garages, service buildings, factories, warehouses, etc., where it is desirable to drive automobiles and motor trucks or industrial tractors under their own power from floor to floor.

GLASS CONSTRUCTION

Mississippi Wire Glass, 220 Fifth Avenue, New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated. Covers the complete line.

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ in. 8 pp. Illustrated.

L. P. T. Specialty Co., 846 Builders Exchange, Minneapolis, Minn.
Details and Specifications for Counter Balanced Window Hardware. 8½ x 11 in. Illustrated with drawings and blue prints.

McKinney Mfg. Co., Pittsburgh, Pa.
McKinney Cabinet Hardware. Catalog. 6 x 9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
McKinney Hardware for Sliding Doors. Booklet. 6 x 9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

HARDWARE — Continued

Smith & Egge Mfg. Co., The, Bridgeport, Conn.
Catalog No. 10. 6¼ x 9 in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

Stanley Works, The. New Britain, Conn.
Wrought Hardware. Catalog. BJ10. 6½ x 10 in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
Eight Garages and their Stanley Garage Hardware. Booklet. 5 x 6¾ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
Ball Bearing Butts. Booklet. B8. 5 x 7¼ in. 32 pp. Illustrated. Concise description of various butts manufactured.
Stanley Specially Designed Garage Hardware. Booklet. B-50. 6 x 9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
Von Duprin Self-Releasing Fire Exit Devices. Catalog 12F. 8 x 11 in. 41 pp. Illustrated.
"Saving Lives." Booklet. 3¼ x 6 in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
Gasteam Catalog. 6 x 9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Abram Cox, American & Dauphin Streets, Philadelphia, Pa.
Catalog 73. 9 x 12 in. 40 pp. Illustrated. Covers the complete line.
Industrial Housing Circular. 8 x 10½ in. 12 pp. Illustrated. Modern industrial housing projects with specifications for heating equipment.
Smokeless Boiler Circular. 8 x 10½ in. 8 pp. Detailed description of the Novelty Smokeless Boiler—The boiler with the carburetor.

Gorton & Lidgerwood Co., 96 Liberty Street, New York.
Gorton Self-Feeding Boilers. Booklet. 4¼ x 7¼ in. 32 pp. Illustrated. Descriptions, specifications and prices.

Graver Corporation, East Chicago, Ind.
Hot Water Service Heaters. Booklet. 8½ x 11 in. 4 pp. Illustrated. Describing Graver vertical and horizontal service heaters which utilize exhaust steam for heating.

Kelly Controller Co., 175 W. Jackson Blvd., Chicago, Ill.
The Kelly Low Pressure Controller. Booklet. 4 x 9 in. 22 pp. Illustrated. Describing what The Kelly Controller accomplishes, its mechanical operation, and its application.

Kewanee Boiler Co., Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 73. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.
Catalog No. 74. 6 x 9 in. 35 pp. Illustrated. Describes Kewanee steel heating boilers with specifications.
Catalog No. 75. 8½ x 11 in. 6 pp. Illustrated. Specifications on Tabasco Water Heaters, Kewanee water heating garbage burners and Kewanee steel tanks.

Moline Heat, Dept. C, Moline, Ill.
Moline Heat. Catalog. 8½ x 11 in. 46 pp. Illustrated. Covers the complete line.
Moline Heat Supplement A. 8½ x 11 in. 32 pp. Illustrated. Moline Heat as applied to factories, central station, dry kiln heating, etc.

Page Boiler Co., The Wm. H., 141 West 36th Street, New York.
Page Boilers. Catalog. 4½ x 8 in. 84 pp. Illustrated. Descriptions, specifications and methods of installing Page Round and Square Sectional Boilers.
Monarch Smokeless Boilers. Circular. 8½ x 11 in. Illustrated. Describing the Monarch Down-draft Smokeless Boilers.

Riverside Boiler Works, Cambridge, Mass.
Riverside Range Boilers and Tanks. Catalog. 6 x 3 in. 35 pp. Illustrated. Shows sizes regularly manufactured, methods of installation and descriptions of processes used in manufacturing.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
General Boiler and Radiator Catalog. 4 x 7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.
Engineer's Data Ring Book. 4 x 7 in. 125 pp. Illustrated.
Architect's and Contractor's Binders. These binders are made up of 9½ x 11 in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

United States Radiator Corporation, Detroit, Mich.
The Complete Line. Catalog. 4¼ x 7¼ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.
A Day's Work. Booklet. 3½ x 6 in. 20 pp. Suggestions from employees for the purpose of promoting service and good will.

Utica Heating Co., Utica, N. Y.
Imperial Boilers & Heating Supplies. Catalog. 3½ x 6½ in. 52 pp. Illustrated.
Imperial Super Smokeless Boilers. Loose leaf catalog. 8½ x 11 in. 24 pp.
Superior Warm Air Furnaces. Catalog. 4½ x 8 in. 36 pp. Illustrated.
New Idea Pipeless Furnaces. Circular. 8½ x 11 in. 4 pp. Illustrated.

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
Hoists for Industrial Plants. Booklet. 6 x 8¾ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.
Removing Ashes. Booklet. 6 x 8¾ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 53*

INSULATION

Armstrong Cork Co., 132 Twenty-fourth Street, Pittsburgh, Pa.
Nonpareil Corkboard Insulation. Catalog. 6 x 9 in. 152 pp. Illustrated. Describes use in cold storage warehouses and wherever constant low temperatures are necessary.
Nonpareil Cork Covering. Catalog. 6 x 9 in. 64 pp. Illustrated. Describes the insulation of cold pipes and tanks of all kinds.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

JOISTS AND STUDS, PRESSED STEEL

General Fireproofing Co., Youngstown, Ohio.
Steel Lumber. Hand Book. 4 x 6½ in. 72 pp. Illustrated. Data on the use of Steel Lumber and Metal Lath for economical fireproof construction. Tables and Specifications.

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Pressed Steel Lumber Manual. Catalog. 6 x 9 in. 56 pp. Illustrated. Describes a new system of light weight fireproof construction.

Truscon Steel Co., Youngstown, Ohio.
Truscon Standard Buildings, 4th ed. Catalog. 8½ x 11 in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptations are given.
Truscon Structural Pressed Steel. Catalog. 8½ x 11 in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

KITCHEN EQUIPMENT

Aluminum Cooking Utensils Co., New Kensington, Pa.
Wear-Ever. Catalog. 6 x 9 in. 55 pp. Illustrated.

LATH, METAL AND REINFORCING

The Bostwick Steel Lath Co., Niles, Ohio.
Bostwick Steel Lath, Revised Edition 1920. Catalog. 9 x 11½ in. 28 pp. Illustrated. Covers the entire line. Drawings and Specifications.

General Fireproofing Co., Youngstown, Ohio.
Herringbone Rigid Metal Lath. Catalog. 8½ x 11 in. 32 pp. Illustrated. A treatise on the many uses of Metal Lath.
Trussit. Booklet. 6 x 9 in. 16 pp. Illustrated. Detailed descriptions on the use of Trussit as a reinforcement for Concrete.
Self-Sentering—A Reinforcement for Concrete Floors, Roofs and Walls. Booklet. 8½ x 11 in. 36 pp. Illustrated.

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.
Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chanelath, a form and reinforcing for concrete.

Truscon Steel Co., Youngstown, Ohio.
High Rib and Metal Lath. 18th ed. Catalog. 8½ x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications, special uses and views of installations.

LUMBER

American Walnut Mfrs. Assoc., Rm. 1000, 616 S. Michigan Blvd., Chicago, Ill.
American Walnut, the Choice of the Master Craftsman. Booklet. 7 x 9 in. 45 pp. Illustrated. The use of walnut in fine furniture and woodwork.
Specification Notes for American Walnut Interior Trim. 8½ x 11 in. 3 pp. Includes notes on the different styles of finish suitable for walnut.

California Redwood Association, 760 Exposition Building, San Francisco, Calif.
California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated.
Specialty Uses of California Redwood. Booklet. 6 x 9 in. 24 pp. Illustrated.
California Redwood on the Farm. Booklet. 3¾ x 9¼ in. 40 pp. Illustrated.
How to Finish California Redwood. Booklet. 3¾ x 9¼ in. 16 pp. Illustrated. Formulae and instructions.

Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.
The Post Everlasting. Booklet. 10½ x 7½ in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.
Poles That Resist Decay. Booklet. 9¼ x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.

METAL LATH—See Lath, Metal and Reinforcing

METALS

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.
Reference Book. Pocket Ed. 2½ x 4½ in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.
Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.
Apollo and Apollo-Keystone Galvanized Sheets. Catalog. 8½ x 11 in. 20 pp. Illustrated.
Research on the Corrosion Resistance of Copper Steel. Booklet. 8½ x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.
Facts Simply and Briefly Told. Booklet. 8½ x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.
Black Sheets and Special Sheets. Catalog. 8½ x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.
Bright Tin Plates. Catalog. 8½ x 11 in. 16 pp.

METALS — Continued

International Nickel Company, 43 Exchange Place, New York, N. Y.
Pamphlet. 3½ x 6 in. 8 pp. Illustrated. Describing the wire strength and durability of Monel Screens.

METAL TRIM — See Doors, Windows and Trim, Metal

METAL WORK, ORNAMENTAL

Hope & Sons, Henry, 103 Park Avenue, New York.
Hope's Leadwork Catalog. 9 x 12 in. 46 pp. Illustrated.

MORTAR COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Booklet. 3½ x 6⅜ in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

NURSERIES

King Construction Company, N. Tonawanda, N. Y.
Catalog No. 52. 9 x 11 in. 45 pp. Illustrated. Illustrating and describing greenhouses erected for private estates and public parks.

OFFICE SUPPLIES

Angel, Inc., H. Reeve, 7–11 Spruce St., New York.
Drawing Papers. Sample Book. 3½ x 5½ in. Showing all the surfaces and substances in general demand.

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N.J.
Finding Your Pencil. Booklet. 6¼ x 3¼ in. 16 pp. Illustrated.
The First Five. Booklet. 3½ x 5¼ in. 10 pp. Illustrated.
A Study in Sepia. Booklet. 7 x 4½ in. 5 pp. Illustrated.

Faber Co., Eberhard, 37 Greenpoint Avenue, Brooklyn, N. Y.
Eberhard Faber Pencils, How They Are Made. Booklet. 4¾ x 6¾ in. 23 pp. Illustrated.

N. Y. Blueprint Paper Co., 102 Reade St., New York.
Catalog of Drawing Materials, Mathematical and Engineering Instruments. 4 x 6 in. 400 pp. Illustrated. Covers the complete line.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Berry Brothers, Detroit, Michigan.
"Natural Woods and How to Finish Them." Booklet. 6½ x 4¾ in. 95 pp. Containing technical information and advice concerning wood finishing.
"Beautiful Homes." Booklet. 8½ x 6½ in. 26 pp. Illustrated in colors. Giving information to home builders and others on interior finishing.

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

Creo-Dipt Company, Inc., 1025 Oliver St., Tonawanda, N. Y.
Dixie White. Folder. 3½ x 8 in. 3 pp. Illustrated. A heavy white stain which produces the whitewashed effect.

Devoe & Raynolds Co., Inc., 101 Fulton Street, New York.
Architectural Finishes. Catalog. 5 x 7 in. 40 pp. Specifications and suggestions for painting, varnishing, staining and enameling.
Harmony in the Home. Booklet. 4½ x 6 in. 24 pp. Illustrated. Flat finish wall paints, color suggestions and specifications.

Eagle-Picher Lead Co., The, 208 S. La Salle Street, Chicago, Ill.
Protective Coatings for Structural Metals. Book. 6 x 9 in. 48 pp. Illustrated.

Fox Co., M. Ewing, New York, N. Y.
Calcimines. Booklet. 3¼ x 6¼ in. 8 pp. Color cards.
Water Paints. Booklet. 3¼ x 6¼ in. 6 pp. Color cards.

O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.
That Magic Thing Called Color. Booklet. 5½ x 8½ in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.
Architects' Specification Manual. 8½ x 11 in. 50 pp. Complete specifications for all paint products.

The Sherwin-Williams Co., 882 Canal Road, Cleveland, Ohio.
A Book of Painting and Varnishing Specifications. 8½ x 11 in. 30 pp. A text book on painting and finishing.
Announcement of Sherwin-Williams Flat-Tone Multi-Color Effects. Booklet. 2½ x 6 in. 10 pp. Illustrated. Development of a new system of wall decoration.
Monthly Architectural Bulletin. 8½ x 11 in. Bulletin issued periodically on painting and finishing.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.
Architect's Hand Book. 4¾ x 7½ in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Spread the Sunshine Inside. Booklet. 5 x 8 in. 24 pp. Describes methods for light saving by the application of light reflecting enamels to interior walls of factories and workrooms.

Wadsworth-Howland Co., Inc., Boston, Mass.
Paints and Varnishes. Catalog. 5¾ x 8½ in. 140 pp. Illustrated. Covers the complete line.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 54*

PIPE

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "A." 4 x 6½ in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.
National Bulletin No. 11, History, Characteristics and Advantages of National Pipe. Catalog. 8½ x 11 in. 48 pp. Illustrated.
National Bulletin No. 25. National Pipe in Large Buildings. Catalog. 8½ x 11 in. 88 pp. Illustrated.
National Bulletin No. 7, Manufacture and Advantages of National Welding Scale Free Pipe. Booklet. 8½ x 11 in. 16 pp. Illustrated.
National Bulletin No. 3, Prevention of Corrosion in Pipe. Booklet. 8½ x 11 in. 24 pp. Illustrated. Contains the results of carefully conducted investigations.

U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
Keystone Columns. Architectural Service Sheet. 16½ x 21½ in. Illustrated. Standard specifications with description and formula for calculating cast iron building columns.

PLUMBING EQUIPMENT

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 4 pp. Illustrated.
Whale-bone-ite Seat. Booklet. 3½ x 6¼ in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.
Catalog "M." 9¼ x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.
Crane Products in World Wide Use. Catalog. 5 x 9½ in. 24 pp. Illustrated.
Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 43 pp. Illustrated.
No. 50 Steam Pocket Catalog. 4 x 6½ in. 775 pp. Illustrated. Describes the complete line of the Crane Co.

Eagle-Picher Lead Co., The, 208 S. La Salle Street, Chicago, Ill.
Plumbers' Lead Guide. Catalog. 4⅞ x 7⅞ in. 52 pp. Illustrated.

Maddock's Sons Co., Thomas, Trenton, N. J.
Highest Grade Standardized Plumbing Fixtures for Every Need. Catalog. 5 x 7½ in. 94 pp. Illustrated. Covers the complete line.
Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated. Showing view of complete bathrooms with complete descriptions of floor plans.
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Rundle-Spence Mfg. Co., Milwaukee, Wis.
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Goulds Mfg. Co., The, Seneca Falls, N. Y.
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Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.

REFRIGERATION

Johns-Manville Co., The H. W., Madison Avenue and 41st Street, New York, N. Y.
Johns-Manville System of Refrigeration. Booklet. 3½ x 6 in. 16 pp. Illustrated.

ROOFING

American Sheet and Tin Plate Co., Frick Building, Pittsburgh, Pa.
Better Buildings. Catalog. 8½ x 11 in. 32 pp. Illustrated. Describes corrugated and formed roofing together with table of weights and methods of application.

Philip Carey Co., The, Cincinnati, Ohio.
Architects' Specifications for Carey Building Material. 8½ x 11 in. 48 pp. Illustrated.

Creo-Dipt Company Inc., North Tonawanda, N. Y.
Thatch Roofs. Booklet. 8½ x 11 in. Illustrated. Showing the varied effects obtainable with Stained Shingles.

Johns-Manville Co., The H. W., Madison Avenue and 41st Street, New York.
Johns-Manville Asbestos Shingles. Booklet. 3½ x 6 in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. 3½ x 6 in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

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Ambler Asbestos Corrugated Roofing and Siding. Catalog. 8½ x 11 in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. 8½ x 11 in. 32 pp. Illustrated.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 55*

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHRUBS, TREES, ETC.—See Nurseries

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. 3¾ x 8¾ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Vol. 1. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 4. Indiana Limestone Bank Book. 6 x 9 in. 48 pp. Illustrated. Descriptive of the use of Indiana Limestone for bank buildings, containing partial list of buildings in which it has been used.
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Kawneer Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog "K." 8½ x 11 in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
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New Jersey Terra Cotta Co., Singer Building, New York.
Store Front. Booklet. 8½ x 11 in. 20 pp. Illustrated.

Zouri Drawn Metal Co., B. J. 10, Chicago Heights, Ill.
Key to Getting the People In. Catalog BJ8. 6 x 9 in. 68 pp. Illustrated. Zouri Safety Sash, corner and division bars have been approved by the Underwriter's Laboratories and are manufactured under their supervision.

STUCCO—See Cement, Portland.

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Homes Built on the Wisdom of Ages. Catalog. 6 x 9 in. 48 pp. Illustrated. Describing the use of Bishopric stucco board and Bishopric sheathing board.

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6 x 9 in. 32 pp. Illustrated.

TELEPHONE, INTER-COMMUNICATING

Western Electric Co., 195 Broadway, New York.
Specification for W. E. Inter-phones and Private Telephone Systems. 8 x 10¾ in. 88 pp. Illustrated.

TERRA COTTA

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. 8¼ x 11 in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

TILE, FLOOR AND WALL

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Tile Floors and Walls for Hospitals. Booklet. 8½ x 11 in. 40 pp. Illustrated. Reasons for selecting Tile for hospitals.
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Swimming Pools. Booklet. 8½ x 11 in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. 8½ x 11 in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11. 32 pp. Illustrated. A complete treatise on the subject of hollow tile wall construction.
Industrial Housing Bulletin 172, 8½ x 11 in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.
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VALVES

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ in. 16 pp. Color plates.
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Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6 x 9 in. 32 pp. Illustrated.

Moline Heat., Dept. C, Moline, Ill.
Univent. Catalog. 8½ x 11 in. 32 pp. Color plates. Ventilation in all its phases.
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Royal Ventilator Co., 415 Locust Street, Philadelphia, Pa.
Ventilation. Catalog. 4¾ x 9 in. 48 pp. Illustrated.

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Anti-Hydro Waterproofing Co., 299 Broadway, N. Y.
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General Fireproofing Company, Youngstown, Ohio.
The Waterproofing Handbook. 6 x 9 in. 95 pp. Illustrated. A Guide to the correct use of GF Waterproofing in addition to describing the complete line of materials.

Minwax Company, Inc., 18 East 41st Street, New York, N. Y.
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Sandusky Cement Co., Dept. F, Cleveland, Ohio.
Medusa Waterproofing. Booklet. 6¾ x 9 in. 37 pp. Illustrated.

Toch Brothers, 320 Fifth Ave., New York, N. Y.
Toxement. Booklet. 5¼ x 8⅛ in. Illustrated. 24 pp. Describes Toxement, an integral waterproofing compound for concrete, stucco, cement, mortar, etc.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R. Detroit, Mich.
Structural Waterproofing. Handbook. 8½ x 11 in. 100 pp. Illustrated. A reliable and trustworthy text-book on modern waterproofing practice.

Wadsworth-Howland Co., Inc., Boston, Mass.
Bay State Waterproofings. Booklet. No. 10. 8½ x 11 in. Illustrated. Methods of applying Cement Coating.

WATER SOFTENERS

Graver Corp., East Chicago, Ind.
Graver Zeolite Softeners. Bulletin 509. 8½ x 11 in. 16 pp. Illustrated. Water softeners for homes, institutions, hotels, apartments, etc.
Graver Small Continuous Water Softener. Bulletin 507. 8½ x 11 in. 12 pp. Illustrated. A softener for raw water ice plants and small steam power plants.

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. 8½ x 11 in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

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Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Modernize Your Farm. Booklet. 7¾ x 10¼ in. 16 pp. Illustrated. Description of water systems and lighting equipment.

Graver Corporation, East Chicago, Ind.
Graver Vertical Pressure Water Feeders. Bulletin 502. 8½ x 11 in. 8 pp. Illustrated. Detailed description of parts, capacities and dimensions.

WINDOW CORD

Samson Cordage Works, Boston, Mass.
Catalog. 3½ x 6¼ in. 24 pp. Illustrated. Covers complete line.

WINDOWS, CASEMENT

Crittall Casement Window Co., 685 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9 x 12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Catalog. 5½ x 8 in. 8 pp. Illustrated. Miniature details and phantom drawings.
F. S. Details. 22 x 34 in. Full size working details for mill work and installation with isometric views.
Architects' Portfolio. 8½ x 11 in. Loose leaf circulars.

Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

International Casement Co., Inc., Jamestown, N. Y.
Casements for Banks and Public Buildings. Catalog. 8½ x 11 in. 24 pp. Illustrated. Shows construction of steel windows and surrounding masonry.

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