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MARCH 1937

Editor, Howard Myers; *Managing Editor*, Ruth Goodhue; *Associates*, George Nelson, A. C. Shire, Cameron Mackenzie, Paul Grotz, Madelaine Kroll Thatcher, Peter Lyon, Henry N. Wright, Nadia Williams, John Beinert.

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VOLUME 66—NUMBER THREE

THE MONTH IN BUILDING

VOLUME

CONTRACTS	JAN. 1936	DEC. 1936	JAN. 1937
Residential	$ 37,439,500	$ 65,487,300	$ 78,423,700
Non-residential	90,479,800	72,956,000	95,968,900
Public Works-Utilities	76,873,500	61,252,400	68,451,400
Total	214,792,800	199,695,700	242,844,000

Contracts are from 37 States east of the Rockies, F. W. Dodge statistics.

Unusually mild weather plus considerable winter building caused January building indices to rise contra-seasonally above December levels. January contracts showed a 20 per cent rise over the last month of 1936, residential building doubling the figure for January, 1936. The continued rise in non-residential work was completely in line with industrial activity.

SUBSIDY. "Like Mark Hopkins' college, which consisted of Mark on one end of a log and you on the other, the housing program needs to be brought down to essential matters." These words prefaced a shrewd and biting analysis of land speculation and housing first delivered before the 1935 National Public Housing Conference in Washington, and later issued by that body in a booklet under the title of "The Great American Delusion."* Author of the booklet was Irving Brant, editor of the editorial page of the St. Louis *Star-Times,* and author of "Storm Over the Constitution," a book which is supposed to have helped convince President Roosevelt that a constitutional amendment was unnecessary to enlarge the powers of Congress.

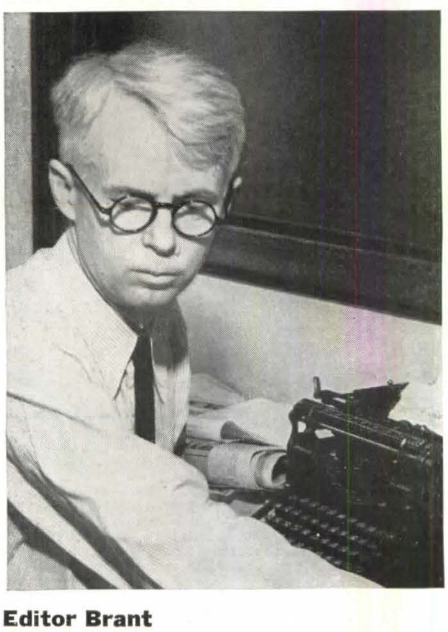
Last month Editor Brant uprose once more before the Housing Conference in Washington, and proceeded to make the housing news-of-the-month with the first public estimate of the total cost of a complete housing program for the U. S. A week later Senator Robert Wagner was to be greeted with shocked headlines when he hinted at a billion dollar subsidy for housing. Editor Brant blandly put the over-all cost at twenty billion dollars, a figure to give everybody pause.

Basis of his estimate was that six million families today live in sub-standard housing; that the Government would be obliged to grant an average subsidy of $4 per room per month, four rooms being the requirement of the average family; and that this subsidy should be capitalized at 3 per cent. Granted that the result is at best a loose estimate, its basis seems conservative enough. "I think," Editor Brant remarked, "there is a tendency to ignore total figures in dealing with the costs of housing, just as there was a tendency to ignore total relief costs a few years ago."

*This same booklet has been used to good effect by the PWA to make landowners see eye to eye with the Federal Government when it goes about assembling land for its housing projects.

FLOOD. In New York State last month the Income Tax Bureau ruled that losses resulting from floods are deductible from income taxes, so long as they are "not compensated by insurance or otherwise." Thus had one State begun to take stock of the damages wrought by the greatest flood in the history of the country. Conservative estimates placed the total damage at about $500,000,000, more than twice the damage estimated to be the result of the eastern floods of last year.

Conservative though the 1937 estimate appeared to be, it was still a shot in the dark which might or might not approximate such items as damage to top soil, levee repairs, insurance losses. For Building it was a poor guide to future construction because the need for new building is not to be measured by the extent of the flood but by its nature. A truer barometer to future business would be found in reports on the swiftness of the current, the amount of floating debris, the depth and duration of flood stages. By all these criteria it was already patent last month that this year's flood will demand greater rebuilding than the $200,000,000 flood of 1936. Per dollar of estimated damage the rebuilding bill promised to be proportionately higher (see p. 238). Yet to be seen was how restraining an influence the tax on corporate surpluses might be; certainly, if it has worked according to its intention, the resulting lack of quickly available working capital will prove a deterrent to industrial rebuilding.



Editor Brant

LABOR SHORTAGE. Out of a welter of conflicting rumors and facts, one aspect in the riddle of whether there is or will be a shortage of building trades labor (see page 242) stands solid and uncompromising: there must be immediate progress in apprenticeship training.

In 1928-29, there were some 1,600,000 skilled building mechanics at work in the U. S. To this number there were added a theoretical 11,000 by apprenticeship by 1931, another 6,000 by 1935. And this insignificant total has dwindled further in the past year. From that 1,600,000 must be subtracted at least 35 per cent by the toll of Death and Depression. Despite some current unemployment in the building trades, Secretary E. M. Craig of the National Association of Building Trades Employers was not unduly gloomy, in the eyes of some observers, when he predicted last month 1,100,000 jobs by fall, with only 900,000 mechanics to fill them.

There may be, as debunkers insisted again last month, no shortage in sight. But any body of men, with a constantly increasing amount of work to do, cannot be expected to do it if their number constantly decreases, is never replenished. And in that situation was building labor last month.

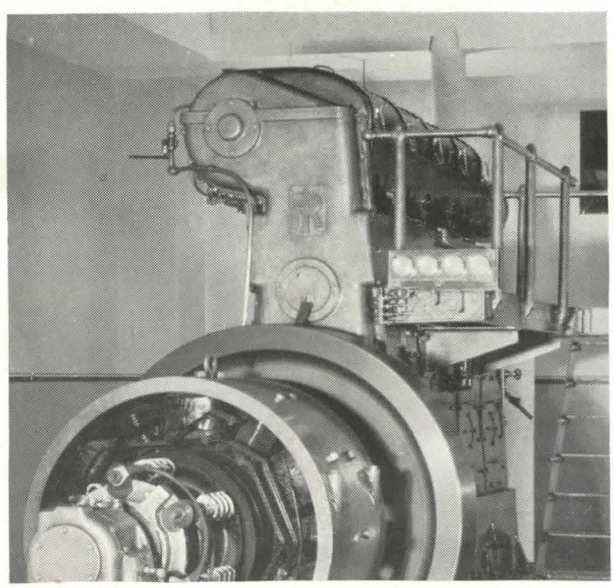
Apprenticeship is bound, in time, to reward contractor, builder, material manufacturer, and laborer alike. And as the far-sighted realize more acutely than ever, the seeds of apprenticeship do not bear fruit for three years. For that reason, the apparently picayune efforts at starting a program of apprenticeship training which were in evidence last month are vastly important, although trifling in scope. It might be merely a local program, whereby a manufacturer is sending ten boys through Minneapolis's Dunwoody Institute, or it might be national, like the recent plan for apprentices to the plumber's craft as formulated by William F. Patterson's Federal Committee on Apprenticeship Train-

Pictures Inc.

MAN OF THE MONTH . . . life for Harvard, Harvard for life (page 14)

Harkins

BUILDING OF THE MONTH . . . none too large, yet none too small (page 216)



PRODUCT OF THE MONTH . . . kilowatt hours for a penny apiece (page 197)

Industry builds

To diagnose the prosperity of 1936 and 1937 in the nost elementary way is to say that its origins are industrial rather than agricul-ural; to note that while the Government is still paying the farmer his bounty, it s levying a surplus tax on the industrialist on the theory that he can afford it. The observation is worth making here because it serves to throw into its correct and mpressive perspective the factory; for the factory is, of course, the mechanical neart of an industrial revival. One out of every four people gainfully employed in he U. S. works in a factory, and one out of four dollars in the national income is lerived from manufacturing.

While it could be deduced that the construction of new factories had in-creased with the current industrial revival, the dollar volume figures are never-heless startling. During 1936 industrial building in the U. S. amounted to 309,000,000. This represented an increase over 1935 of 79 per cent; and 1935 ndustrial building in turn was 63 per cent greater than the total for 1934. The prospects for industrial building during the current year can most accurately be gleaned from the fact that new capital corporate issues for 1936 (whence will come most financing for 1937 factory construction) were more than three times is large as those for 1935.

For the industrial architect, engineer, and builder on the one hand, and the realtor on the other, this year promises a huge return, promises almost without a quibble a building volume in excess of $400,000,000. This is more industrial building than there was in 1927 or 1928, is within striking distance of the all-ime record of $547,000,000 made in 1929. But to deduce that 1937's industrial building will resemble 1929's as closely in form as it may in volume is to ignore a sharp difference between the problems of 1929 and those of 1937. Back of 1929 for reference there stood the record-breaking performances of 1928 and 1927. Crudely speaking, a designer of factories had only to improve slightly on last year's model; he knew that the basic factors conditioning his design were little changed. The real estate salesman had no problem at all; he simply sold the ad-joining lot. Back of 1937, on the other hand, stands the depression, during which all the basic factors—from land costs to technological methods—underwent pro-found changes while the factory skyline itself stayed still as a backdrop. The great majority of these economic changes and technological advances have yet to receive commercial recognition, are still piled deep in the economist's files and high on the technician's shelves. Clearly, 1937 is a year for reappraisal, for the revaluation of the basic elements of factory design and factory placement. The two prime questions are: Where will the new industrial sites be? What kind of factories will be built?

The subject in its entirety is obviously too big to be covered in these pages.

PROPHECY

"Industrial building is entering a field of greater activity. That there is a tendency to locate new factories away from large cities is a fact currently promoted by not only the widespread availability of electric power and the increased use of trucking facilities, but also the rising costs of labor, land and taxes . . . One of the watchwords for economy in any locality should be the factory itself—careful planning, utilization of modern building materials, installation of cost-reducing production devices, and economical management."

—Robert F. Martin, Director of Research, National Industrial Conference Board

NEW SECURITIES
intended to pay for Real Estate and Plant and Equipment
1936

Jan.	$10,209,623
Feb.	5,385,356
March	9,497,908
April	36,094,000
May	2,319,923
June	32,370,750
July	6,683,809
Aug.	7,729,778
Sept.	29,873,840
Oct.	20,394,000
Nov.	31,732,150
Total	$192,291,137

Data from Securities and Exchange Commission

THE AVERAGE POPULATION of the average city in which an industrial building was erected:

1926	338,055
1936	250,053

THE AVERAGE COST of an industrial building:

1926	$250,000
1936	$161,000

	NATIONAL INCOME Produced in the U. S.	**VALUE ADDED** to the raw product by the process of manufacture
1929	$81,034,000,000	$31,800,000,000
1933	$41,472,000,000	$14,538,000,000

Figures from the U. S. Dept. of Commerce and the Census of Manufactures

rgaret Bourke-White

Therefore, this hedge: the factory about which we shall talk will be a new (1937) one, of average ($160,000) size, engaged in the manufacture of an article requir ing a fair amount of heavy mechanical equipment. Much that is said will appl only to certain segments of the industry, none to all of it; and generalization will be made with due acknowledgment to their obvious exceptions. Our purpos here is neither to design nor to locate a factory, but simply to review broadl the long-term factors which affect these two acts.

PLANT LOCATION

A survey conducted by the National Electric Light Association and the Metropolitan Life Insurance Company during 1926 and 1927 in 2,084 cities in the U. S. and Canada revealed the following reasons given for plant location, arranged according to the frequency with which each was cited:

1. Markets
2. Labor
3. Transportation
4. Materials
5. Available factory building
6. Personal reasons
7. Power and fuel
8. Cheap rent
9. Near related industries
10. Living conditions
11. Financial aid
12. Taxes
13. Mergers and consolidations
14. Cheap land
15. Near parent company
16. Banking facilities

THE SITE

For the purposes of this article, the answer to the question of location can b found in the study of the following components of the industrial economy:

1. Power costs
2. Transportation costs
3. Land
4. Labor costs

Broadly, the question involved is whether to pay high transportation charge on the finished product in order to avail yourself of cheap land and labor in th hills; or to pay high land and labor prices in order to be near your Main Street During the Depression, the theory of decentralization came in for a great dea of publicity and some research. The net of this research was small. It showe that the great bulk of industries is centered in 200 out of the 3,000 counties i the U. S. It showed that "decentralization" was a loose term which shoul properly be broken down into "slow diffusion" from urban to suburban or satel lite towns, and "wide dispersion" from these areas to areas totally unrelated an usually geographically distant. It showed that *diffusion* has been going on sinc the last century at a more or less steady and miniscule rate, and that the move ment was away from the principal cities toward their peripheries, their counties and their satellite towns in descending order of popularity. It showed tha *dispersion* was a more recent phenomenon, closely related to economic depres sion and mainly confined to factories making boots, shoes, silk, rayon, men' clothing, and knit goods. And it showed that the whole movement of decentrali zation over the last 40 years had affected no more than 20 per cent of all factories

Thus it appears that, at least until recently, decentralization has been littl more than a theory whose validity has usually been honored in the breachin of it, and whose chief use has been to fill the white space in sales pamphlets o the bigger engineering and construction firms. However, an examination of it four chief components—power, transportation, land, labor—reveals that th last five years have established a much more imperative demand for decentrali zation, both diffusive and dispersive.

ECONOMY

"Every aspect of the current trend stresses attainment of minimum price to the ultimate consumer. One most interesting phase is reflected in relocations dictated solely by a desire to cut production and distribution costs. The paper industry is typical."

"Companies producing the largest tonnages have shifted en masse to Southern and Western States, where low labor costs and an ample supply of pulp are close at hand. They have found production economies great enough to offset the longer haul to market and the added expense of new plants."

—**George A. Bryant, Jr., Executive Vice President of the Austin Company**

POWER AND FUEL were long factors antagonistic to decentralization be cause they were derived straight from the mine and the river beside which th factory must perforce stay. Since 1920, however, the supply of electricity—indus trial energy in its most ubiquitous form—has increased two and a half times an its price has declined 35 per cent; and since 1932 the country's consumption o electric power has increased 41 per cent while its national bill has gone up onl 13 per cent. Nowadays, so far as power is concerned, a factory can go where it likes

TRANSPORTATION

	Ton miles by rail	Ton miles by truck
1925	417,418,000,000	9,536,000,000
1930	385,815,000,000	16,982,000,000
1935	283,307,000,000	20,680,000,000

TRANSPORTATION costs lie at the very root of the question of decentrali zation. A cogent example in point is that of the Bethlehem Steel Company. T send 100 lbs. of sheet steel from their plant at Sparrow Point, Md., to the larg Detroit market by rail costs 38 cents. The route from Buffalo, N. Y., to Detroi is covered by boat, costs 18 cents. The new Bethlehem plant was located on the outskirts of Buffalo.

In the quest for industrial economy, the question of transportation costs bulks larger today than ever. The costs vary from industry to industry, running from about two up to as high as 25 per cent of the wholesale price. For reference, here are some typical figures:

Unit	Raw Materials	Transportation to Factory	Factory Charges	Transportation to Wholesale
Carpet	48%	1.5%	48.5%	2 %
Steel Girder	50	7.	35.	8
Diesel Engine	20	.5	78.	1.5
Toy (10¢)	30	5.	65.	10

Obviously a reduction in freight rates will favor dispersion (but no diffusion), since it will serve to reduce the relative importance of transportation charges in the total cost of the manufactured article, and also make economically available for industrial sites whole new areas formerly too distant. In 1924 the average freight revenue per ton mile was 1.132 cents; by 1935 it had dropped to .998. These reductions have been largely due to the war of attrition which the I. C. C. has been waging on freight rates over the last decade. During 1935 and 1936 this body allowed an emergency charge of about 6 per cent to be added to the rates of most basic industry goods such as coal and iron. But this charge has been repealed as of 1937, and rates today stand lower than they have in many a year.

One of the considerations which impelled the I. C. C. to remove this surcharge was to allow the railroads to compete with the serious threat of the truck—a brand new transportation baby which has so far made its way by undercutting the rail rates and by offering superior mobility of routes. How firmly trucks have established themselves in the field of the short haul—usually from factory to market—may be deduced from this sample comparison: the Pennsylvania Railroad quotes a charge of $10.36 to ship a car from Linden, N. J., where is located General Motors' newest plant, to Stamford, Conn. A trucking company will move that same car for $8 for anybody, will probably give General Motors a decidedly lower rate than that. But so far truck shipping is relatively unimportant; in 1935 the total of trucking ton miles was only 7 per cent of the rail total.

LAND values fell unequally during the depression, those at urban peripheries declining much more profoundly in relation to their prosperity levels than those nearer to the congested areas. For instance, in Manhattan the depression drop for industrial sites did not average over 10 per cent; in outlying metropolitan New Jersey the decline was about 40 per cent (from about $45,000 to $20,000 an acre); in rural Putnam County, it was about 90 per cent (from about $3,000 to $300 an acre). Such wide differentials—and these are fairly typical of any industrial center—cannot fail strongly to encourage diffusion at a greater than average rate.

A dispersive as well as a diffusive force is the tax rate on industrial sites. An increase in tax rates on land is occasioned quite simply by an increase in the costs of local government. These increases are obviously larger in urban, industrial areas than in rural areas, and it is this fact which makes the relation of taxation to decentralization particularly pertinent today. For the costs of municipal government are high today, and will continue to be high. How direct an effect this has on realty business is nowhere better seen than in the fact that at this very time realty organizations all over the U. S. are launching the most determined drive

THE WESTINGHOUSE ELECTRIC AND MANUFACTURING CO. introduced an "incentive" system together with a few simple assembly changes in their East Pittsburgh plant, and thus effected a 52 per cent saving in time. Use of a motion study gained them another 37 per cent saving in time.

THE WESTERN ELECTRIC COMPANY installed conveyors and reorganized the plant of their Hawthorne Works in Chicago. Results were a 49 per cent reduction of their raw material and process stock investment; a 70 per cent reduction in their piece-part investment; a 17 per cent saving in floor space.

THE CADILLAC MOTOR CAR COMPANY in Detroit, Mich., changed from the straight-line production method to the "process control" (hodgepodge), and so effected a cut in labor costs of 40 per cent, a reduction of floor space required of 40 per cent.

THE TEXTILE DYEING AND PRINTING CO. OF AMERICA have been enlarging their Richmond, Va., plant, producing correspondingly less in their Paterson, N. J., plant. A big factor: the Paterson tax rate is $43.80 per thousand, the Richmond tax rate $22.

RELOCATION

"I believe that to a considerable extent rural rehabilitation of industry may best be brought about by the building up of branch establishments and the development of new industries in the isolated communities. This, I believe, is better than a large-scale attempt to move industries bodily from one location to another. The development of branches would make possible the employment of the rural population working seasonally without possible ill effects such as would result from moving an industry overnight and leaving former employes stranded in the city."

—Daniel C. Roper, Secretary of Commerce

PRE-WAR

Globe

POST-WAR

Publishers Photo Ser

THE ABBOTT LABORATORIES, North Chicago, Ill., installed specially designed packers' benches and thus increased the output per man approximately 23 per cent.

THE APEX ELECTRICAL MANUFACTURING COMPANY, Cleveland, Ohio, by the modernization of equipment and the installation of a special grinder for grinding rotor shafts, has reduced the number of rejections of assembled motors by 90 per cent.

THE PACKARD MOTOR CAR COMPANY saved half the floor space of their Detroit plant by reorganizing their layout. In the space thus gained they were able to manufacture the new "120."

THE HALSEY SYSTEM

In 1891 F. A. Halsey, forerunner of the modern efficiency movement, installed in the factory of the Canadian Rand Drill Company a plan of wage payment whereby the worker, while receiving the regular time wage, was offered in addition a premium for increased production over a stated normal day's work. This norm was based on current output. Plants using the Halsey System report the following: a median increase in production of 40 per cent; a median increase in earnings of 20 per cent; a median reduction in wage cost per piece of 20 per cent, with 70 to 100 per cent of the employes able to earn a bonus.

THE TAYLOR SYSTEM

The essence of the Taylor Plan is to set two rates, one well above the normal time rate, and one somewhat below, and to limit the workers who should receive the high rate to those who were able to reach and surpass a specified standard of performance. There were two standards of performance, but no bonus was given for surpassing the lower standard and not reaching the higher one, nor for surpassing the higher one. Factories using the Taylor System report a median increase in output of 25 per cent; a median increase in earnings of 20 per cent; a median increase in unit cost of 17 per cent.

of their lives to assure to their respective communities some form of tax limitati on realty. For a horrible example of its effects they can and repeatedly ha pointed to New York City, where the commercial and industrial exodus in flig from the tax burden has developed to the point where it has caused prolong deliberations by the local government.

That these high tax rates will undoubtedly continue can be demonstrated l two facts. As of 1933, State and municipal long-term debts were 13 per ce above 1929, and the per capita debt stood 10 per cent higher. Since that day—t last in which records are available—these debts have increased rather th decreased in most of the larger cities. So long as they do not decrease, their co sequent cost in high taxes represents a force for dispersion.

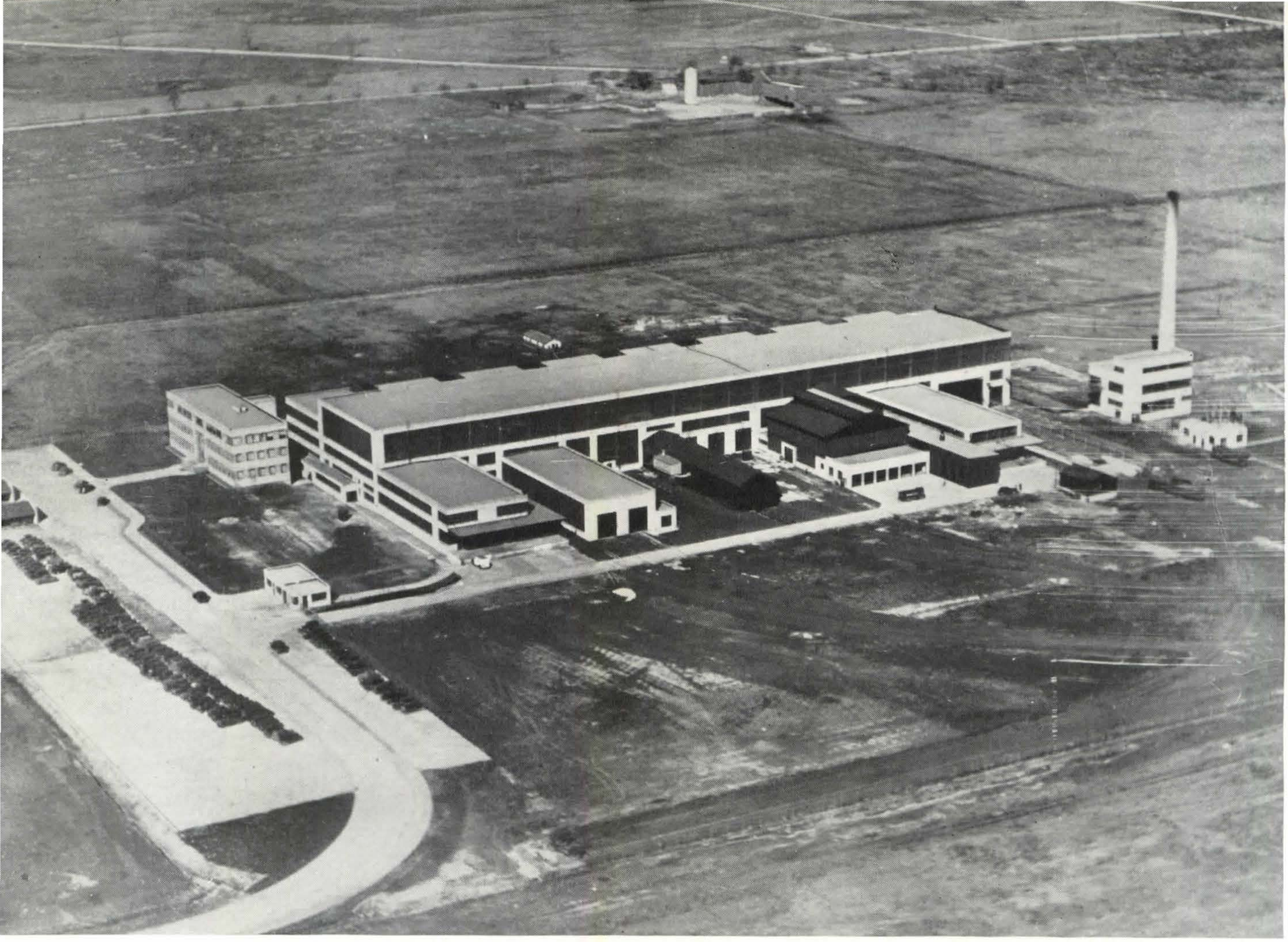
LABOR The elements of decentralization so far examined—land, power, a transportation—have all revealed a permissive rather than a compulsive tenden toward decentralization. The element of labor, however, promises to constitu a strong compulsive force toward both the dispersion and the diffusion of indu tries. Stated elliptically and baldly, this compulsion arises from the fact th organized labor is heading for shorter hours and higher pay. Since, in 1933, t wages of labor were already eating up 67 cents out of every dollar of industri income, any substantial increase in the position of labor could not fail to jeopa dize industrial economy and cause immediate readjustments. These readju ments will put at a premium economical factory sites.

Over the last quarter century, labor itself has contributed much to the i provement of industrial efficiency and profits. This was largely the result of non-recurring impetus given to industry through the discovery of the "efficien expert."

The first efforts at increasing labor's efficiency consisted simply in training t men to use their tools more expertly; for it was found that even craftsmen had b (i.e., wasteful) habits. Next step was to increase the incentive to better wo For this purpose a number of bonus systems were devised and put into fai general operation. Efficiency methods, as applied not only to the worker but l tools, have resulted, according to the Brookings Institution's *Income and Ec nomic Progress*, in an estimated increase of 25 per cent in industrial produ tivity since 1920. In the same period labor's wages rose 14 per cent.

The other side of the picture is that today about one-quarter of industr wage earners are members of non-company unions, the number of strikes h risen from 650 in 1930 to 2,014 in 1935, and the 30-hour week seems far fr improbable. To cap it all, the NRA is once more standing in the wings of Capi Hill.

An example of the decentralizing effect of these rising labor costs is curren being unfolded in the textile industry. Between 1921 and 1929 the number textile firms in New Jersey decreased from 749 to 378. In the same period th



E ARCHITECTURAL IDIOM of factories since 1900 is broadly traced by two pictures opposite and the one above. The pre-War factory was a ary shelter whose interior plan was designed mainly to support the roof. Twenties brought a growing tendency to integrate the structure of factory more closely with the processes it sheltered. A curious by-product this new economy is shown in the second picture. Its owner has contrived a pseudo-Spanish exterior to excite the public, and so make his factory do extra duty as an advertisement. More logical in its economy is the modern plant above. Its main shed is sufficiently anonymous in design to house a number of processes, is thus prepared to change to a new kind of production at a minimum cost. Specialization is represented by the thirteen wings. This plant stands in open country fifteen miles outside Chicago.

Pennsylvania increased from 167 to 397, those in Rhode Island from 16 to 36, d those in North Carolina from none recorded to 29. The impetus behind this uthward migration was the search for cheap labor and lower taxes.

Now look at all the elements of decentralization together. The need for power longer limits a plant's location with any strictness. The gradual decrease in l rates, together with the increased use of the truck, have made new areas onomically available for industrial use. The increase in municipal tax rates, to-ther with the depression decline in the price of semi-rural sites, make relocation ore desirable. And the rise of labor as an integrated economic force is pushing ose that can move further than ever away from the urban centers which are so sceptible to organization by labor. Note that these forces are all either the sult of, or have been sharply intensified by, the depression; and that without ception they favor decentralization either by diffusion or by dispersion. The pression not only slowed down industry; it changed its course.

HE FACTORY

Since the factory is, by definition, a strictly utilitarian structure, its design must governed by economy. Time was, before the War, when all a factory had to do s to produce a maximum number of units to meet an expanding market. The

THE GANTT SYSTEM

Henry L. Gantt, an associate of Taylor's, devised a system incorporating both the bonus (Halsey) and the standard of achievement (Taylor). This system guarantees a minimum wage, then adds a bonus for work over a standard considerably higher than the minimum. Thus is avoided the two rigid classifications of the Taylor System. Users of the Gantt System report a median increase in output of 32 per cent; a median increase in earnings of 20 per cent; and a median reduction in unit cost of 17 per cent.

THE EMERSON SYSTEM

In the Emerson Plan a standard of efficiency is set, and at a certain percentage of this standard, say 67 per cent, bonus payments begin on a carefully graduated scale. At 100 per cent efficiency, the rate becomes almost straight piece rate. Below 67 per cent efficiency the worker receives his straight time wage. Plants using the Emerson System report increased production of from anywhere between 25 and 100 per cent; unit costs reduced from 15 to 50 per cent, and earnings increased from 10 to 100 per cent.

MAJOR INDUSTRIAL BUILDING CONTRACTS 1936

Bethlehem Steel Co.	$41,000,000
Tenn. Coal, Iron & Railroad Co.	25,000,000
Amer. Sheet & Tin Plate Co.	25,000,000
Jones & Laughlin Steel Corp.	25,000,000
Standard Oil Co. of Indiana	10,000,000
Ontario Paper Co.	8,500,000
Southern Kraft Corp.	7,500,000
Youngstown Sheet & Tube Co.	7,350,000
Industrial Rayon Corp.	7,000,000
Continental Can Co.	7,000,000
General Motors Corp.	6,500,000
Republic Steel Corp.	5,750,000
Container Corp. of America	5,500,000
Tubize Chatillon Co.	5,300,000
Carnegie-Illinois Steel Corp.	5,000,000
West Virginia Pulp & Paper	5,000,000
Fisher Body Corp	5,000,000
Lever Bros. Co.	5,000,000
Olds Motor Works Inc.	5,000,000
Kieckefer Container Corp.	4,000,000
Champion Paper & Fiber Co.	3,000,000
Monsanto Chemical Co.	3,000,000
Crown Cork & Steel Co.	2,750,000
Union Bag and Paper Corp.	2,500,000
Wisconsin Steel Works	2,500,000
Atlantic Refining Co.	2,000,000
Owens-Illinois Pacific Coast Co.	2,000,000
Soundview Pulp Co.	2,000,000
Kraft-Phenix Cheese Corp.	2,000,000
Johns-Manville Corp.	1,950,000
Ludlow Mfg. Associates	1,500,000
Shell Petroleum Corp.	1,500,000
Linde Air Products Co.	1,500,000
Spreckles Sugar Co.	1,500,000
Standard Oil Co. of Ohio	1,500,000
Buick Motor Co.	1,500,000
Viscose Co.	1,200,000
Industrial Rayon Corp.	1,200,000
Ford Motor Co. of Canada	1,200,000
Armour & Co.	1,100,000
Holly Sugar Co.	1,100,000
Garford Co.	1,000,000
Atlas Powder Co.	1,000,000
Petrol Refining Co.	1,000,000
Cyclops Steel Co.	1,000,000
Butler Bros.	1,000,000
DuPont Rayon Co.	1,000,000
Carbide & Carbon Chemical Corp.	1,000,000
Postum Co.	1,000,000
Solvay Process Co.	1,000,000
International Nickel Co.	1,000,000
Technicolor Inc.	1,000,000
Union Carbide Co.	1,000,000
Kendall Refining Co.	1,000,000
Socony Vacuum Oil Co.	1,000,000
Eastman Kodak Co.	1,000,000
Owens-Illinois Glass Co.	1,000,000
Crowell Publishing Co.	1,000,000
Rahr Malting Co.	1,000,000
National Dairy Products Corp.	1,000,000
General Dyestuff Corp.	1,000,000
Sheffield Farms Co.	900,000
Studebaker Pacific Corp.	850,000
Bendix Aviation Corp.	800,000
International Harvester Co.	800,000
Celanese Corp. of America	750,000
Utah-Idaho Sugar Co.	750,000
Chevrolet Motor Co.	750,000
Pure Oil Co.	700,000
Mesta Machine Co.	700,000
Libbey-Owens-Ford Glass Co.	700,000
Ralston Purina Co.	700,000
Electro-Motive Corp.	700,000
Grand Rapids Varnish Corp.	600,000
Ford Motor Co.	500,000
Chapman Price Steel Co.	500,000
Campana Corp.	500,000
General Phosphate Co.	500,000
Pontiac Motor Co.	500,000
General Motors Truck Co.	450,000
Jefferson Lake Oil Co.	450,000
United Aircraft Corp.	400,000
Cudahy Packing Co.	400,000
Universal Atlas Cement Co.	400,000
Lockheed Aircraft Corp.	400,000
L. A. Young Spring & Wire Corp.	400,000
Hammermill Paper Co.	350,000
Sunshine Mining Co.	350,000
Climax Molybdenum Co.	350,000
George A. Weston Co.	300,000

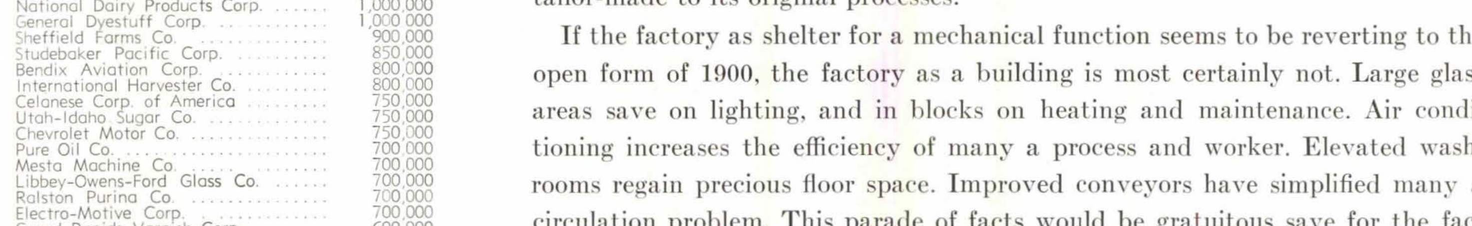
THE CADILLAC MOTOR COMPANY rearranged an assembly line in its Detroit plant in the manner shown below. Results were a reduction in workers from 27 to 17, a space salvage of 50 per cent.

War enlarged our productive capacity—with a few notable exceptions—until w were producing more than we were consuming, and in the resulting competitio the governing function of the factory changed almost overnight to production a a minimum cost per unit. The rise in land costs, labor costs, and taxes alread examined has latterly made this economy all the more imperative. But wishing i not all the industrialist can do today to achieve his savings in plant structure. Th fact is that the technological advances of the last five years have been so grea and the opportunities to install them commercially so small, that he cannot pos sibly ignore the need for them.

On the one hand these advances have been in the process of manufacture. Th assembly processes at the turn of the century were largely haphazard, laid out a much to accommodate the structure as the flow of work. During the second an third decades the progressive industrialist abandoned the hodge-podge assembl process in favor of one operating more or less in a straight line. Currently, th assembly line is undergoing another great change in the name of efficiency: th straight line is being abandoned in many plants in favor of a more circuitous on which saves space and labor.

Concurrently, the increased mechanization of many industries has raised th ante in their gamble in dies, tools, and other bulk installations. For example, th American Rolling Mill plant in Ashland, Ky., decided its worries were over whe it fitted itself up with a complete set of dies geared to produce 68 in. turret to auto strips. Two years later the specifications were changed to 98 in. Plan alterations were required before the new dies could be installed. Sad tales suc as this, taken in conjunction with the continued evolution of production system are placing a premium on the convertible type of plant. It must nowadays b geared to continued and fundamental changes in layout usage, rather tha tailor-made to its original processes.

If the factory as shelter for a mechanical function seems to be reverting to th open form of 1900, the factory as a building is most certainly not. Large glas areas save on lighting, and in blocks on heating and maintenance. Air cond tioning increases the efficiency of many a process and worker. Elevated wash rooms regain precious floor space. Improved conveyors have simplified many circulation problem. This parade of facts would be gratuitous save for the fac that it emphasizes the new economies which new techniques and materials ca achieve. And economy, as we have seen, has become a competitive weapon tha cannot be sharpened too keenly. At its best the Factory of 1937 becomes a lo structure with an unobstructed interior, quickly convertible to new processes o the needs of a new owner. Its power comes from an electric company rather tha a mine or river, and its location is as rural as its marketing problem permits. I makes use of new materials, new construction systems, new distribution method Its first cost may be high but its maintenance cost must be low. It looks we because it looks its part. And it recognizes in its facilities an obligation to serv not only the machine but the man who runs it.



Reprinted from Factory—McGraw-Hill Publishing

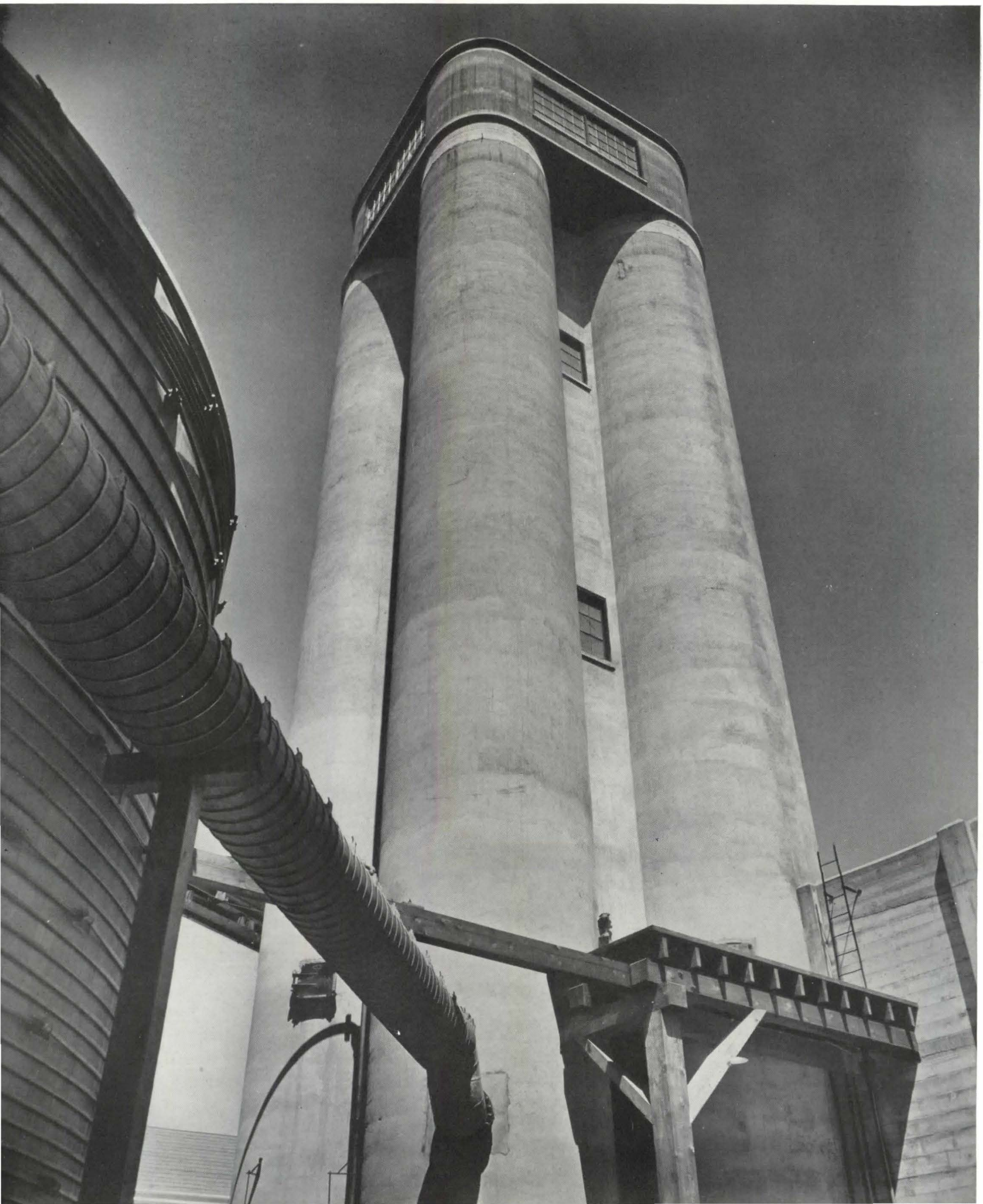
PULP MILL

PULP DIVISION, WEYERHAEUSER TIMBER CO.

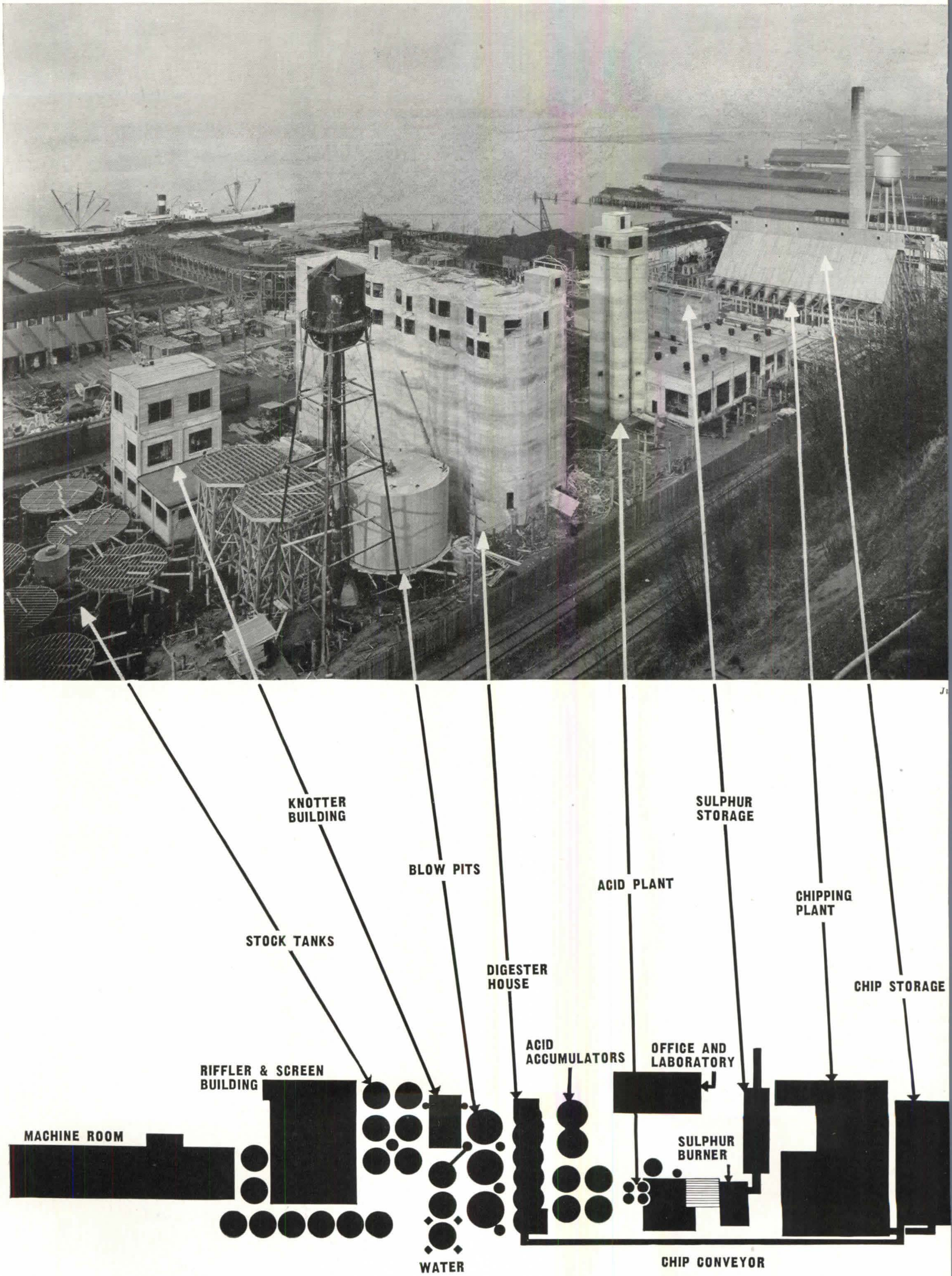
EVERETT, WASHINGTON

O. C. SCHOENWERK, CONSULTING ENGINEER

leen Studio



PULP MILL, WEYERHAEUSER TIMBER CO.



etting up a pulp mill near the scene of gging operations simplifies the problems transportation and facilitates the process-g of the raw product.

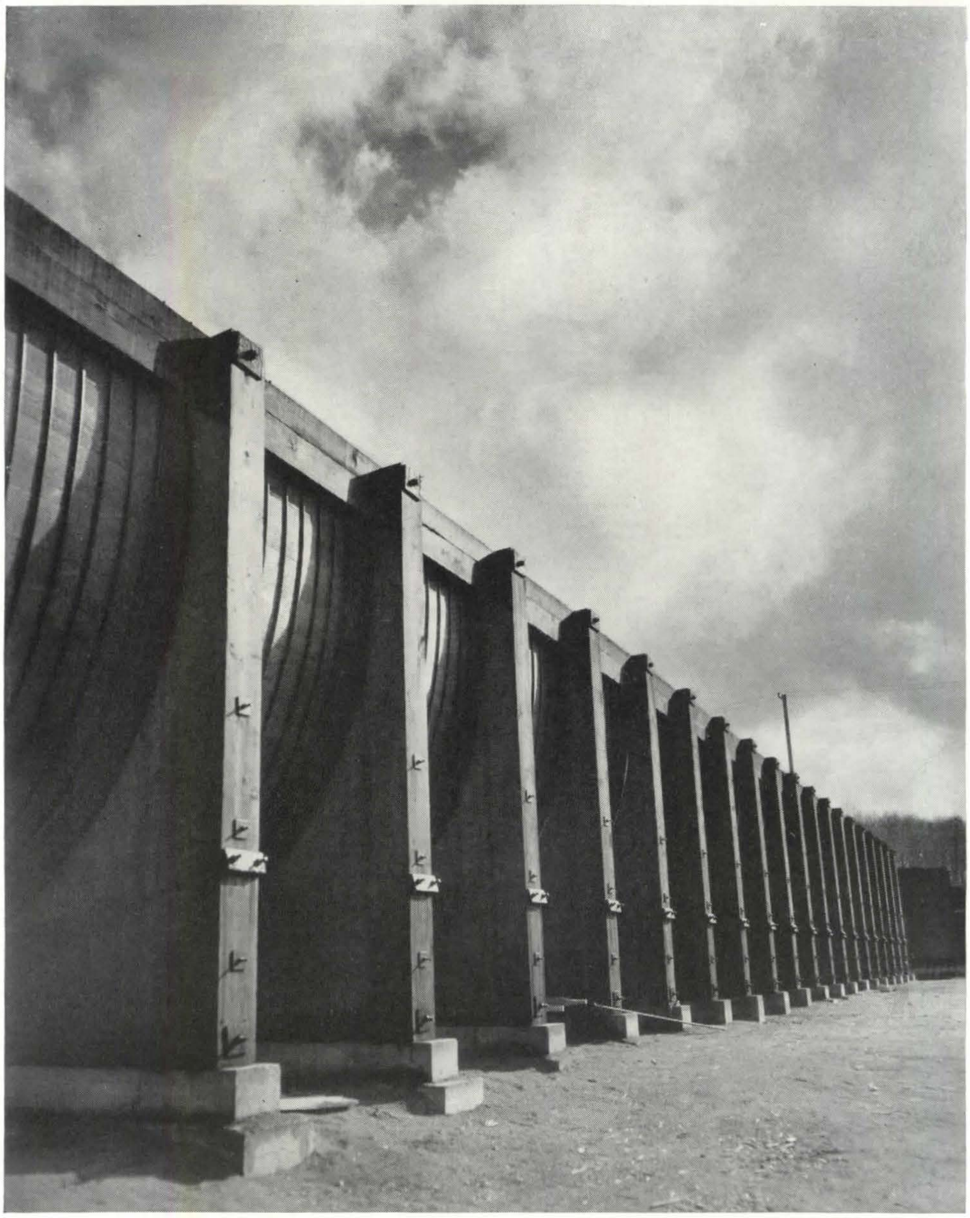
onveniently located for both rail and ean transportation, this mill is an ex-ptionally interesting example of the flow-an developed into a series of structures outstanding architectural merit. As shown the diagram on the opposite page, e plant is set up for straightline produc-on. The buildings are functional, mak-g no concessions to appearance by the plication of extraneous "architectural" mo-es, a fact which is responsible for the ccess—architecturally speaking—of the re-lt. Part of the group is of concrete, and rt is of wood; in each case the material s selected for its suitability.

ne first unit, shown on this page, is a filter ant, located about a mile from the rest of e mill. Elevated about 240 ft. above the ill, it provides a water head sufficient to itate the water in the head house where emicals are mixed with it.

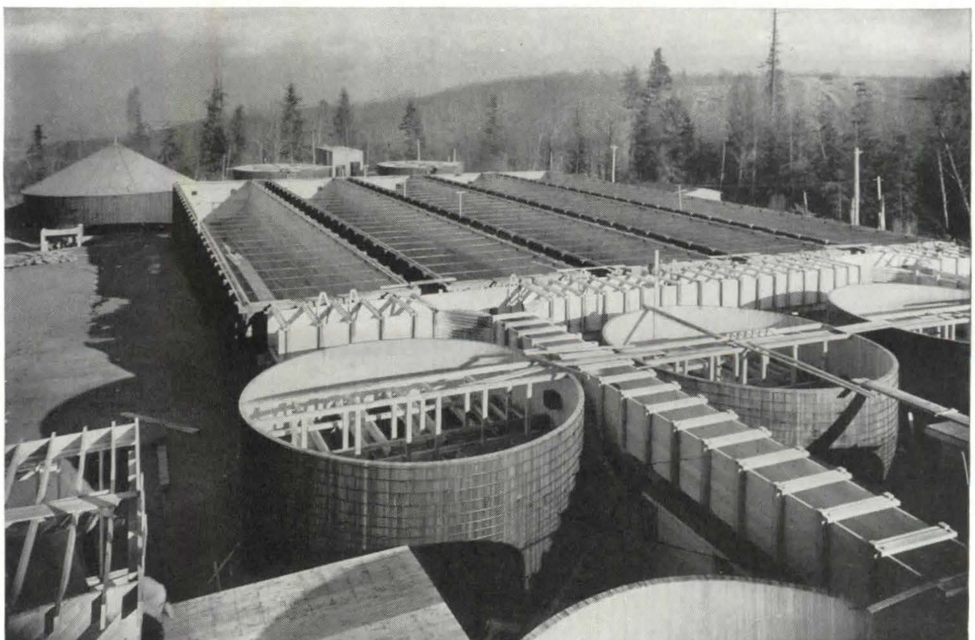
lphur is carried directly from the docks the storage building on an elevated belt nveyor. As the material is needed it is awn out of the bottom of the bins, and oved on another conveyor to the acid ant, where the so-called "cooking acid" produced. This is stored in wooden tanks, d in two large spherical steel accumulators om which it is drawn off as needed.

ne chipping plant reduces wood blocks to ips which are transported by conveyor to storage house adjacent. Both buildings are heavy Douglas fir construction.

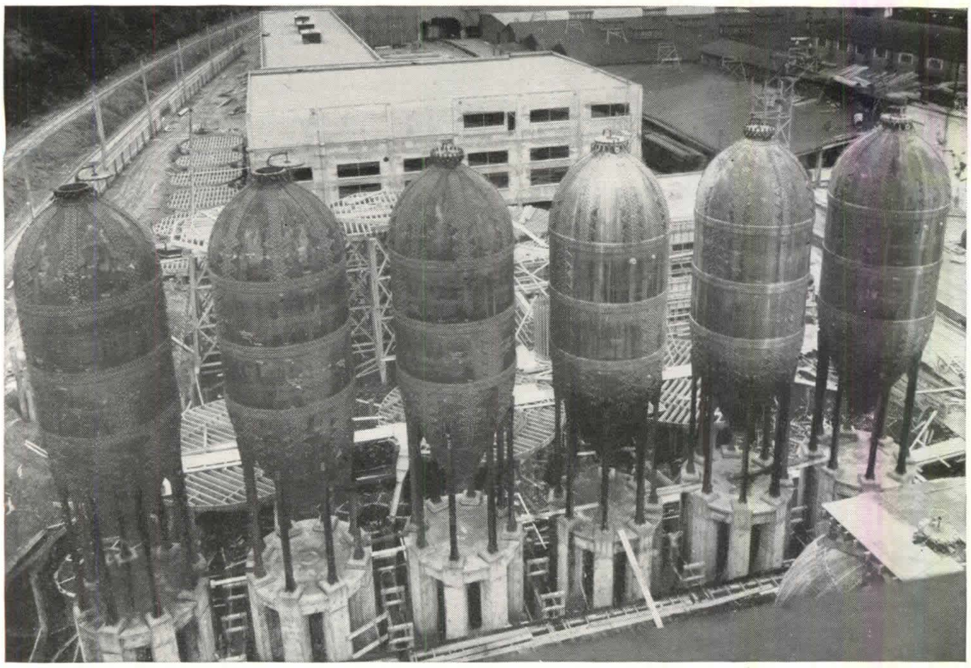
nips and acid meet at the digesters, six rge steel tanks which are enclosed in a ncrete shell, illustrated on the following ge. The chips are introduced at the top d the cooking acid and steam enter at the ttom. Here the ligneous material in the od is dissolved, leaving cellulose fibers. pplementary operations involve the wash-g, cleansing, and drying of the fibers which ally enter the machine room where a 00-ton machine dries them, and where esses roll them into sheets which are cked in 400-lb. bales. Beyond the machine om are pulp storage sheds from which bales are shipped out by boat or rail.



FILTER PLANT



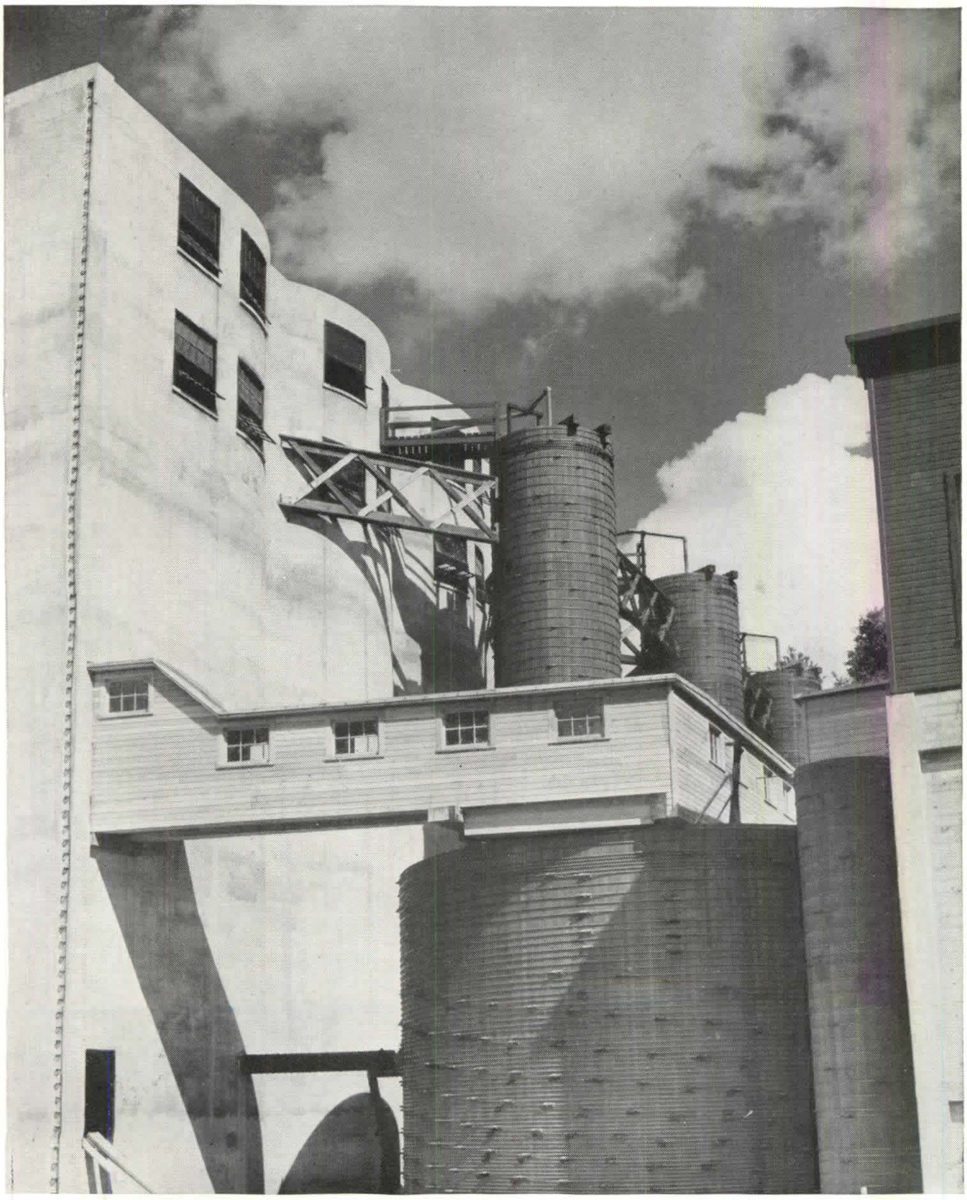
Juleen Photos



Associated Photographic Service

STEEL DIGESTERS

Due to the size of the steel digesters, which are 18 ft. in diameter and 52 ft. high, they were erected in the open and the concrete shell was later built around them with the use of slip forms.



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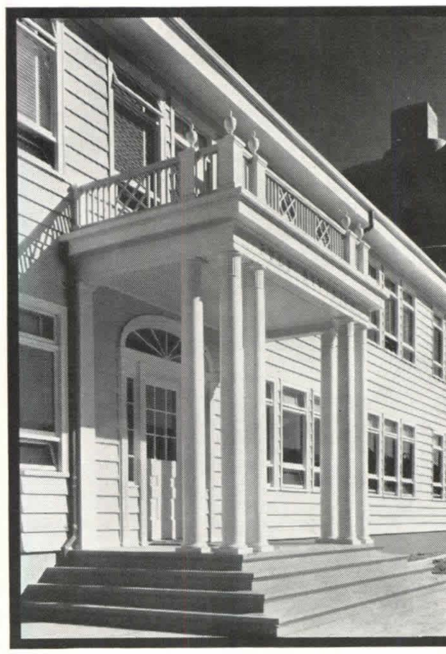
DIGESTER HOUSE



OFFICE AND LABORATORY

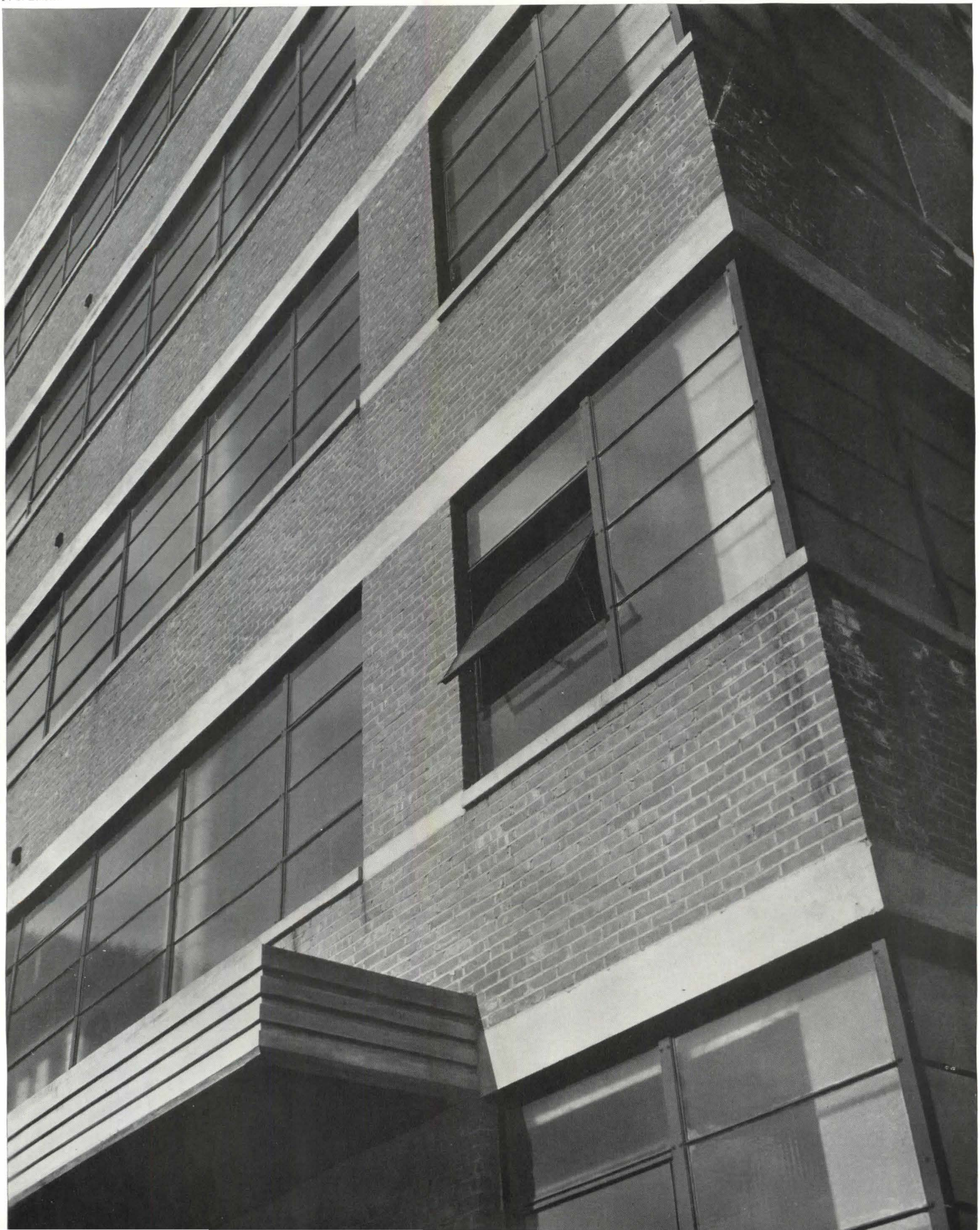
A more than slightly curious contrast exists between the pulp mill and its adjoining office building, which would certainly not be recognizable as part of the group were it not for the digester towers in the background. It is a perennial architectural paradox that industry recognizes the functional approach in its production buildings but immediately reverts to sentimental traditional forms when it shelters its office personnel.

WAREHOUSE

THE SHERWIN-WILLIAMS CO., NEWARK, N. J.

THE AUSTIN COMPANY, ENGINEERS AND BUILDERS

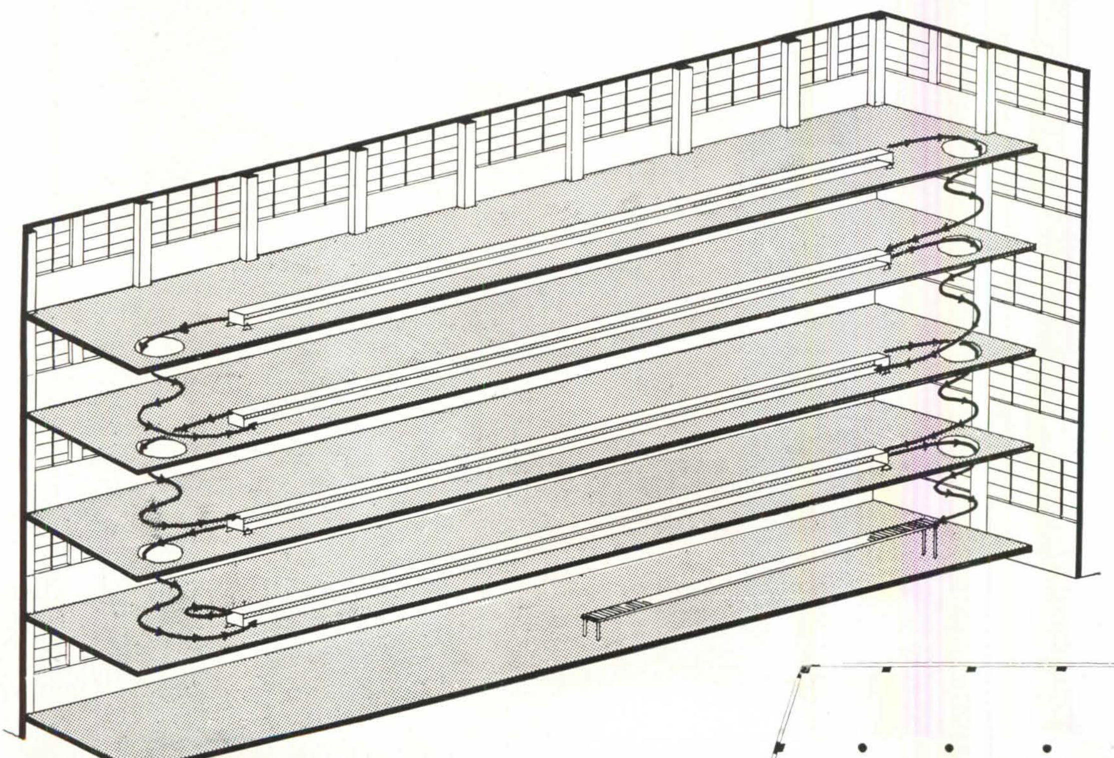
F. S. Lincoln

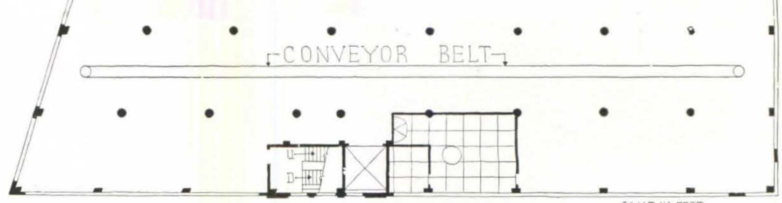


WAREHOUSE,
THE SHERWIN-WILLIAMS CO.

CONVEYOR FROM ADJACENT FACTORY.

F. S. Lincoln





THIRD & FIFTH FLOOR PLANS

The Sherwin-Williams warehouse is an expansion of existing storage space. It fronts on the Passaic River, serves a spur of the Pennsylvania Railroad, and is also equipped for delivery by truck. The structure is of reenforced concrete, with a flat slab construction, and is designed to take a live load of 250 lbs. per square foot on all floors. Manufactured goods arrive by conveyor at the fifth floor level, and are distributed to storage bins, also by conveyor, on the floors below. As orders come in they are sent down to the first floor from the various bins and are there assembled for shipment; the first floor is used almost entirely for shipping. A diagram showing the movement of goods through the building by conveyor is on the opposite page. The building was expensive to construct as bad soil conditions made necessary the driving of concrete piles, 30 to 70 ft. in length. According to the Austin Co. a structure of this kind could be duplicated today for approximately $3 a sq. ft., including special foundation work and the mechanical trades.

F. S. Lincoln Photos

FIFTH FLOOR

WAREHOUSE, THE SHERWIN-WILLIAMS CO.

THIRD FLOOR

GROUND FLOOR

F. S. Lincoln Photos

CONSTRUCTION OUTLINE

FOUNDATIONS
Footings—concrete piles, 30 to 70 ft. long. Foundations—reenforced concrete with minimum strength of 2,500 lbs.

STRUCTURE
Reenforced concrete, flat slab type construction. Floors designed to carry a live load of 250 lbs. per sq. ft. All concrete was vibrated during placing. Exterior walls—common brick with case stone trim. All walls are 12 in. thick. Interior partitions—hollow tile and brick.

ROOF
Reenforced concrete slab covered with a 20 year pitch and slag roof, Johns-Manville Co., Inc.

SHEET METAL WORK
Flashing—16 oz. copper.

WINDOWS
Sash—Fenestra steel, Detroit Steel Products Co. Glass—$\frac{3}{16}$ in. rough hammered.

STAIRS AND ELEVATORS
Stairs—steel with two line pipe railing, channel treads filled with concrete with anti-slip mixture. Elevators—electric freight, 5,000 lbs. capacity, platform 8 x 8 ft., speed 60 ft. per minute, A. B. See Elevator Co., Inc.

FLOORS
Concrete throughout, with 30 to 40 lbs. of metal floor hardener per 100 sq. ft. in mixture.

FLOOR COVERINGS
Asphalt tile in office—Armstrong Cork Products Co.

METAL DOORS
Elevator doors—Peelle type, The Peelle Co. Other interior doors—Kalamein. Main entrance door—metal; remainder of exterior doors—overhead type.

PAINTING
Walls and ceilings in office—2 coats mill white paint. Sash and metal work—2 coats graphite paint as manufactured by the owner.

ELECTRICAL INSTALLATION
All wires are run in conduits embedded in the floor slab. Switches in panel boxes of the dead front safety type.

PLUMBING
All fixtures by Standard Sanitary Manufacturing Co. Wash fountains and showers—Bradley Washfountain Co.

HEATING
Low pressure vacuum pipe system, steam furnished from existing plant. Radiators—installed only in toilet rooms, unit heaters thermostatically controlled being used elsewhere, Modine Mfg. Co. Valves—Sarco Co., Inc., and Ohio Injector Co.

CONVEYOR SYSTEM
Alvey Conveyor Mfg. Co.

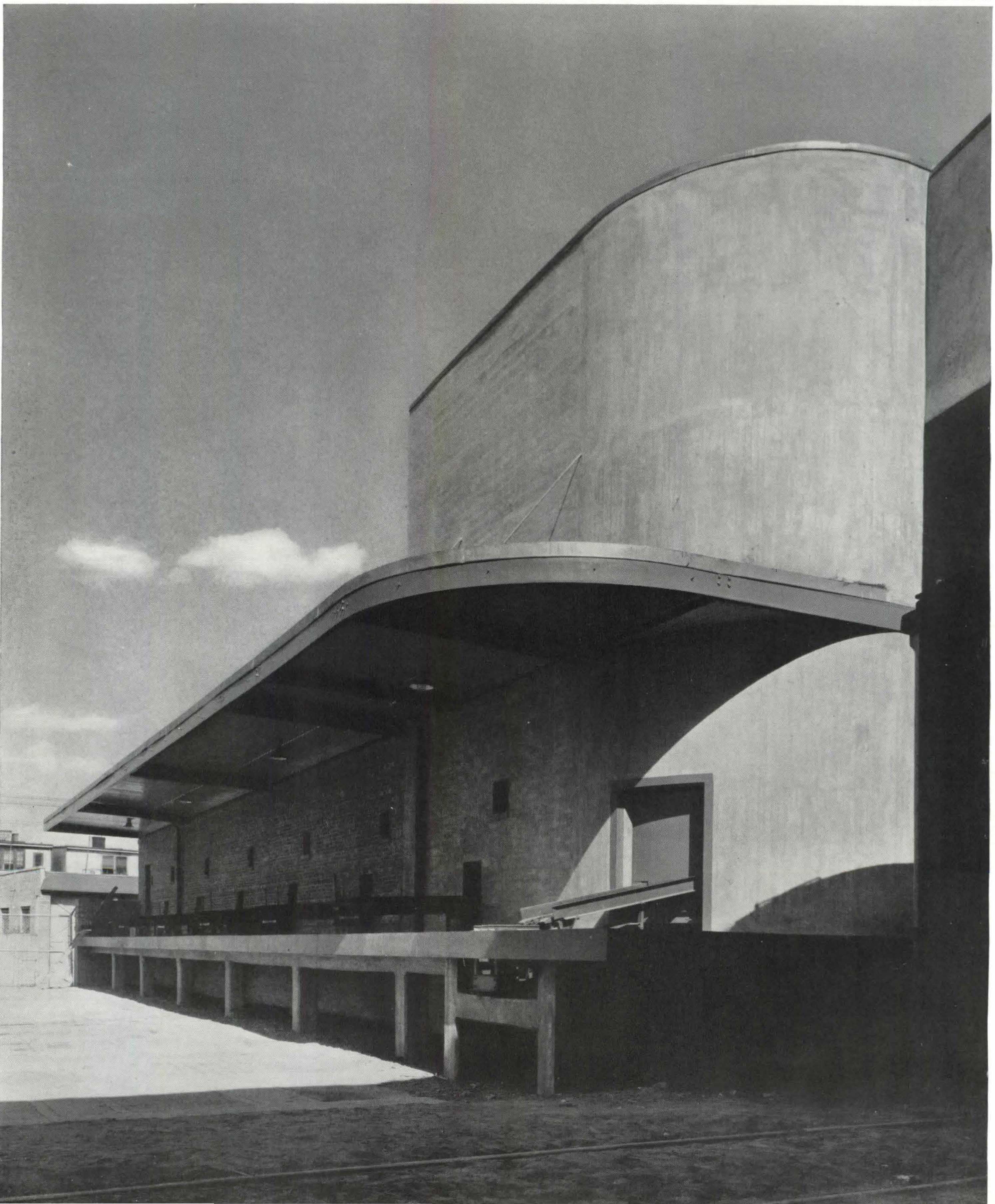
WAREHOUSE

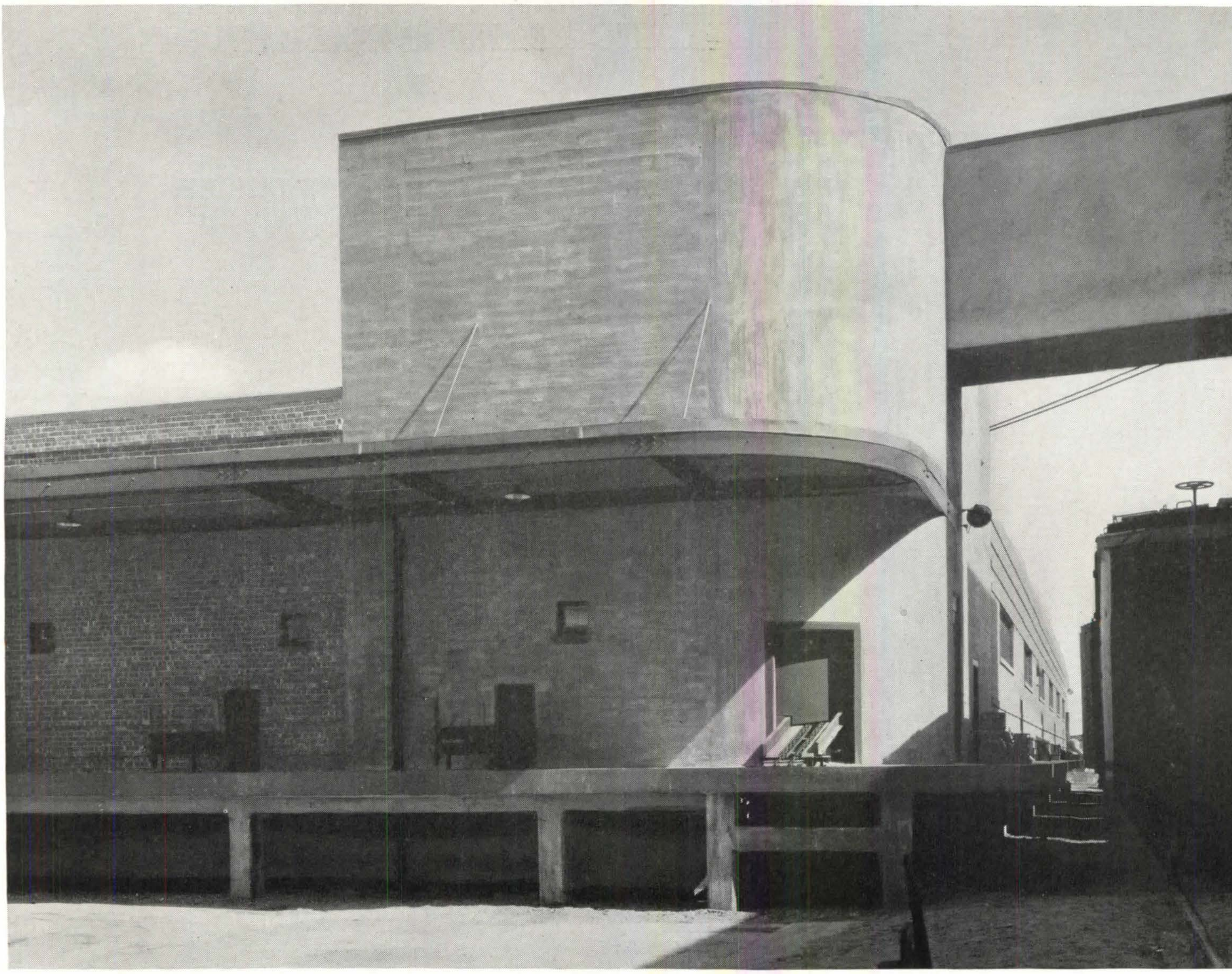
BOTTLING PLANT, P. BALLANTINE & SONS

NEWARK, NEW JERSEY

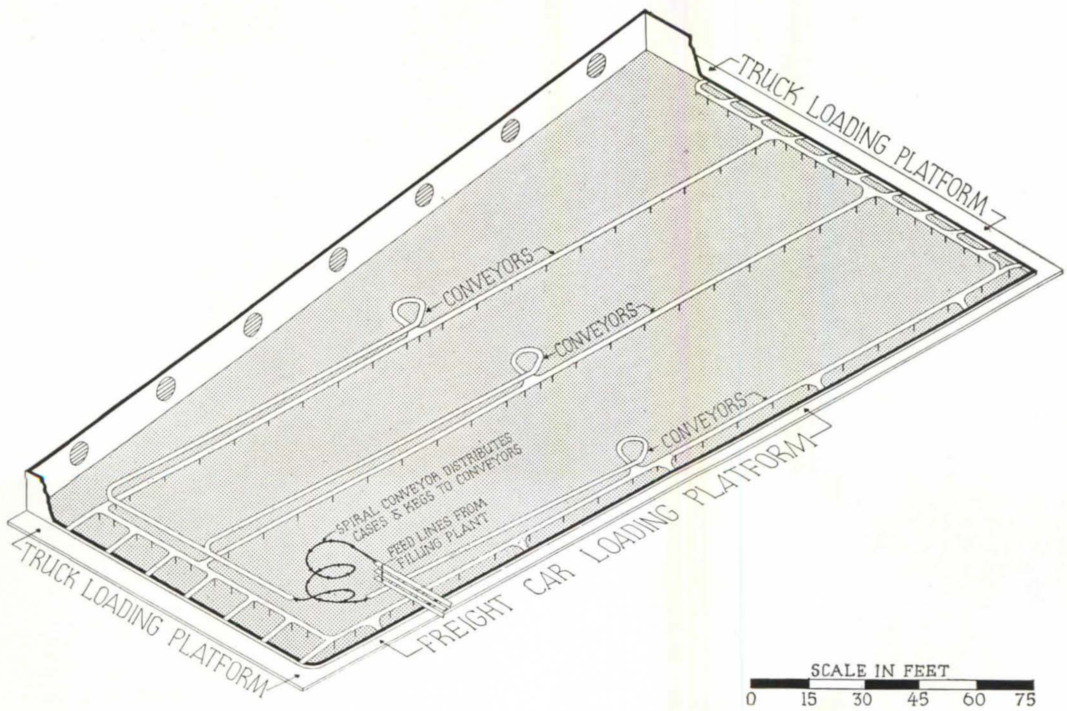
J. SANFORD SHANLEY, ARCHITECT

Charles E. Knell



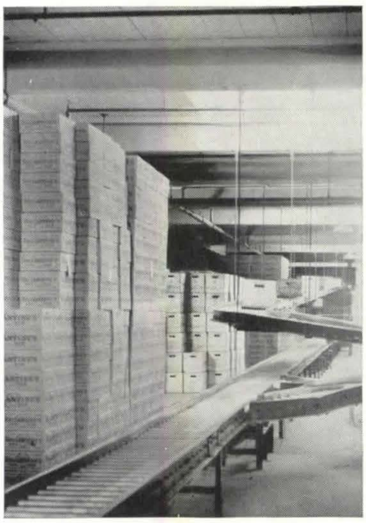


Charles E. Kne

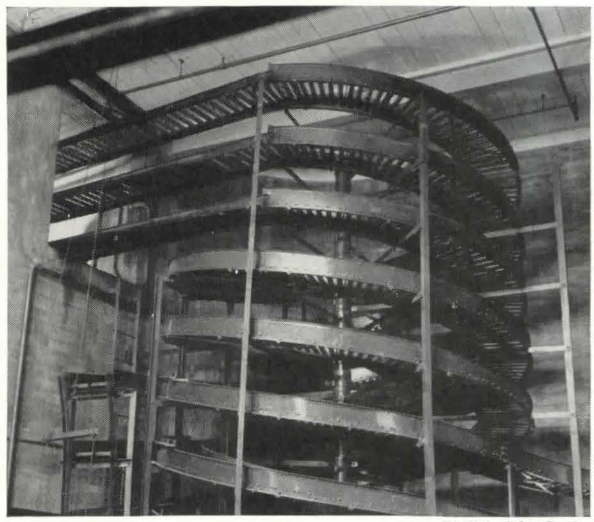


GARAGE ENTRANCE

Charles E. Knell



STORAGE



SPIRAL CONVEYOR

Ruth A. Edge Photos

'he essential problem in this building was ıe of circulation. The actual bottling is one in an adjacent plant, from which the eer is delivered in cases and cartons by eans of an elevated conveyor, and stored r loading on one of the three distributing latforms. Three separate platforms afford ɔading facilities for freight cars, large ailer trucks for long distance hauling, and ght trucks for local deliveries. The con- eyors within the building were carefully orked out in conjunction with the owner ıd the manufacturers. The cases enter at ıe top of the building, are sent down on piral conveyors to the loading level where eflectors route them to any of the three ɔading platforms. The space under the uilding is used as a garage for the com- any's lighter cars. In addition to storage cilities there is office space for the manager : the shipping department, a small clerical ɔrce, and a paymaster.

ONSTRUCTION OUTLINE

ENERAL CONTRACTORS
urner Construction Co.

OUNDATIONS
ootings and walls—reenforced concrete. 'aterproofing—integral, Anti-Hydro Water- roofing Co.

TRUCTURE
xterior walls—common brick. Interior par- tions—terra cotta, National Terra Cotta ɔ., and glazed brick, National Fireproofing ɔrp. Columns—steel with reenforced con- ete floor construction.

OOF
tructural steel frame, wood planks and onded Black Diamond roofing, with flash- gs in same material, The Barrett Co.

SHEET METAL WORK
Flashing and gutters—16 oz. copper. Sash—commercial grade, steel factory, Detroit Steel Products Co. In the large openings on Christie St. the frames are fitted with porcelain enamel metal louvers. All skylight glass—¼ in. thick. All window glass—double strength, quality B, Libbey-Owens-Ford Glass Co.

STAIRS
Steel throughout.

FLOORS
Office space—mastic floors. Toilets and wash-rooms—terrazzo.

WALL COVERINGS
Acoustical plaster in office, U. S. Gypsum Co.

DOORS
Steel, Atlanta Steel Co. Garage doors—folding and sliding, Richmond Fireproof Door Co.

HARDWARE
All hardware, Yale & Towne Mfg. Co.

PAINTING
All paints—E. I. Dupont de Nemours & Co.

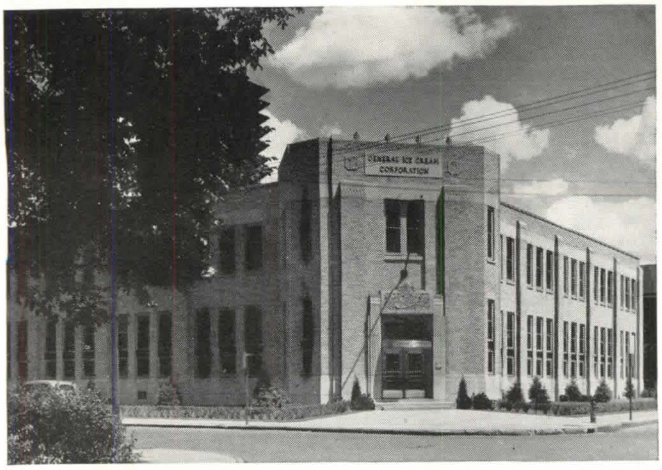
PLUMBING
All fixtures—Standard Sanitary Mfg. Co.

HEATING
Unit heater—Buckeye and blower type, installed by B. F. Sturtevant Co. Exhaust fans—B. F. Sturtevant Co. Valves and traps—Illinois Engineering Co. Regulator—Minneapolis-Honeywell Regulator Co.

CONVEYOR SYSTEM
The Alvey-Ferguson Co., Inc.

GENERAL ICE CREAM CORPORATION, SYRACUSE, NEW YORK

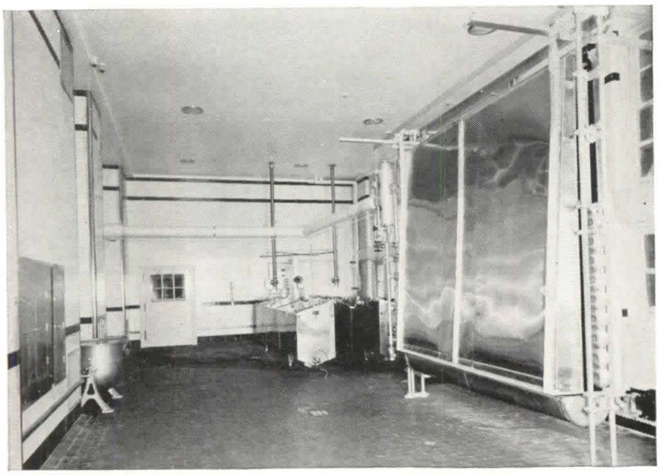
MELVIN L. KING AND HARRY A. KING,
ARCHITECTS



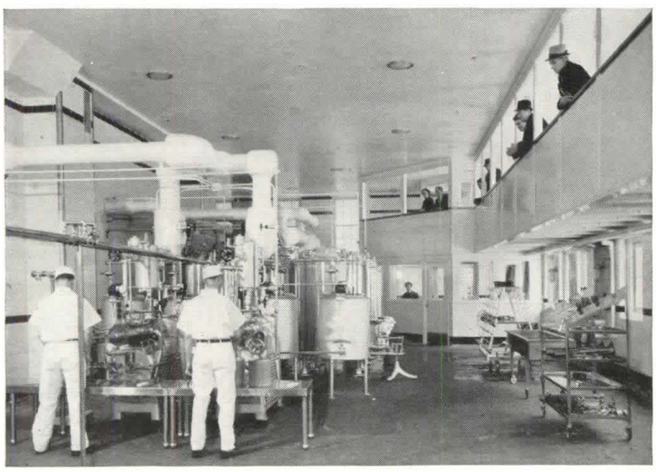
Dana A. Barnes

The building is of concrete frame construction with exterior walls of brick and cast stone backed up by Haydite masonry units. It has two floors and a mezzanine and an excavated space about 4 ft. deep below the first floor. Heating is accomplished by means of forced air, this method being used primarily to eliminate the excessive moisture from the plant equipment and water used for cleaning. In the manufacturing area there are vapor-proof, flush type lighting fixtures which provide an intensity of 25 foot-candles at working height.

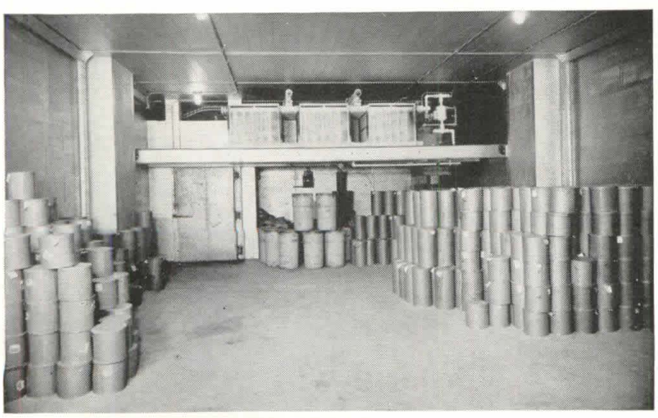
The plan below shows the routing of operations through the manufacturing room. There is an observation gallery on the mezzanine from which visitors can watch the entire process of manufacture. On this level are located women's rest and locker rooms, an employes' meeting room, and a first aid room. The plant also includes an auditorium, for use by women's clubs and other groups. There is also a kitchen which is available for use in connection with the auditorium.



PASTEURIZING

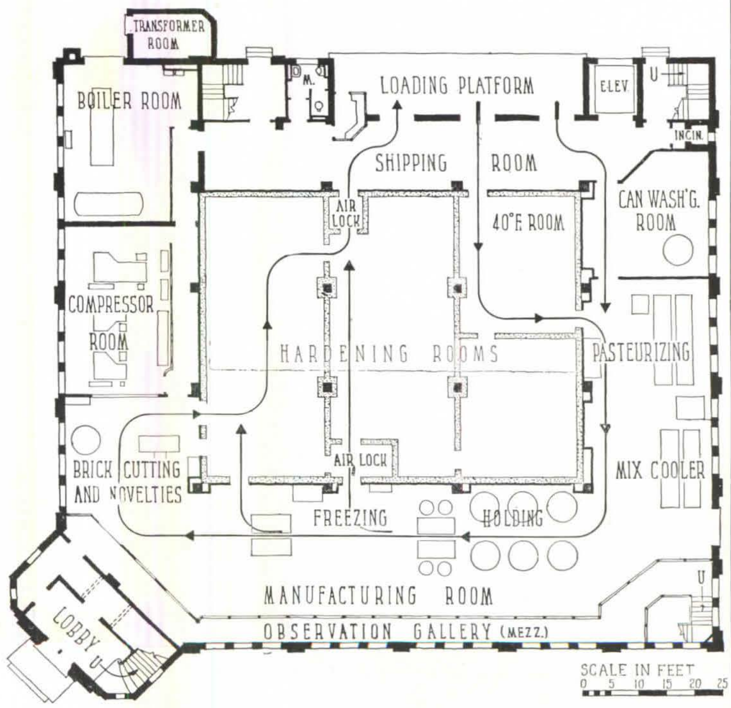


FREEZING



HARDENING

Robert J. Arnold Photos



FIRST FLOOR

PRECISION SPRING CORPORATION, DETROIT, MICHIGAN

Photos, Austin Co.

THE AUSTIN COMPANY

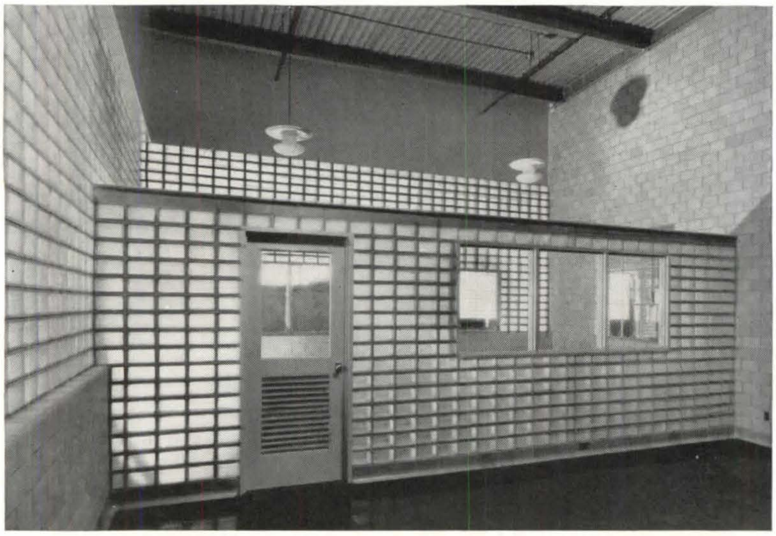
ENGINEERS AND BUILDERS

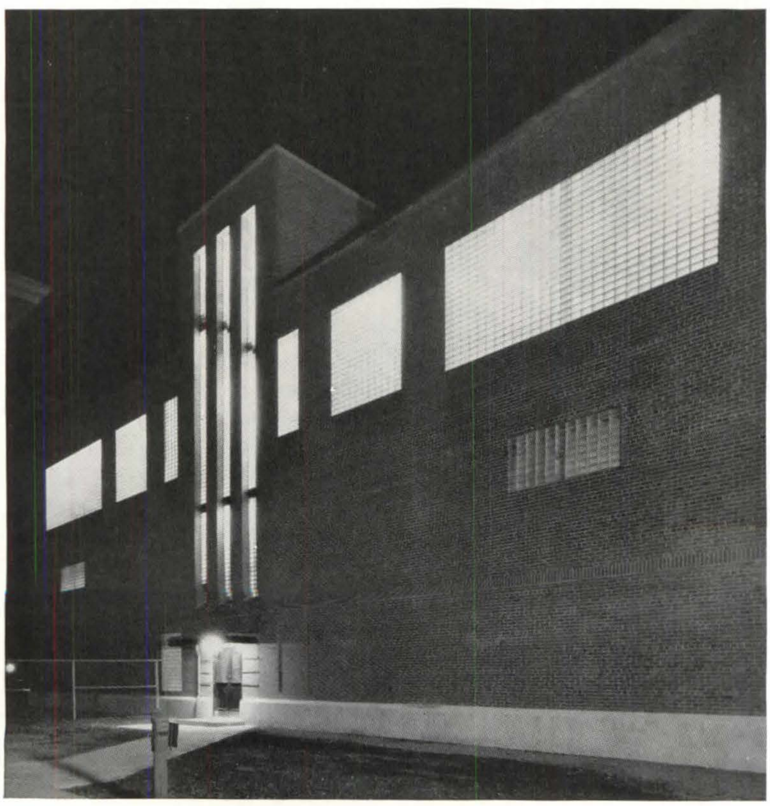
These two small plants, for the Precision Spring Corp. and the Partool Machine Co., both in Detroit, are indicative of a trend in factory design which holds out much encouragement for the future. The buildings make effective use of simple materials and stock factory sash, and house office and manufacturing space in a consistent manner. The plant above covers 46,000 sq. ft., the factory area being enclosed by side walls of continuous steel sash, with additional lighting furnished by long monitors. The building illustrated below shows in an interesting manner how a facade of a certain monumentality can be developed by merely terminating the form of the building itself. Such examples as these are proof enough that the usual inconsistency between the factory proper and its offices can be resolved in an effective and suitable manner.

PARTOOL MACHINE COMPANY, DETROIT, MICHIGAN

FACTORY AND WAREHOUSE FOR OWENS-ILLINOIS GLASS COMPANY, GAS CITY, IND.

THE AUSTIN COMPANY
ENGINEERS AND BUILDERS





Photos, Chicago Arch. Photo Co.

Here is glass block used as it should be used. Note in the photograph at the top of the page that the block is used flush with the brick, creating the effect of a solid wall. This is a correct expression of the material, as it does form a wall and it is laid in that manner. The building is a factory and warehouse for corrugated containers, operated by the Owen-Illinois company for its own use. The working of the plant is simple, involving only the receiving and storage of large rolls of paper and the making and storing of the finished containers. The partitions in the office space are also made out of the company's glass block and serve as an additional demonstration of its possibilities.

PLANNING TECHNIQUES

FOR NEW AND REMODELED BUILDINGS

B. ALTMAN & CO., NEW YORK

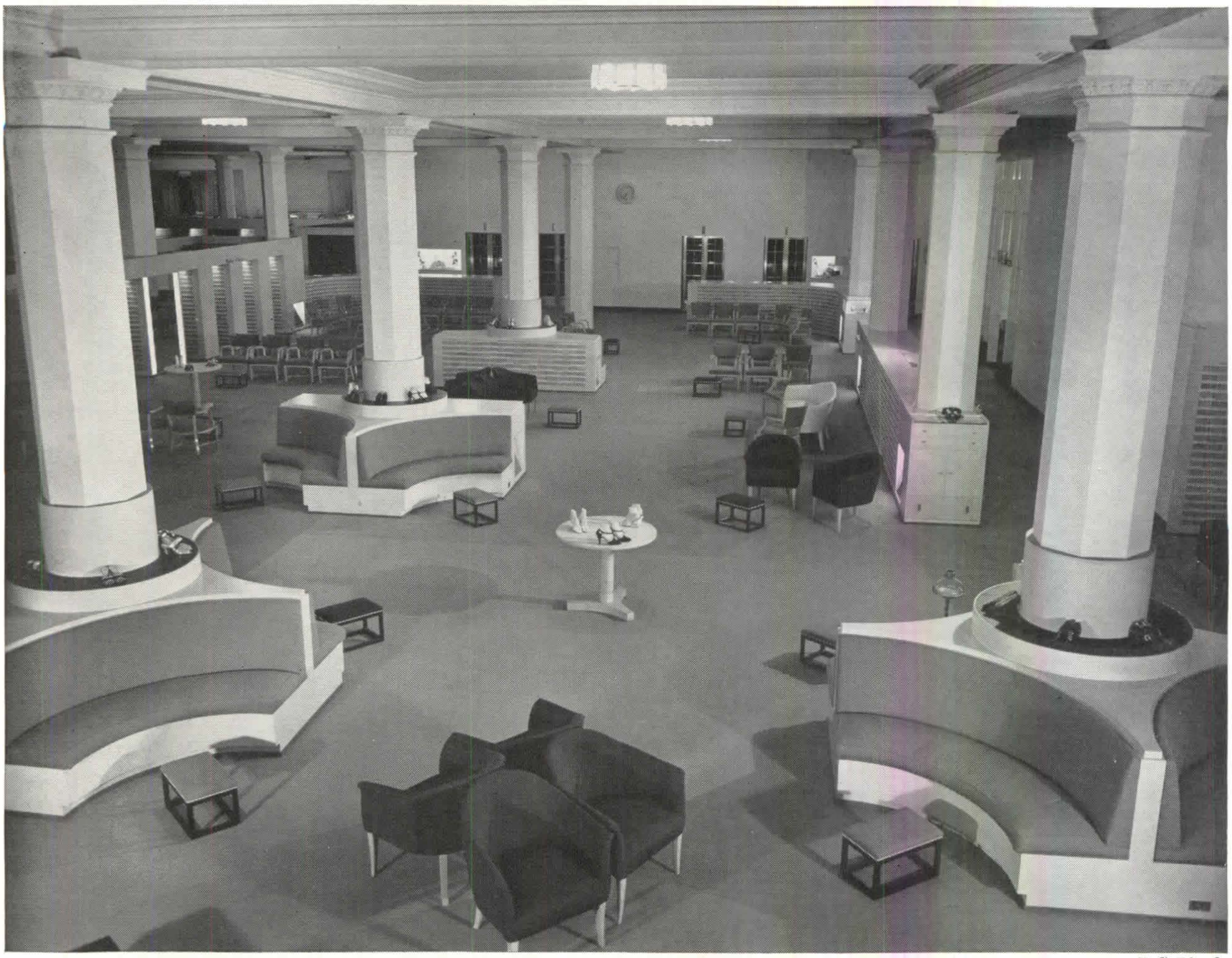
Robert J. Coates

NO. 2. SHOE STORES

DEPARTMENT STORES. Of approximately 20,000 retail shoe outlets in the U. S., 1,300 are located in department and clothing stores. While the percentage of the total is not very large, the dollar volume is; in 1929 it amounted to about one-third of all shoe sales made. One reason for the growth of the shoe department as opposed to the retail store is the tendency of customers, particularly women, to buy shoes as part of an ensemble. The most natural way to do this, obviously, is to buy clothes, accessories, and shoes in the same store.

INDEPENDENT STORES. The independent store, as in other fields of retail activity, has had increasing competition from the department store on the one hand and the chains on the other. Observations seem to indicate that the independent store is most successful where a clientele buying medium- and high-priced shoes has been built up. It is also found advisable to locate the store on a street where the surrounding shops specialize in clothing, millinery, and accessories in the same price range. There is also a tendency to add hosiery, bags, gloves, jewelry, and similar articles; this is an adoption of the department store's merchandising technique.

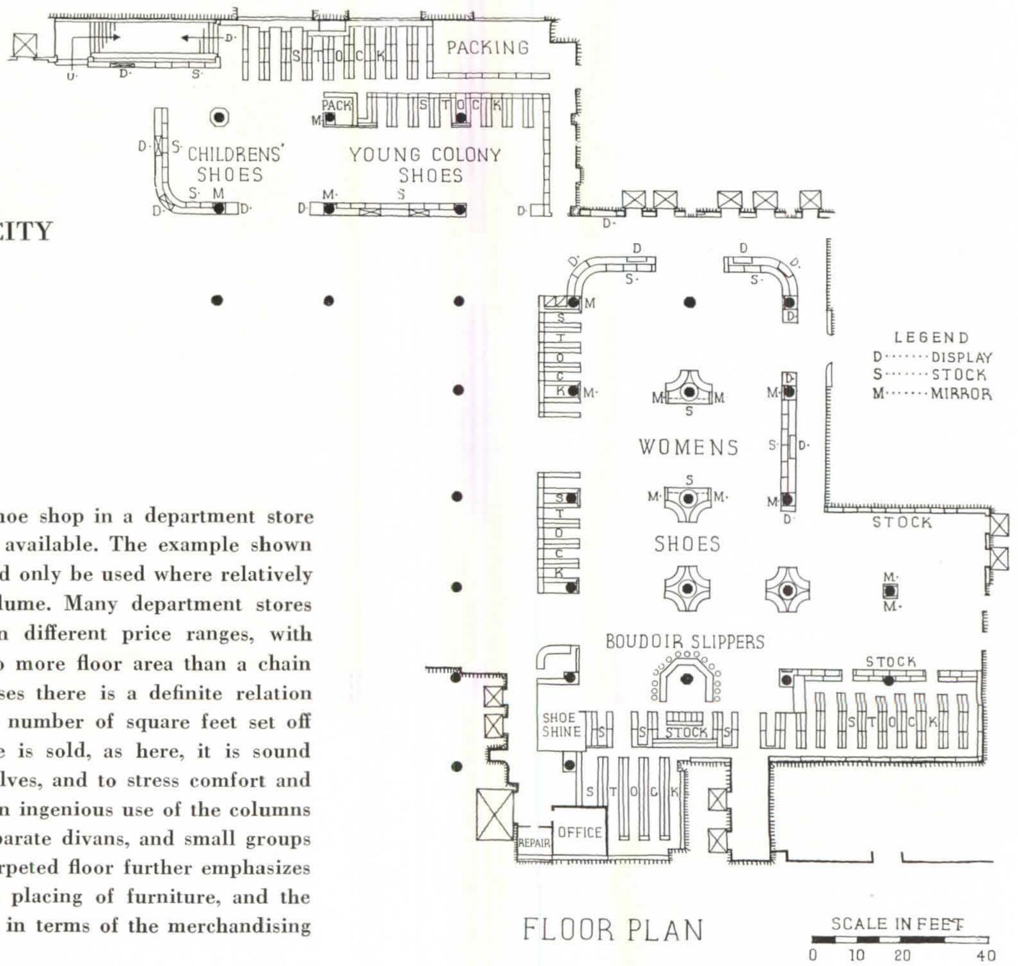
CHAIN STORES. Planning for a chain or independent store encounters similar problems; both customarily rent long stores of narrow frontage, and both cater to a clientele that varies from the lowest to the highest price ranges. It is in selling cheap merchandise that the chains have been most successful, and it is in this price class that the greatest advance has been made in exterior display techniques. Higher class shops, whether chain or independent, generally avoid too blatant a display of goods, and depend more on a group of regular customers. The chains are also showing a tendency to introduce new lines of merchandise in addition to shoes.



F. S. Lincoln

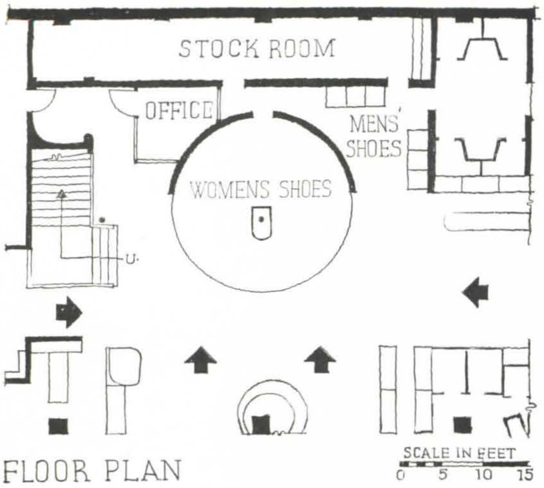
B. ALTMAN & CO., NEW YORK CITY

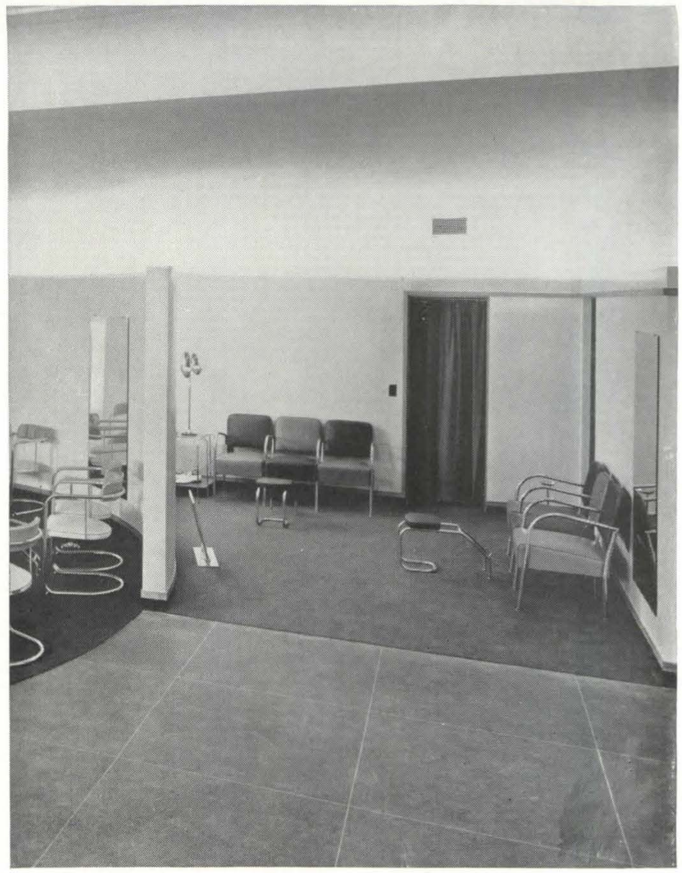
H. T. WILLIAMS, DESIGNER



FLOOR PLAN

The most noticeable characteristic of the shoe shop in a department store is the comparatively large amount of space available. The example shown here represents an extreme instance, and could only be used where relatively few sales added up to a large dollar volume. Many department stores have several different locations for shoes in different price ranges, with the cramped bargain basement occupying no more floor area than a chain store selling similar merchandise. In all cases there is a definite relation between the total amounts of sales and the number of square feet set off for these sales. Where a high grade of shoe is sold, as here, it is sound policy to separate customers, conceal the shelves, and to stress comfort and personal attention to the customer's wants. An ingenious use of the columns is made to provide a center for the four separate divans, and small groups of shoes on sale are displayed. An entirely carpeted floor further emphasizes the note of luxury created by the informal placing of furniture, and the whole represents a design soundly conceived in terms of the merchandising of a special type of article.





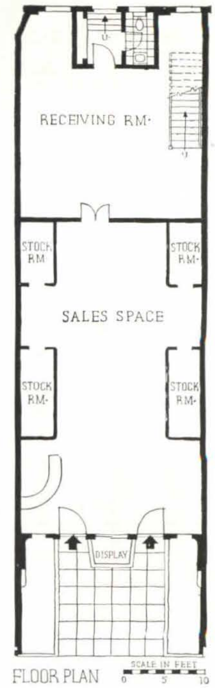
BURDINE'S, MIAMI, FLORIDA

ELEANOR LE MAIRE, DESIGNER

An atmosphere of luxury has been created in a different manner from the Altman store. The department occupies less space, and the designer avoided the use of large, heavy pieces of furniture which would have made the room appear too crowded. The simplest of means were used to produce the desired effect, and a degree of privacy has been obtained by the use of a curved partition which separates the men's and women's departments. Colors are light green, blue, white, and lemon yellow. Lighting is indirect.

Verne O. Williams Photos

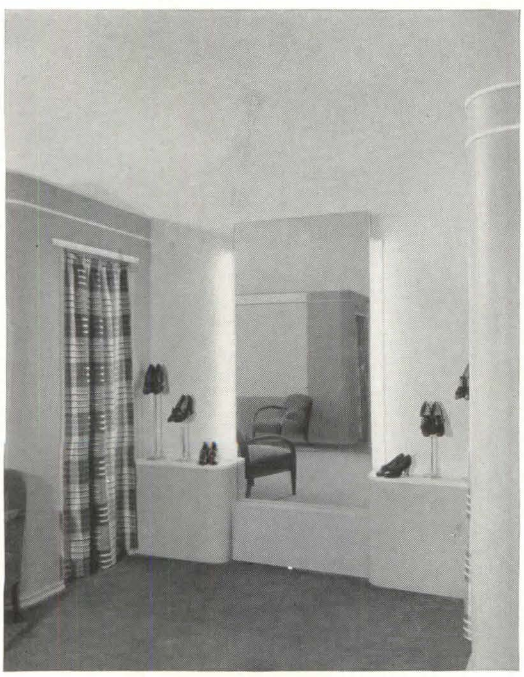
Mott Studio Photos



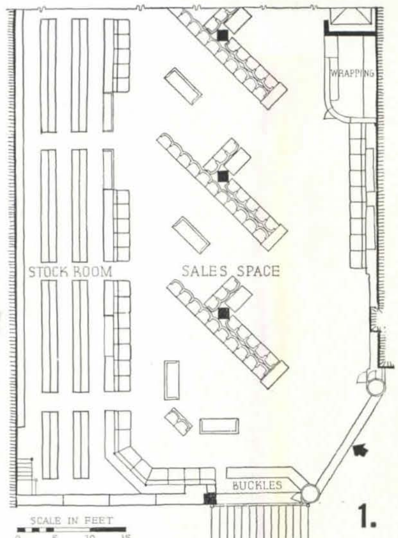
HAROLD'S, WESTWOOD VILLAGE, CALIFORNIA

ALLEN G. SIPLE, ARCHITECT

Here, as in the preceding examples, painted walls, simple furniture, and carpeting are the sole means employed to produce an interior suitable for the selling of high-grade merchandise. The walls are medium and light green, the carpet is dark green, and the furniture is brown, green, and beige. Note that all shelves for shoe boxes are concealed.

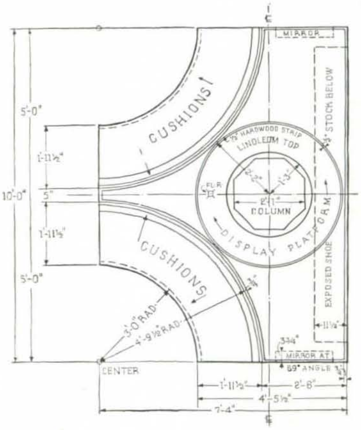


SEATING



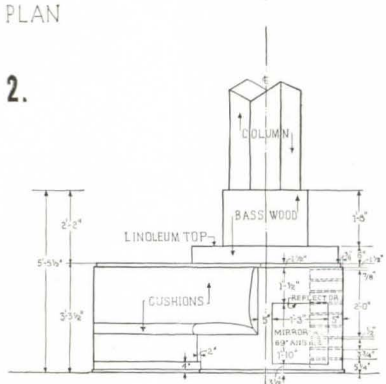
PARTIAL FLOOR PLAN

1.

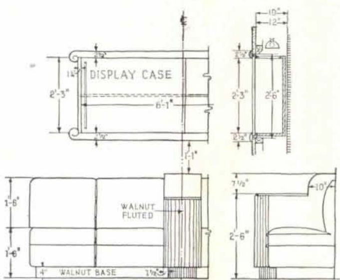


PLAN

2.

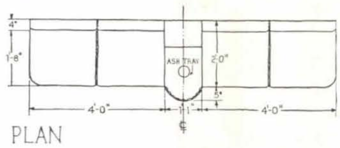


ELEVATION



ELEVATION SECTION

3.

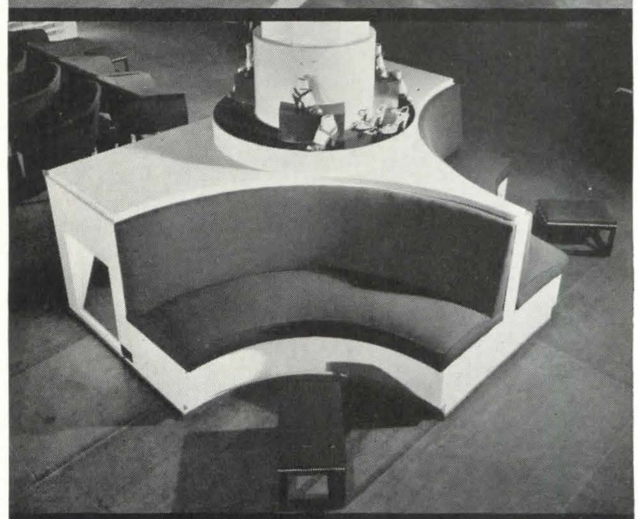


PLAN

Seating is perhaps the most important single element in the planning of a shoe store. The typical plan for long and narrow shops involves the placing of long rows back to back or facing each other. Another arrangement frequently seen is that of short rows, parallel to the front of the shop. At present, even in shops selling inexpensive shoes, the trend is to emphasize informality and privacy; for expensive shops the informal plan is almost mandatory. Chairs vary with the type of business done. Where volume is large they should be comfortable, but not soft, as too well upholstered a chair does not make for speed in sales. In high-class stores divans and large armchairs are suitable. Wall benches are good where the stock is concealed, as their use leaves more floor space and creates a desirable atmosphere of comfort. Illustrations 3, 4, and 5 show variants of the wall bench; 5 uses a lighted wall display to furnish additional local illumination, and the interruption of the wall bench by built-in tables, as in 3, is an excellent way of giving privacy and providing space for ash trays and parcels. The old-fashioned circular *pillar bench* has been replaced by a greatly improved seating arrangement, as shown by 2, and it also incorporates a display shelf and built-in mirrors; 1 illustrates a diagonal seating arrangement which concentrates the customers' attention on wall displays instead of on another row of chairs.

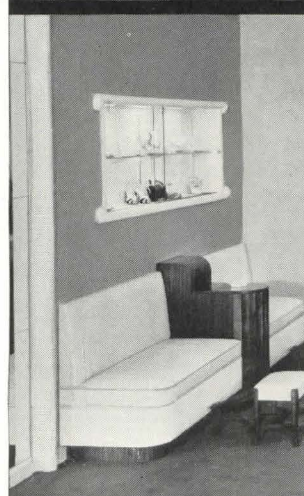
1. Hochschild, Kohn & Co. Department Store, Baltimore, Md., designed by DeYoung, Moscowitz & Rosenberg, Archts. **2.** B. Altman & Co. Department Store, designed by H. T. Williams, see also pages 185, 186, 193. **3.** French Bootery, New York, designed by M. Breslow, Pearl & Boriss Co., Inc., Archts. **4.** The Buffum Store, Long Beach, Calif. **5.** Oppenheim Collins & Co. Store, New York, designed by DeYoung, Moscowitz & Rosenberg, Archts.

1.



2.

3.



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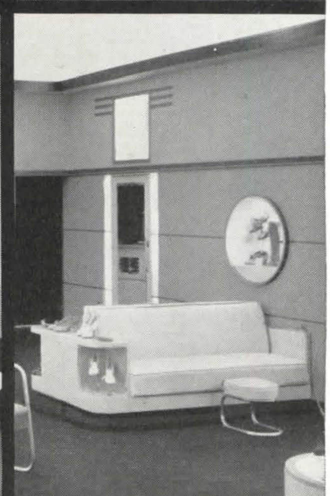

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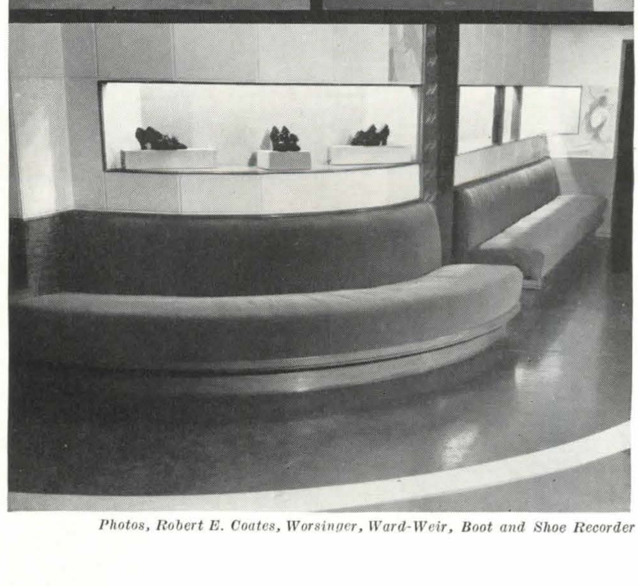
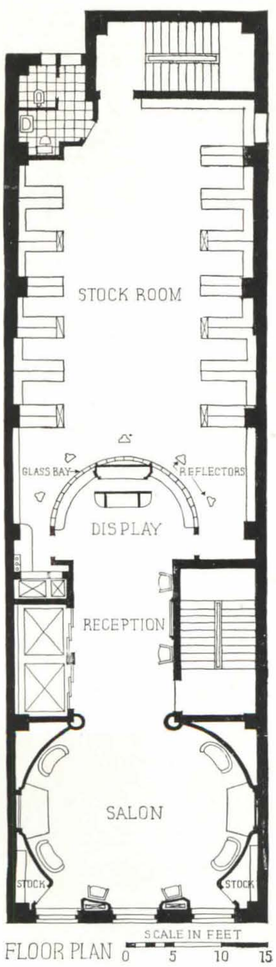


Photos, Robert E. Coates, Worsinger, Ward-Weir, Boot and Shoe Recorder

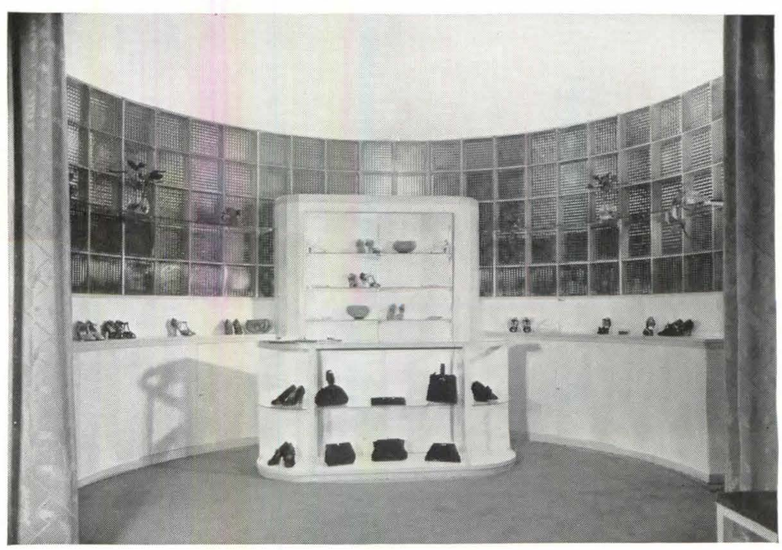
Jack Crawford

FRANK BROTHERS, NEW YORK CITY

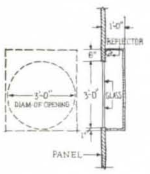
LOUIS H. FRIEDLAND, ARCHITECT



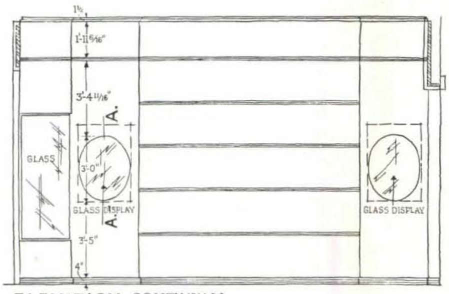
This store sells shoes in the higher price range, and occupies several floors in a mid-town New York building. The illustrations show the debutante shop, which follows much the same pattern as the preceding examples. It can be seen that shops in this category almost invariably have an informal placing of furniture, that the furniture consists of varied rather than standard pieces, and that the stock is kept out of sight. An alcove with a glass block wall provides excellent display space.



ISPLAY

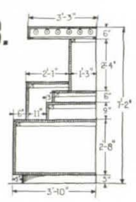


SECTION A.A.



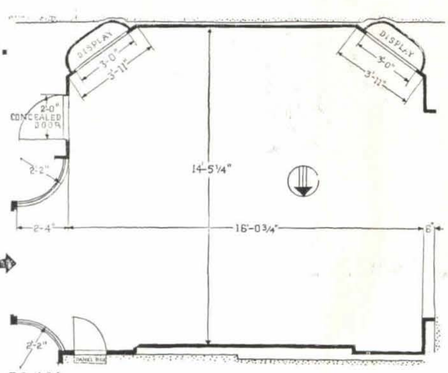
ELEVATION SOUTH WALL

3.



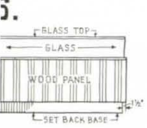
SECTION

2.

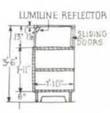


PLAN

6.



ELEVATION



SECTION

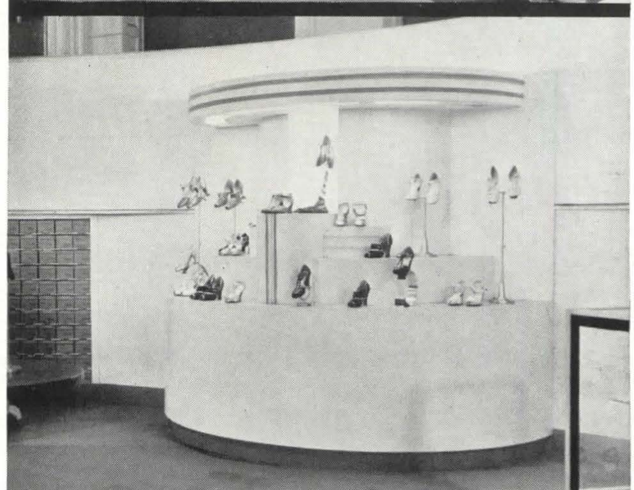
Display cases are becoming more important in shoe store design as shelving ends to be concealed in stock rooms. There are four basic types: (1) wall boxes, (2) projected wall displays, (3) counters, (4) the rear of the show window. The glass counter was formerly the only type of display unit used; ts disadvantages are that it is too easily obscured by customers and its contents are too far below the eye level. This is particularly true where shoes and bags and other small items are concerned. Counters at present end to confine the display to the top section only. In general, where small articles are concerned, the display case, whatever its type, should be small, well lighted, and near the eye level. Seating should also be arranged so hat displays are visible from the chairs. No. 2 illustrates an excellent use of space in the rear of the show window; it serves as a reminder to customers eaving the shop, and adds interest to the doorway. Wall display combined with cases for stock is a logical arrangement; 1 shows a good example. The projected wall display, as in 3, can be very effective, and is generally built s a series of steps. No. 1 shows a typical wall box, and 4 is a similar kind of display, combined with a built-in cabinet. Examples of the new types of counters are shown in illustration 5.

, 2. Regal's Shoe Store, Fifth Ave., New York, designed by Morris Lapidus, rcht., for Ross-Frankel, Inc., see also page 193. **3.** John Wanamaker Department Store, New York, designed by Bureau of Design & Engineering, John V. Ziegler, Chief Engineer, see also page 193. **4.** Mandel Shoe Store, Los Angeles, designed by Burke & Kober, Archts., see also page 194. **5.** Wetherby-Kayser Shoe Store, Los Angeles, Calif., designed by Burke & Kober, Archts., ee also pages 192, 195. **6.** Counter detail by S. Lawrence Klein & Associates, Archts.

1.

2.

3.

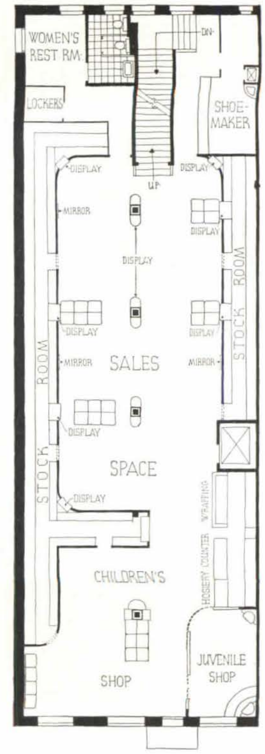


4.

5.

John Beinert, Fred R. Dapprich, Skinner Photo Arts

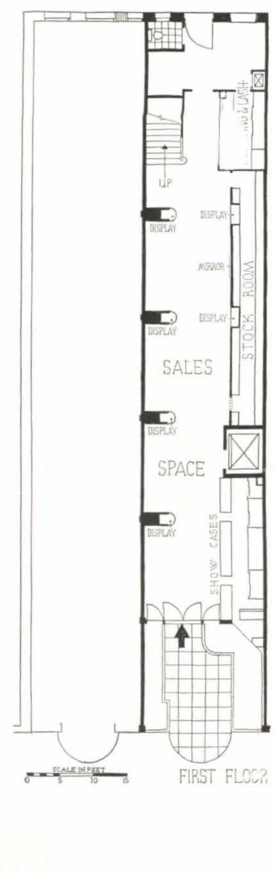
SECOND FLOOR



SECOND FLOOR

FIRST FLOOR

Skinner Photos

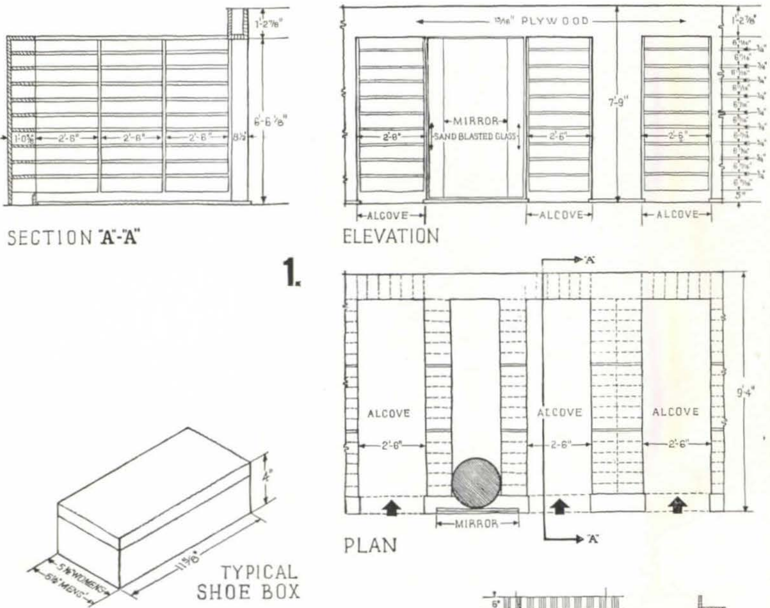


FIRST FLOOR

WETHERBY-KAYSER
LOS ANGELES, CALIF
BURKE & KOBER
ARCHITECT

The better class chain store does not differ materially from independent shops or department stores which sell in the same price range. In this example colors have been subdued, with brown and warm gray carpets on the various levels setting the key. Equipment and furniture have been specially designed, and placing of the displays shows careful study. Most of the displays are at eye level, with special lighting for emphasis.

SHELVING



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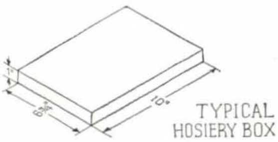

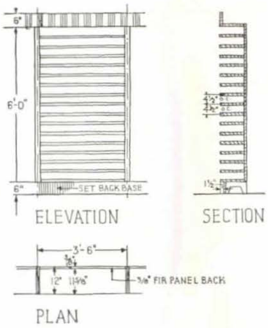

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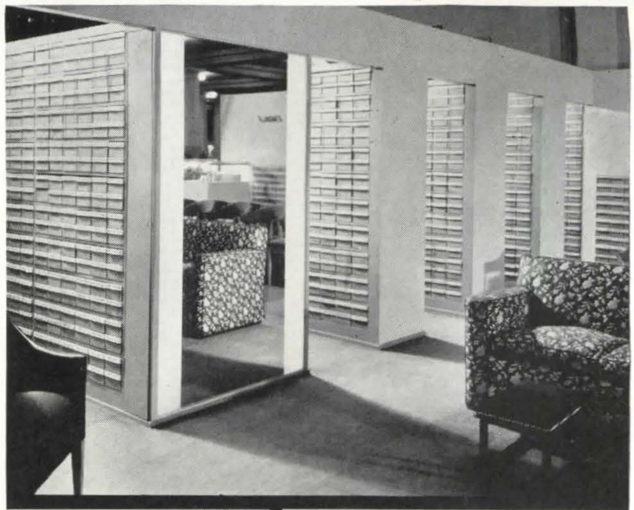

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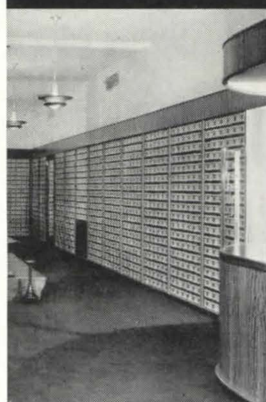

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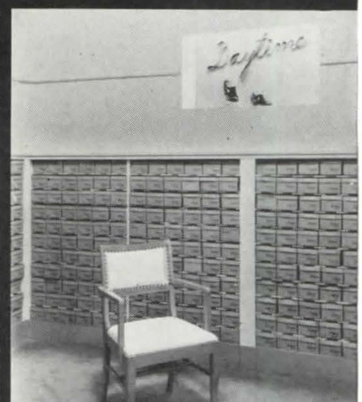

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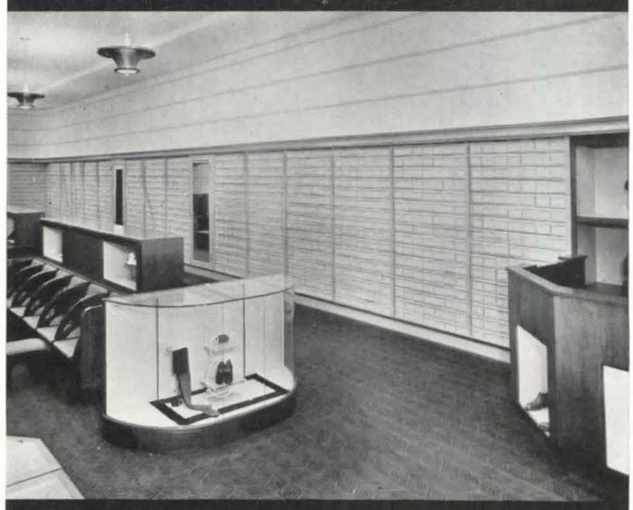


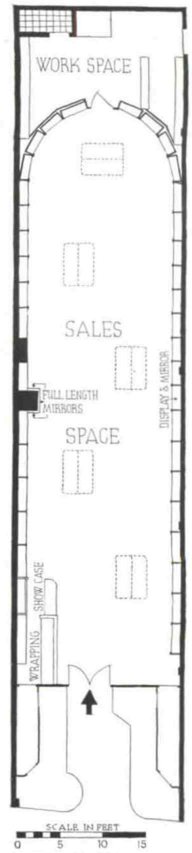
4.

5.

Shelving is either open or concealed in a separate stockroom. In the inexpensive chain store, where a long, narrow space is rented, there is generally no alternative but that of lining the walls with shoe boxes. This is also considered desirable for such stores because it gives the impression of a well-stocked establishment, and because it permits the making of sales in the shortest possible time. The trend, however, is toward the creation of more pleasing interiors with concealed shelving. Present practice is to make shelves one box high, with horizontal sections six boxes wide. Balconies and high shelves are being discarded; while this increases the amount of wall space required it adds considerably to the efficiency of the shop, and the furred space above may be used for air conditioning ducts. The accompanying examples, with one exception, show shelves in the fitting room. No. 1 is an arrangement of shelves outside the fitting room which can be seen by the customer. Where the stock is exposed, an attempt is made to develop it as an attractive addition to the room. The Wanamaker shop in New York, for example 3, has bright red boxes which in themselves constitute a strong decorative note. Where light-colored boxes are used, as in 5, the shelves and uprights may be made dark, producing a pattern by contrast.

1. B. Altman & Co. Department Store, designed by H. T. Williams, see also pages 185, 186, 189. **2.** Regal's Shoe Store, Fifth Avenue, New York, designed by Morris Lapidus, Archt. for Ross-Frankel, Inc., see also page 191. **3.** John Wanamaker Department Store, New York, designed by Bureau of Design & Engineering, John W. Ziegler, Chief Engineer, see also page 191. **4.** Pessemier Bootery, Tacoma, Wash., see also page 195. **5.** Robinson Shoe Co., Kansas City, Mo., designed by James Francis Terney, Archt. **6.** Typical shelving for one box height, S. Lawrence Klein & Associates, Archts.

Photos, Robert E. Coates, John Beinert, Associated Photo Service, Anderson



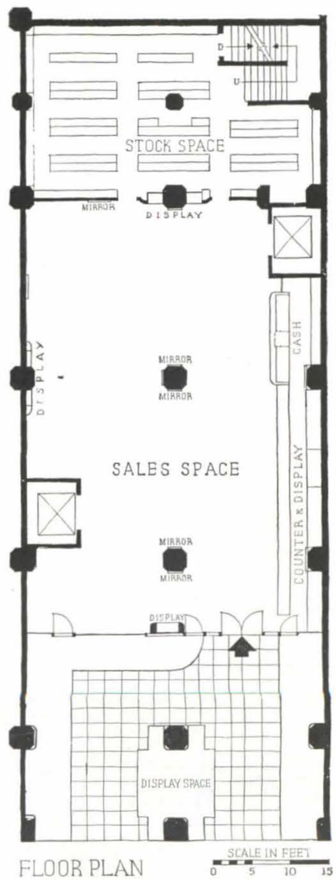
FLOOR PLAN

HOLLAND PHYSICAL CULTURE CO., BROOKLYN, N. Y.

S. LAWRENCE KLEIN & ASSOCIATES, ARCHITECTS

A long, very narrow store presented a difficult problem in arrangement, and was solved in a more interesting manner on the plan than as shown above. The store sells shoes at only one price—$6.50. Exposed shelves provided the only solution in the restricted space. Cost of structural changes, furniture, and equipment: $7,000. Illustrated below is the third floor of a large retail establishment whose shoes range in price from $4 to $11. Moderate-price shoes are sold on the street level, and low-price shoes occupy the second floor. Each floor has its own accessories and hosiery departments. The remodeling of the three floors was carried out as inexpensively as possible and was done for a total cost of $9,500.

Fred R. Dapprich

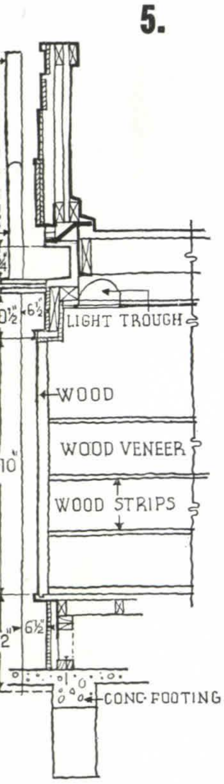


FLOOR PLAN

MANDEL'S, LOS ANGELES, CALIF. BURKE & KOBER, STORE DESIGNERS

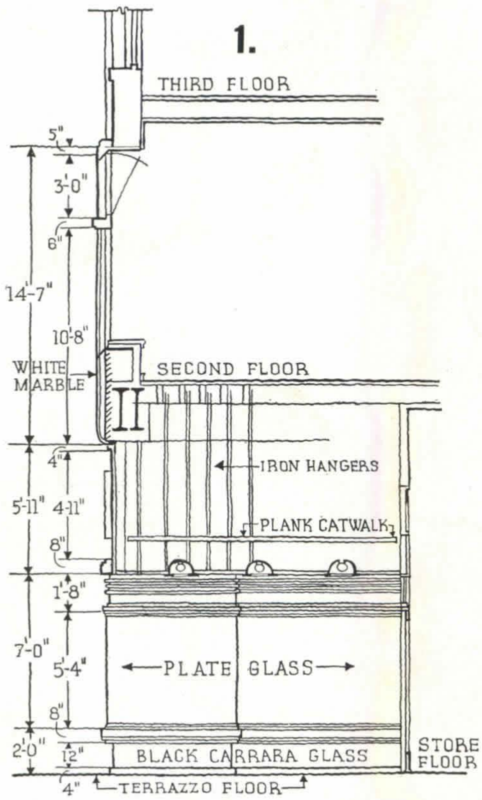
ACADES

5.



SECTION
6" 1' 2' 3' 4' 5'

1.



SECTION
0' 1' 2' 3' 4' 5'

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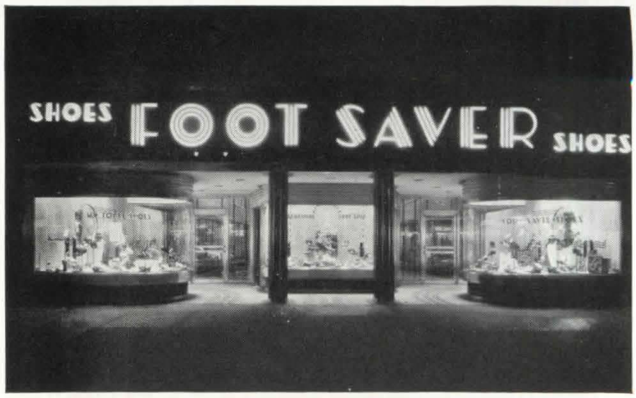

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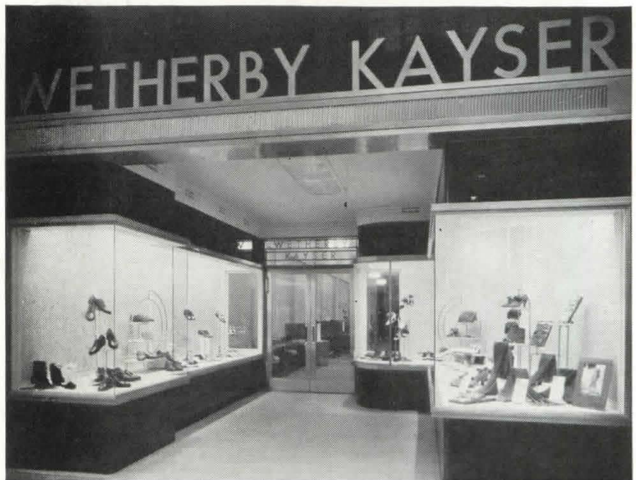

3.

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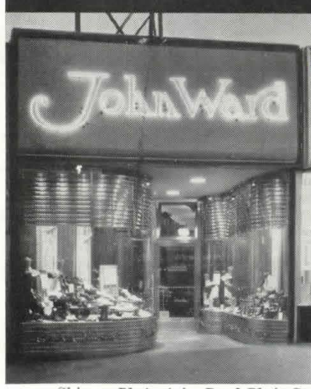

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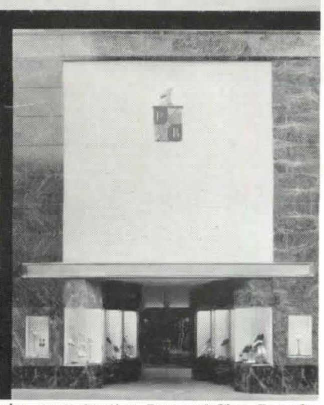
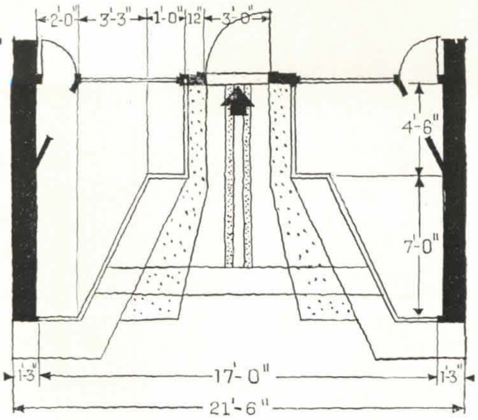


he saw-tooth shoe store front of a few years back and excessive plate glass eas are both being discarded in the design of new shops. Shoes are small jects and require little space for their display. The bulkhead is set at minimum of two feet and in many cases, as for instance 3, much higher. xteriors vary precisely as interiors, depending upon the price class of the erchandise; cheap shoes are now generally shown in large displays, while e more expensive shops depend on much smaller window space. Morris apidus, New York architect, who has had extensive experience in this work, esigns the display grouping and then makes the window conform in shape, procedure which often results in very effective and unusual show windows. will be noted that the old style valance disappeared, the window being t down to the height where the valance stopped. The depth of the windows ries with their size, often becoming small, shallow display boxes. Ornament s disappeared from the backgrounds, simple panels of veneered wood being e most common device used. The problem of exterior design has been comicated by the number of new materials available, but in general the trend toward simplicity, with emphasis on the windows and a well-designed gn. Lighting intensities should be high, as small articles are displayed; out 150-200 foot-candles per lineal foot of plate glass is a good working erage.

Foot Saver Shoes, New York, designed by Horace Ginsbern, Archt. **2.** etherby-Kayser Shoe Store, Los Angeles, Calif., see also pages 191, 192, signed by Burke & Kober, Archts. **3, 4.** Thom McAn Stores, New York, fore and after increasing window space for more display, designed by chard H. Smythe, Archt. **5.** Harold's Shoe Store, Westwood Village, Los ngeles, Calif., see also page 188, designed by Allen G. Siple, Archt. **6.** John ard Shoe Store, New York, designed by Richard H. Smythe, Archt. **7.** ssemier Bootery, Tacoma, Washington, see also page 193.

Skinner Photo Arts, Band Photo Service, Mott Studios, Boot and Shoe Recorder

1.



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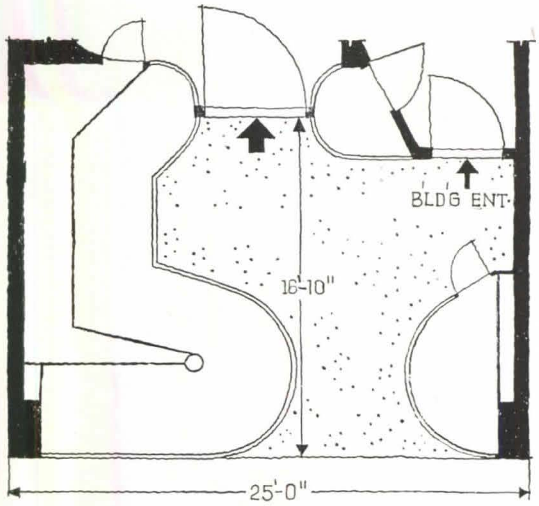

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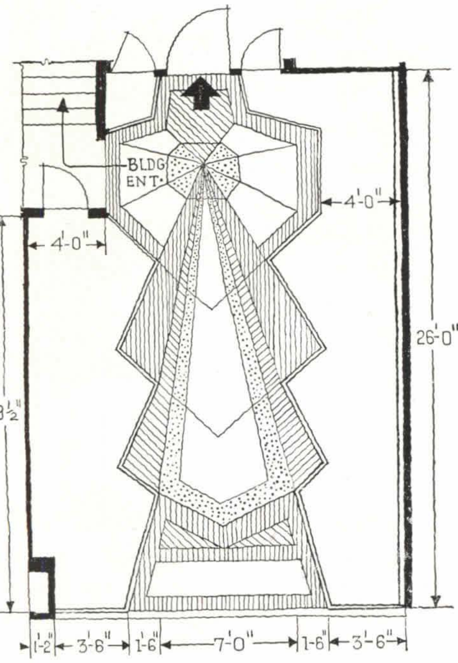

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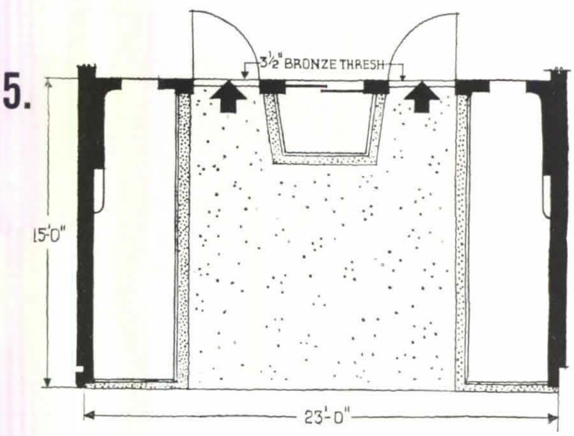

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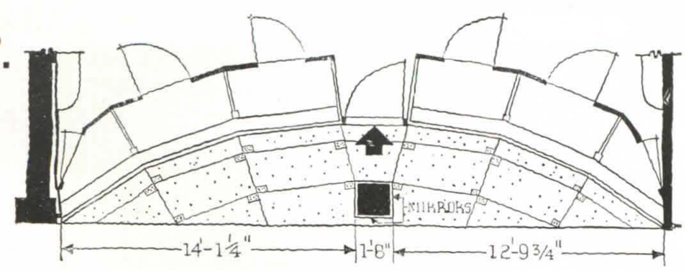
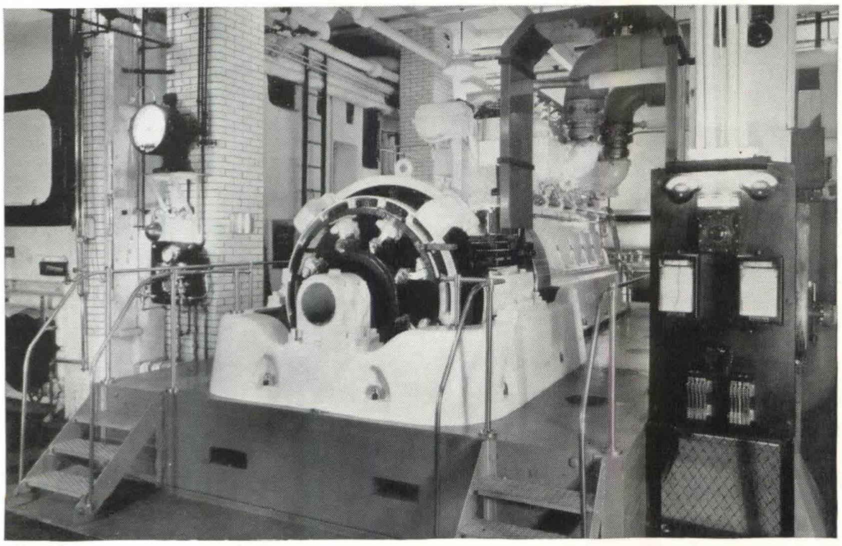


Examples 1-4 are by Ross-Frankel, Inc., Morris Lapidus associate. In each case the window has been designed so that attention is focused on a comparatively small display. The windows are shallow, being rarely over 4 ft. from window to back. Example 5 is by Allen G. Siple and is illustrated on page 188. It shows a comparatively large pavement space, and provides for three separate display units.

PRODUCTS AND PRACTICE

1.

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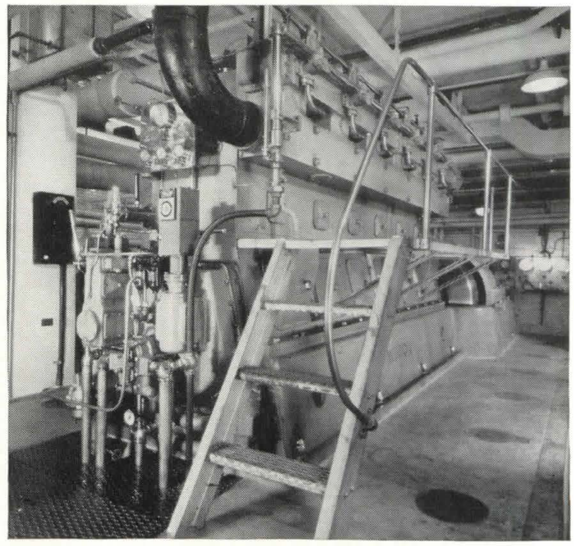
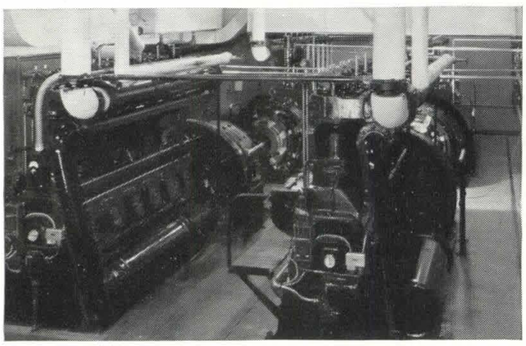
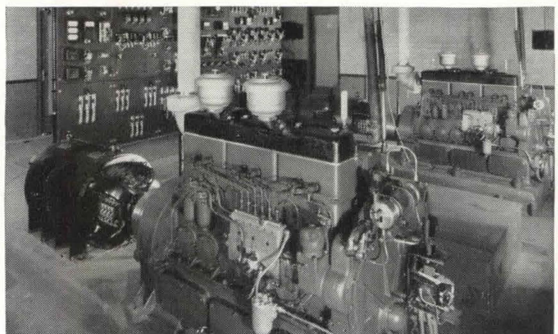



Photos, Morris Rosenfeld

3. 4. 5.

1 & 2. Diehl Generator and Winton Diesel unit in Singer Building, New York, N. Y. 3. Diesels, 1 Park Avenue, New York, N. Y., Chicago Pneumatic Tool Company. 4 & 5. Superior Diesels and Burke Generators, arranged with Philco Batteries for automatic operation, apartment house, 57 West 75th St., New York, N. Y.

PRIVATE ELECTRIC POWER PLANTS

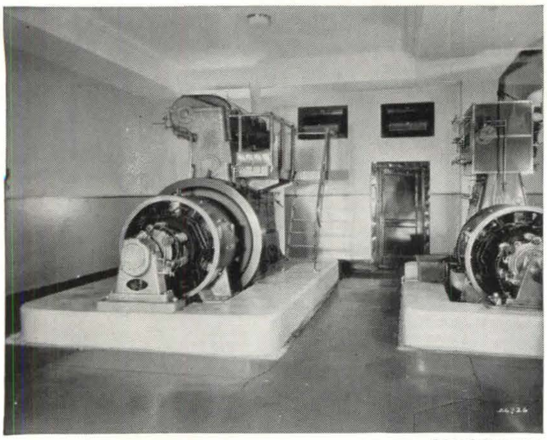
The number of power plants operated for private use is increasing in spite of reductions in public utility rates on electric current. In some cases private plants are installed because of the absence of available public utility power, in some cases as emergency units to be used in case of failure of the public utility supply. More often they are constructed because modern plants are proving that they can in many cases produce electricity cheaper than it can be purchased, so much cheaper, in fact, that the plants can be paid for out of savings in a comparatively few years. Many plants produce current for 1½ cents, 1 cent or even less per kilowatt hour.

Today, private plants are to be found in apartment houses, hotels, office buildings, hospitals, department stores, and industrial buildings of all kinds. Small plants are used in restaurants equipped with cooling systems, in swimming pools, skating rinks, and gas stations; they can be used for taxpayers and large electric signs. The increased use of electricity, particularly for power purposes such as food refrigeration and air cooling, is broadening the field of economic use for the private plant.

TYPES. In private plants the two main sources of power for operation of the dynamos which produce the electric current are steam engines and Diesel engines. Steam engines, long used for this purpose, are usually economical only where comparatively large amounts of current are consumed, because of their need for high pressure boilers and the consequent auxiliaries and attendance. Diesels, on the other hand, operate economically in sizes as low as 5 h. p. and in single units as large as 3,000 h. p. and require comparatively little attention. In regions where low-priced natural gas is available, internal combustion gas engines, similar to the Diesels, but using natural gas instead of oil as fuel, are often used.

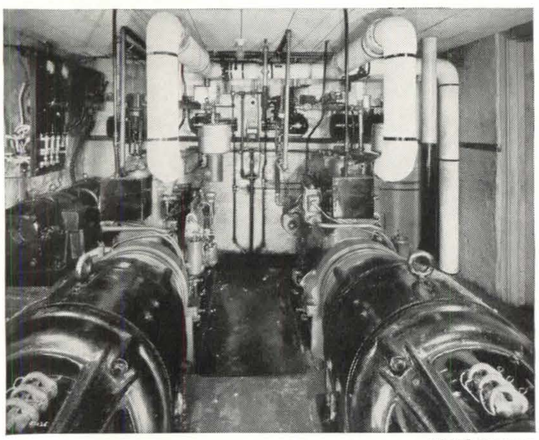
HEAT AS A BY-PRODUCT. The deciding factor in the selection of the steam engine or the internal combustion Diesel as the prime mover may be the use which can be made of their by-product, heat. The steam engine is usually selected where large amounts of heat are required.

Note: To Consulting Engineers A. L. Jaros, E. J. Kates, P. R. Moses acknowledgment for aid in preparing this data. Ed.



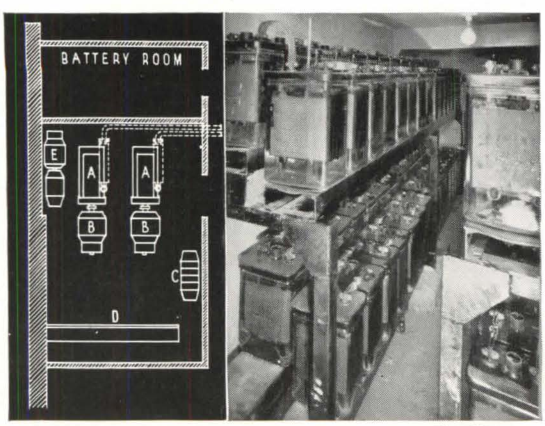
Diesel Progress

Combination steam and Diesel plant, Ingersoll-Rand Diesel and Ames reciprocating engine driving Crocker-Wheeler generators in the Ice Club, New York, N. Y.



Diesel Progress

Completely automatic power plant, Buda Diesels with Ideal Generators and Philco Batteries provide power for air conditioning Ye Eat Shoppe, New York, N. Y., 24 hours a day.



Diesel Progress

Plan showing arrangement of equipment and detail of battery room in the above plant. A. Diesels, B. Generators, C. Balancer Set, D. Switchboard and E. Motor Generator Set.

The cooling water of the Diesel can be utilized for heating also, but usually supplies no more heat than is needed for the domestic hot water supply. Some heat for this purpose can also be recaptured from the Diesel exhaust. In figuring the possible economy of a private plant, this by-product heat should not be disregarded.

COMBINATION PLANTS. Where steam is required only for winter heating, both steam and Diesel engines are often combined in one plant, the steam engine being used in the winter to provide both power and heat, the Diesel acting as a spare, or an additional unit for peak electric loads. In summer, when the steam plant is shut down, the Diesel can be used to supply current and hot water.

In many plants no spare unit is installed, auxiliary or breakdown service being provided from the public utility lines. Batteries are often used for emergency lighting service with private plants or public service. Batteries or small Diesel emergency units prove valuable adjuncts, particularly in hospitals and high buildings in case of failure of public utility service which may be caused by breakdown, strikes, or floods.

Both direct and alternating current are easily obtained in the private plant. Direct current is desirable for elevators, whereas light and other power equipment may be wired for alternating current. To obtain both kinds of current, both AC and DC generators may be driven from the same engine or the direct current obtained from a motor generator set.

THE DIESEL ENGINE. The Diesel is a high pressure internal combustion engine. It differs from the gasoline engine in that it uses a much lower and hence cheaper grade fuel which is exploded by the high temperature resulting from the compression of air in its cylinders. It does not, therefore, require any ignition system, and is very reliable and economical in operation. As the result of improvements in its design and manufacture, it is becoming increasingly popular for many purposes. These improvements have been in the direction of increasing speed and reducing noise and vibration, the higher speed engines being less costly and requiring less space.

AUTOMATIC DIESEL PLANT. The usual Diesel plant does not require full time attention. In order that attendance may be reduced to a minimum, automatic plants have been developed. Automatic controls, batteries and boosters are arranged so that the engines are automatically started and thrown on the line, or stopped, as the load conditions require; voltage is automatically maintained constant to avoid light flickering. Combinations with steam power plants or with outside current sources can be arranged in this way so that the Diesels will pick up excess loads, act as standbys to prevent interruption of service or provide for better heat balances where steam plants may be suddenly called upon for more low pressure steam for heating or process work.

With automatic operation, a number of plants not too far apart may be serviced by a few attendants. In New York City Automatic Diesel Electric, Inc. not only installs such plants but completely services them and guarantees their operating costs.

It should not be assumed that a private plant will always be more economical than purchased power nor that information can be given which will enable a building owner to select the plant best suited to his purpose. Conditions in every building are different and decisions should be based on careful surveys and recommendations made by competent engineers whose services will also be needed to design efficient plants when their use is indicated.

APARTMENT HOUSE GROUP. Academy Gardens, Bronx, N. Y.

Eight buildings consisting of 480 apartments and eight stores.

Cost of plant and power room, $22,555.

Two Worthington Diesels provide 175 k.w. and are supplemented by 19 k.w. of auxiliary service from public utility for emergency lighting of engine room and power for elevators.

Annual earnings from the sale of current were $22,700, annual operating costs $10,487, gross earnings, $12,213.

One third total cost of power house and equipment was paid in cash, and the balance in equal monthly installments over three years is being paid out of savings, despite a reduction in rate of 10 per cent to the tenants which has saved them over $2,000 in a year.

Engineers who designed the plant were Percival R. Moses, Sidney R. Klein & Associates.

DEPARTMENT STORE. A. I. Namm & Son, Brooklyn, N. Y.

900 k.w. plant with electric changes cost about $170,000.

Producing current at a cost of 0.8 cents k.w. hour.

Expected to pay for itself in six years out of savings.

Five Worthington Diesels provide flexibility for varying load conditions. 4-300 h. p. 514 r. p. m. engines drive 200 k.w. Crocker Wheeler generators, and one 150 h. p. engine drives a 100 k.w. generator and a 200 ton Carbondale refrigerating compressor. There are also 2-50 k.w. motor generator sets for supplying direct current to the elevators.

In this building the low steam consumption for heat compared with the high electric load dictated the use of Diesel engines.

Cooling water from engines is used for heating basement and first floor in winter, and in summer brine from refrigerating plant passing through same coils provides summer cooling.

Exhaust from two of the engines passing through heat exchanger is used for heating water.

Maxim Silencers are used on the engine exhausts not passing through heat exchangers and also on the stack.

Engineers who designed the plant are Huxley Madeheim and Henry Rosenthal.

RESTAURANT. Ye Eat Shoppe, New York, N. Y.

Air conditioned, open 24 hours a day.

Current supplied at 1.2 cents per k.w. h. from completely automatic Diesel plant.

Saving is 3.46 cents per k.w. h. or about $5,200 a year, with additional saving of $360 by securing hot water from Diesel jacket water.

Expect to pay for plant in less than five years out of savings on current cost.

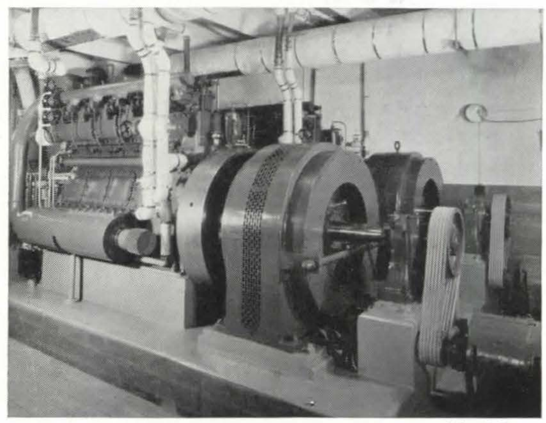
Two 50 h.p. Buda Diesels drive two 35 k.w. Ideal DC generators. There is a 10 k.w. motor generator set for AC, 5 k.w. booster set and 115 cells of Philco 200 ampere-hour batteries.

Exhausts and intakes have Burgess Silencers and engine bases are set on Korfund balanced cork mats.

Plant was designed, installed, and is maintained by Automatic Diesel Electric, Inc. in conjunction with Petroleum Heat and Power Co. Inc., both of New York.

Diesel Power

Located in a vault beneath this landscaped court is the power plant shown below. Academy Gardens Apartments, Bronx, N. Y.



Diesel Power

Two 125 h.p. Worthington Diesels furnish the power for the Academy Gardens plant.

SOME PRIVATE PLANT DIESEL ENGINE INSTALLATIONS*

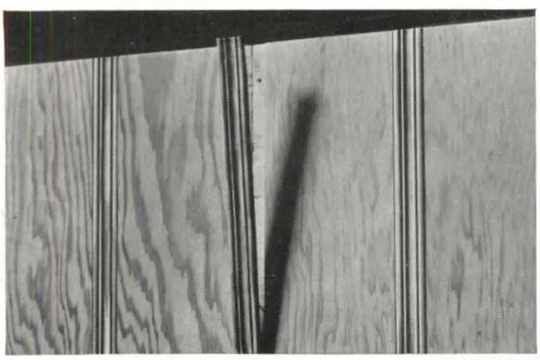
Name of Engine Manufacturer	Type of Bldg.	Name and Location of Bldg.	No. Units	Size of Engine h.p.	Size of Engine r.p.m.	Size Generator k.w.	Make of Generator
American Locomotive Co. Diesel Engineering Division	Institution	New York University, N. Y.	2	300	720	250	General Electric
			1	225	360	150	General Electric
	Prison	Raiford, Florida	1	625	225	450	General Electric
Atlas Imperial Diesel Engine Co.	Summer Resort	Point-O-Woods, N. Y.	1	38	1000		
Bolinders Co., Inc.	Stores & Garages						
The Buda Company	Restaurant	Ye Eat Shoppe, N. Y.	2	50		35	Ideal
Buckeye Machine Co.	Office	Nashville, Tenn.		187		125	
Busch-Sulzer Bros. Diesel Engine Co.	Hotel	Hotel New Yorker, N. Y.	1	750	300	500	Crocker Wheeler
De La Vergne Engine Co.	Hotel	Hotel New Yorker, N. Y.	1	530	275		
Caterpillar Tractor Co.	Hotel	Quincy, Ill.	1	45		35	
Chicago Pneumatic Tool Company	Hotel	Hotel Allerton, N. Y.	1	250		65	Ideal
	Industrial	Lincoln Warehouse, N. Y.	1	150	400	100	Ideal
Fulton Iron Wks.	Department Store	R. H. Macy, N. Y.	2	1000	225	800	Crocker Wheeler
Fairbanks Morse & Co.	Institution	Manhattan College, N. Y.	3	80	1200		
	Store	Sears, Roebuck, Camden, N. J.	2	140		90	
Ingersoll-Rand Co.	Skating Rink	Madison Sq. Garden, N. Y.	1	225	360	150	Crocker Wheeler
Lister-Ruston Diesel Engine Co.	Club	Colony Club, N. Y.	1	27	1000		
Superior Diesel Engine Co.	Apartment House	57 W. 75th St., N. Y.	2	225	1200	40	Burke
	Office	586 Fifth Ave., N. Y.	2	250	514	150	
Winton Engine Corp.	Office	Singer Building, N. Y.	1	525	375	350	Diehl
Worthington Pump & Machinery Corp.	Institution	Lenox, Mass.	1	50	514	35	Westinghouse
	Hotel	Hotel Houston, Dothan, Ala.	2	75	514	50	Westinghouse

*Some of these are combined steam and Diesel plants

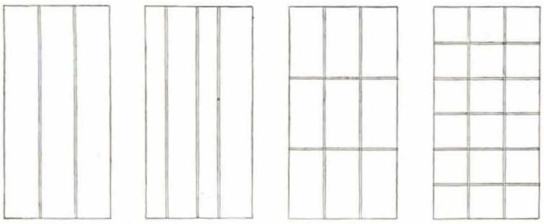
"KABINETTE" WATER HEATER

"KABINETTE" AUTOMATIC WATER HEATER

Designed to harmonize with modern kitchen and laundry equipment, a new automatic gas fired water heater of unique shape and construction has recently been introduced by the United American Bosch Corp., Springfield, Mass. Housed in a square, table height cabinet, the new heater may be placed anywhere, provides additional work surface to make up for the space which it occupies. Operation of the heater is entirely automatic. An adjustable temperature control, in the form of a small knob located conveniently at the front of the cabinet, may be set at "hot" (165°), "medium" or "warm" (135°) according to the individual requirements of the user. By turning the knob further to the right the heater may be shut off entirely except for the pilot light, in order to save gas while the family is away on a long week-end or a vacation. Instead of the conventional copper coil, the Kabinette heater employs an extended fin type heat exchanger of modern design. This is said to utilize the utmost heat content of the gas consumed and result in lowered operating cost as well as assuring the heater longer life by preventing condensation and consequent corrosion. Water is stored in a 20 gallon insulated tank, which is spherical in shape. Since this shape of tank presents a minimum of outside surface per gallon of water stored, heat losses from the tank by radiation from the outside surface are reduced. Recovery capacity of the unit is 28 gallons per hour, adequate for the average family and one-bathroom house. The size of the new heater is 25 in. square by 36 in. high, depth and height corresponding to the depth and height of the typical kitchen cabinet. Finish is white enamel with black enamel trim and chromium plated top and rim. Models are available for operation on all types of gas currently supplied in the United States.



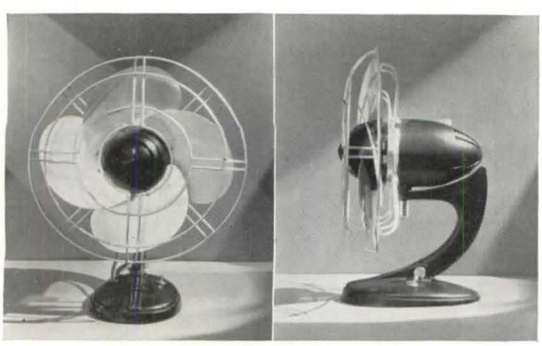
"ART-PLY" *John Beinert*



"ART-PLY" PATTERNS

"ART-PLY" PANEL BOARD

A special plywood panel board for walls and ceilings, which is self-joining, using its own pattern to cover joints, and eliminating the necessity for unsightly batten strips, has been developed by the Vancouver Plywood and Veneer Co., Vancouver, Wash. Known as Art-Ply, the plywood is ingeniously manufactured with a neat narrow molding which covers all joints and breaks up the surface of the material into decorative panels. Made of regular 3-ply Douglas Fir plywood, the edges of the panels are rabbetted to receive the cover strip flush with the surface of the board and additional strips recessed in the face of the panels carry out the pattern. The plywood is nailed to the studs or furring strips with 4-penny finish nails and the cover strip glued or nailed with wire brads so as to cover both the joint and the nails. Art-Ply is made in four standard patterns in the regular 4 x 8 ft. size so as to fit wood frame construction. Standard plank Art-Ply is inlaid with molding strips in 16 in. widths and rabbetted only at the sides of the panels. Random plank is inlaid with moldings at varying widths. Rectangular tile Art-Ply has moldings placed to form 16 x 32 in. rectangles and square tile has moldings forming 16 in. squares. The tile patterns are intended primarily for use on ceilings but may, of course, be used on sidewalls as well. The material may be finished with any of the stains, paints, enamels or other finishes usually used with plywood panel boards. Shipped in packages containing 10 standard size sheets, ¼ in. thick, together with necessary moldings, wrapped in manila and labeled, Art-Ply is said to be only slightly more expensive than regular plywood panel board of comparable quality. It should prove popular as a substitute for plaster walls, especially in alteration work where the fuss and bother associated with plastering must be avoided, or where low cost wood panel effects are desired.



"AIRFLOW" FAN

"AIRFLOW" ELECTRIC FAN

The new streamlined electric fan shown at the left was designed by Robert Heller for the A. C. Gilbert Co., 493 Blatchley Ave., New Haven, Conn. An efficient and sturdy fan operating on a new oscillating principle, the oscillating mechanism is completely enclosed in the fan housing, and therefore not subject to injury and the collection of dust and dirt as in older models. Instead of the usual driving arm, the fan employs an actuating pin operated by gears, which works in a groove in the base running parallel to the motor housing. The redesign of this mechanism has contributed to the beauty and simplicity of the streamlined form of the fan. Made in 10 in. and 12 in. blade models, full oscillating, the fan can be raised and lowered to direct the flow of air to any desired angle. The 10 in. blade size, finished in telephone black with metal parts chromium plated, will retail for $9.95.

(Continued on page 90)

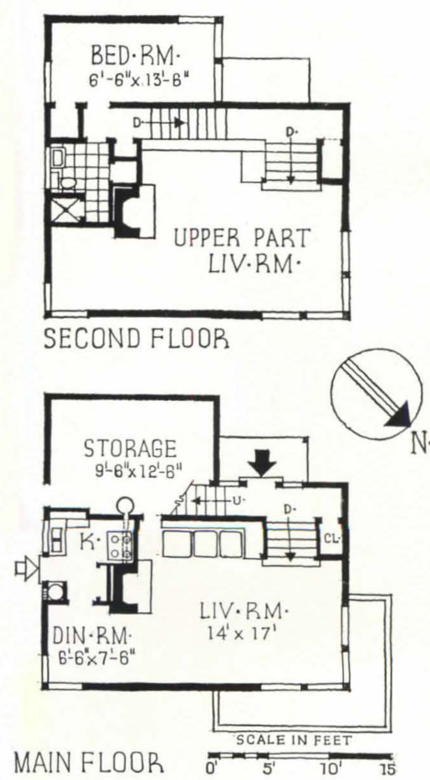
HOUSES

N. Richardson

BUILDING COSTS VARY FROM MONTH TO MONTH, FROM TOWN TO TOWN. COSTS QUOTED IN THE FORUM ARE IN ALL CASES SUPPLIED BY THE ARCHITECT, ARE USEFUL AS A RELATIVE GUIDE IN COMPARING ONE HOUSE WITH ANOTHER, BUT IN NO CASE ARE TO BE INTERPRETED AS A LITERAL AND LOCAL CURRENT INDEX.

GUEST HOUSE FOR PROF. ROBERT TRYON, BERKELEY, CALIF.

N. Richardson Photos



Making good use of a steeply sloping site, this house is entered at an intermediate landing of the stairs. The high living space, sheathed with mahogany plywood, affords flexible areas for dining and entertaining. Cabinets and coat closet, also treated as cabinet-work, are arranged for maximum convenience. Disciplined by the size of the plywood panels, the exterior is a simple and frank expression of the well ventilated and illuminated interior. The grouping of windows at corners permits of the most advantageous use of wall surface for furniture. Cubage: 9,000. Cost: approximately $2,900 at 31 cents per cubic foot.

LIVING ROOM

LIVING ROOM SEEN FROM UPPER STORY

CONSTRUCTION OUTLINE

STRUCTURE
Exterior walls—¼ in. Oregon pine plywood, double-kraft building paper, 1 in. Oregon pine sheathing and studding. Interior finish—ribbon-grained mahogany wallboard.

ROOF
Wood joist covered with diagonal 1 in. Oregon pine sheathing, 4-ply tar and gravel, Paraffine Companies, Inc.

SHEET METAL WORK
Flashing and leaders—24 gauge galvanized iron, American Rolling Mill Co. Gutters—California redwood.

WINDOWS
Sash—wood, white pine, awning type. Frame—redwood sill, white pine jambs and head. Glass—single strength, quality B, Libbey-Owens-Ford Glass Co. Blinds—National Venetian Blind Co.

FLOORS
Living room—salvaged teakwood. Bedrooms and halls—common white oak.

FLOOR COVERINGS
Kitchen and bathroom—linoleum, Jaspe, grade B, Armstrong Cork Products Co.

WOODWORK
Trim—white pine. Shelving and cabinets—Oregon pine. Interior doors—pine, single panel. Exterior doors—Rezo flush panel pine, The Paine Lumber Co., Ltd.

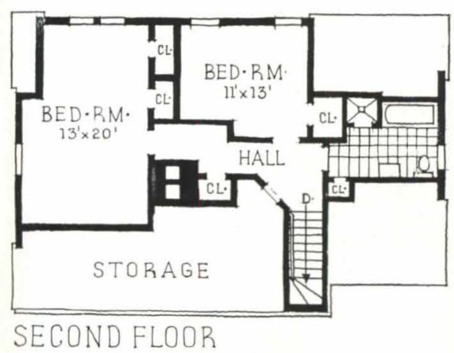
PAINTING
Interior: Walls and ceilings—natural stain. Floors—brown stain, filler, varnish and wax. Sash—painted. Exterior: Walls—Two coats Plyseal. All paints by Sherwin-Williams Co.

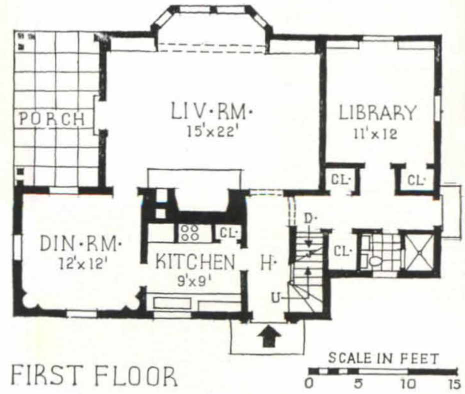
PLUMBING
All fixtures by Standard Sanitary Manufacturing Co. Soil and waste pipes—cast iron. Vent pipes—galvanized iron, Walworth Co. Water supply pipes—cold: wrought iron; hot: copper tubing, sweat fittings—Mueller Co.

HEATING
Gas burning warm air blower type. Hot water heater—30 gallon galvanized iron tank, automatic storage, National Radiator Corp.

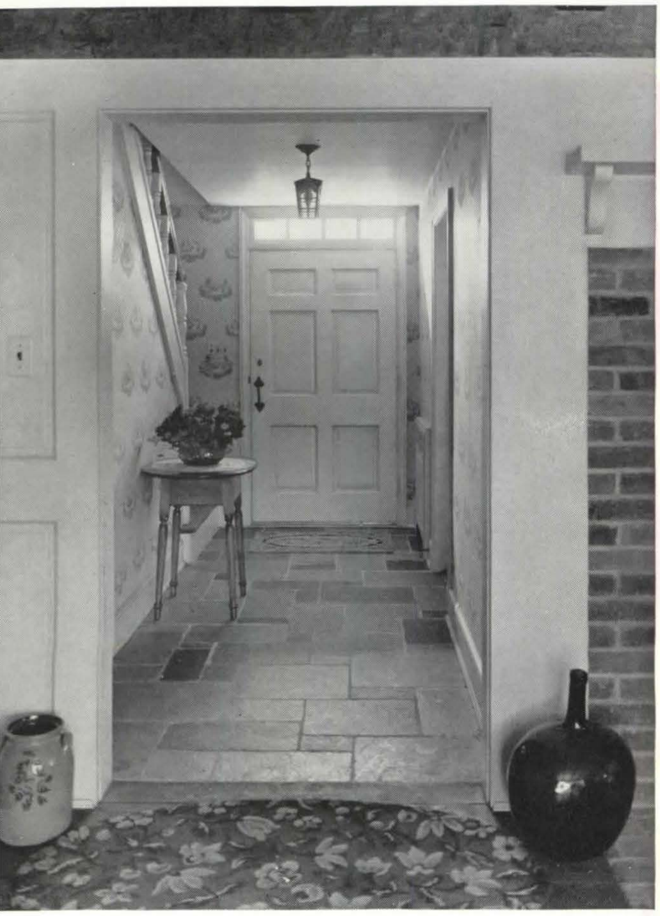
HOUSE FOR CY WILLIAMS, ROCKVILLE CENTRE, L. I., N. Y.

Murray M. Peters Photos





The adaptation of the Colonial idiom to contemporary planning is successful in this example. The ample hall areas may be justified by the ease of circulation from the kitchen to other rooms. The location of the living and bedrooms, at the rear, besides contributing to privacy, has preserved the simple roof planes in front. The size of the shingles and detail is consistent with the true scale of the house. Cubage: 25,116. Cost: $9,500 at about 27 cents per cubic foot.

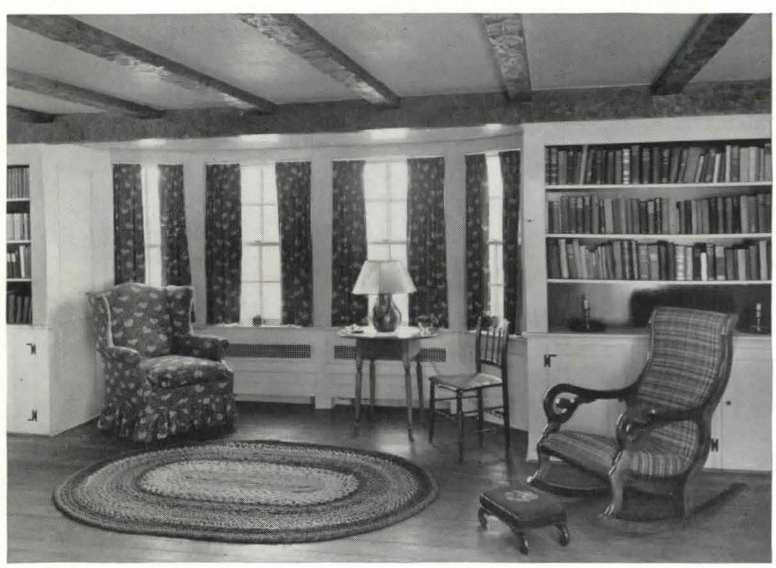


NTRANCE HALL

CONSTRUCTION OUTLINE

FOUNDATION
Walls—poured concrete. Cellar floor—cement.
STRUCTURE
Exterior walls—hand rift wood shingles on wood frame.
ROOF
Covered with wood shingles.
CHIMNEY
Flashing and leaders—copper. Gutters—wood, copper lined.
INSULATION
Outside walls, attic floor and roof—4 in. rock wool, Johns-Manville, Inc.
WINDOWS
Sash—wood, double hung. Glass—double thick, quality A. Screens—wood frame, bronze mesh.
FLOORS
Living room—oak plank. Bedrooms—N. C. pine. Halls: First floor—slate; second floor—oak. Kitchen—linoleum, Armstrong Cork Products Corp. Bathrooms—tile.
WALL COVERINGS
Living room—white pine wall paneling, painted. Bedrooms—pine, painted. Halls—wallpaper. Bathrooms—tile wainscot, 4 ft. high, wallpaper above.
PAINTING
Interior: Ceilings—painted, glazed, Sherwin-Williams Co. Floors—oak, antiqued, and waxed; pine, painted.
ELECTRICAL INSTALLATION
Wiring system—BX. Fixtures—wrought iron, special, Lightolier Co.
KITCHEN EQUIPMENT
Stove, electric, Westinghouse Electric & Manufacturing Co. Refrigerator—General Electric Co.
PLUMBING
All fixtures by Kohler Co. Soil pipes—extra heavy cast iron. Hot and cold water pipes—copper tubing.
HEATING
One pipe steam. Boiler—oil fired, American Radiator Co. Radiators—convector type. Valves—Hoffman Specialty Co., Inc. Thermostat—Minneapolis-Honeywell Regulator Co. Hot water heater—Taco, 40 gallon Monel metal storage, Taco Heaters, Inc.

ITCHEN

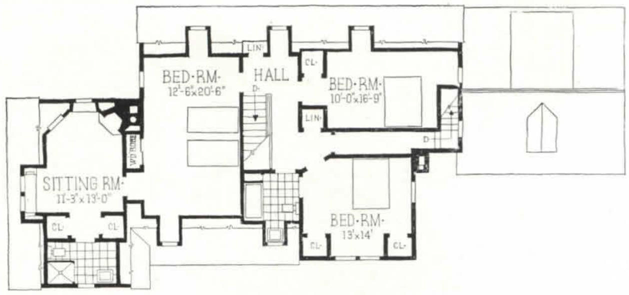


LIVING ROOM

HOUSE FOR MAJOR GENERAL GEORGE S. GIBBS, LIME ROCK, CON

George H. Van Anda Photos

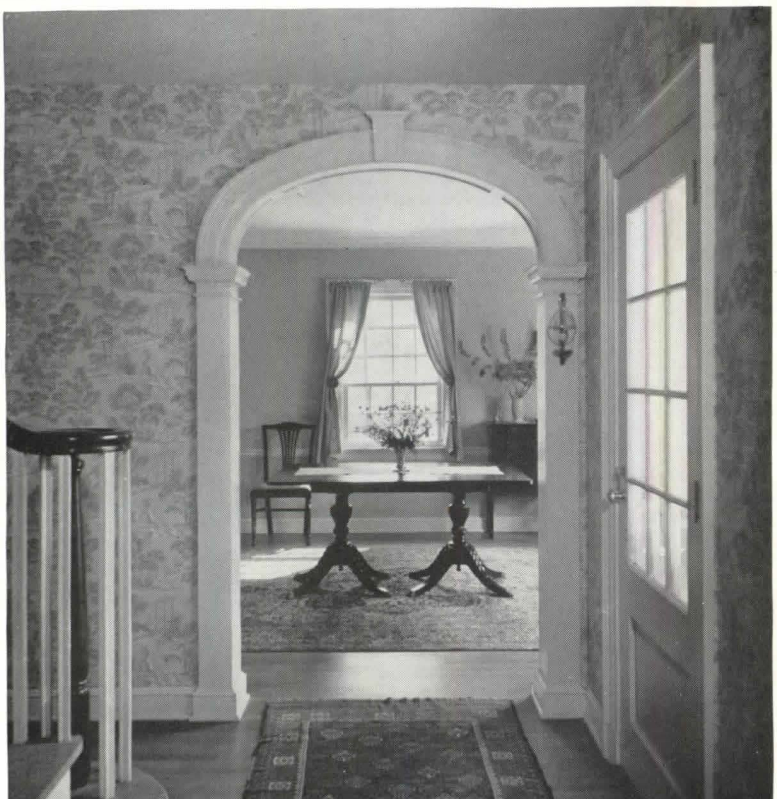
Space requirements were met by a horizontal addition aptly conforming to the terrain. The entrance hall, opening upon the garden terrace, also serves the living, dining, and service quarters. The first floor bathroom may be used in connection with the guest bedroom or independently. What might have been an unduly formal living room was relieved by the asymmetrical placing of the fireplace. On the second floor, the corner fireplace adds to the informality of the secluded sitting room. The garage, under the maids' rooms, is reached through the basement, which contains the laundry and air conditioning equipment. Garage and basement walls are of field stone. Cubage: 54,290. Cost: $18,500 at about 30 cents per cubic foot.



SECOND FLOOR

FIRST FLOOR

GARDEN ELEVATION



HALL-DINING ROOM

CONSTRUCTION OUTLINE

FOUNDATION
Walls—continuous, stone 16 in. thick, cement mortar. Cellar floor—4 in. concrete.

STRUCTURE
Exterior walls—24 in. Cabot's dipped shingles, heavy building paper, ⅞ in. wood sheathing, 2 x 4 in. studs, 16 in. o.c., Cabot's Quilt insulation between studs, metal lath and plaster, Samuel Cabot, Inc.

ROOF
Wood shingles, stained 1 coat creosote, over 1 x 3 in. nailing strips, Samuel Cabot, Inc.

CHIMNEY
Terra cotta lining. Dampers—H. W. Covert Co.

SHEET METAL WORK
Flashing, gutters and leaders—copper.

WINDOWS
Sash—wood, double hung. Weatherstripping—zinc, Chamberlain Metal Weather Strip Co., Inc. Glass—single strength, quality A. Screens—white pine frame, bronze mesh.

FLOORS
Living room and halls—oak. Bedrooms: First floor—oak, second floor—fir. Kitchen—medium grade linoleum, Armstrong Cork Products Co. Bathrooms—tile.

WALL COVERINGS
Living room, bedrooms, halls and bathrooms—Salubra, wall covering, Frederick Blank & Co.

HARDWARE
Interior and exterior—P. & F. Corbin.

PAINTING
Interior: Walls and ceilings—3 coats Wallhide, Pittsburgh Plate Glass Co. Floors—filler, 1 coat shellac, 2 coats Minwax, Minwax Co., Inc.

ELECTRICAL INSTALLATION
Wiring system—medium grade, General Electric Co. Switches—enclosed tumbler. Fixtures—Chase Brass & Copper Co. and Lightolier Co.

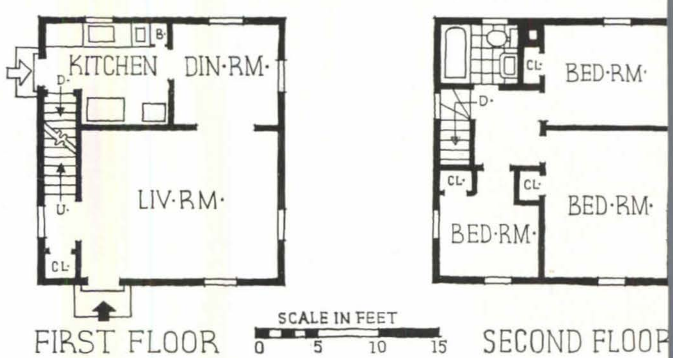
KITCHEN EQUIPMENT
Stove and refrigerator—General Electric Co. Sink—stainless steel, double compartment.

PLUMBING
All fixtures by Standard Sanitary Mfg. Co. Soil pipes—cast iron. Water supply and vent pipes—galvanized steel. Pump—deep well, 1,000 gallon, galvanized tank, Fairbanks-Morse & Co.

HEATING AND AIR CONDITIONING
Two pipe steam, oil fired boiler, General Electric air conditioning system. Radiators—cast iron, Crane Co.

Buckingham Studio

ELDRED MOWERY, DESIGNER

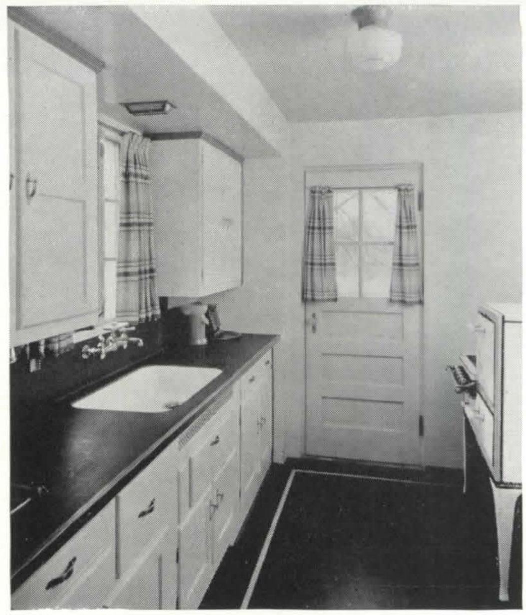


One of four demonstration houses erected by the Lumber Manufacturers Association, forerunner to one thousand small, wood demonstration houses the Association plans for this year. This design achieves compactness and maximum economy in plumbing layout, framing, and general circulation. Preserving the best traditions of our early carpenters, the mass is boldly and clearly conceived. The lunette and the change from clapboards to flush siding in the attic story relieve any impression of austerity. More attention to landscaping, grading, and details of the back porch are clearly needed. Cost: $3,450.

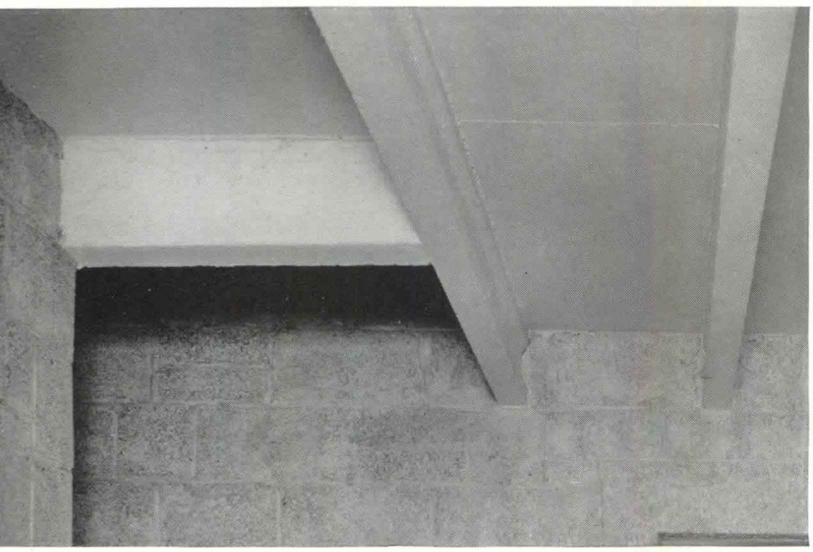
CONSTRUCTION OUTLIN

FOUNDATION: 8 in. cinder blocks.
STRUCTURE: Standard wood frame, 8 in. siding, inside wood lath and plaster.
ROOF: Covered with wood shingles.
SHEET METAL WORK: Galvanized iron.
WINDOWS: Wood, double hung, Curtis stock. Glass—single strength.
FLOORS: All rooms—maple, except bath which ha linoleum over pine.
WALL COVERINGS: All rooms—wallpaper, excep painted walls in kitchen and bath.
ELECTRICAL INSTALLATION: Wiring system—BX Switches—toggle.
KITCHEN EQUIPMENT: Stove—gas. Refrigerator—electric. Sink—rolled rim.
PLUMBING: All fixtures by Standard Sanitary Mfg Co Soil pipes—cast iron. Water supply pipes—galvanize iron.
HEATING: Gravity, hot air, coal fired boiler. Ho water heater—Pittsburgh automatic storage.

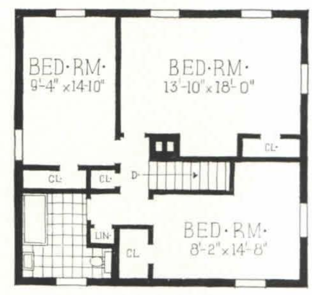
Courtesy, Portland Cement Assn.



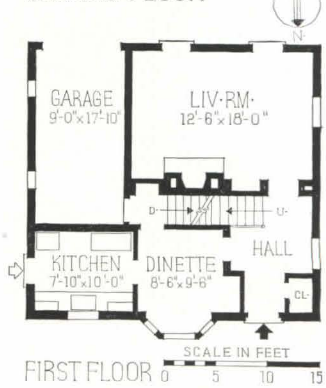
KITCHEN



TERIOR WALL AND CEILING DETAIL



SECOND FLOOR



FIRST FLOOR

inder block gives a pleasant texture to both the exterior and in-rior of this house of French type. The compact plan and simple nstruction showed their merits in the budget. Precast concrete sts were left exposed, providing logical ornament for otherwise re reenforced concrete ceiling slabs. The small "dinette" is adequate family meals. The house is all of fireproof construction except for wood-frame roof. Cubage: 18,000. Cost: $5,000 at about 36 cents r cubic foot.

CONSTRUCTION OUTLINE

STRUCTURE: Exterior walls—cinder block with reenforcing rods every second course. Exterior finish—Masonoc paint, Arco Co. Interior finish: First floor—Wallhide, directly on block, Pittsburgh Plate Glass Co. Second floor—plaster and wallpaper. Floor construction—reenforced concrete with precast concrete joists, left exposed, Cinder Block and Material Co. Second floor ceiling—plaster on Ecod fabric and wood joists, Reynolds Metals Co., Inc.

ROOF: Asphalt shingles, Certain-teed Products Corp.

WINDOWS: Sash—steel casements and screens, Fenestra, Detroit Steel Products Corp.

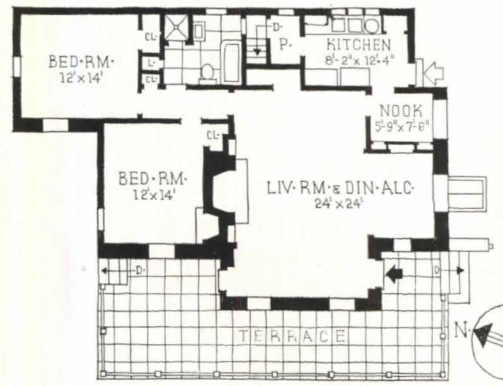
FLOOR COVERINGS: Living room, bedrooms and kitchen—linoleum, Armstrong Cork Products Co. Halls—Tile-tex, The Tile-Tex Co. Bathrooms—tile, U. S. Encaustic Tile Co.

PLUMBING: All fixtures and piping by Crane Co.

HEATING: Warm air, Fox Furnace Co.

HOUSE FOR WILLIAM ELLIOTT, GULF MILLS, PENNSYLVANIA

Ph. B. Wallace Photos



FLOOR PLAN

LIVING ROOM

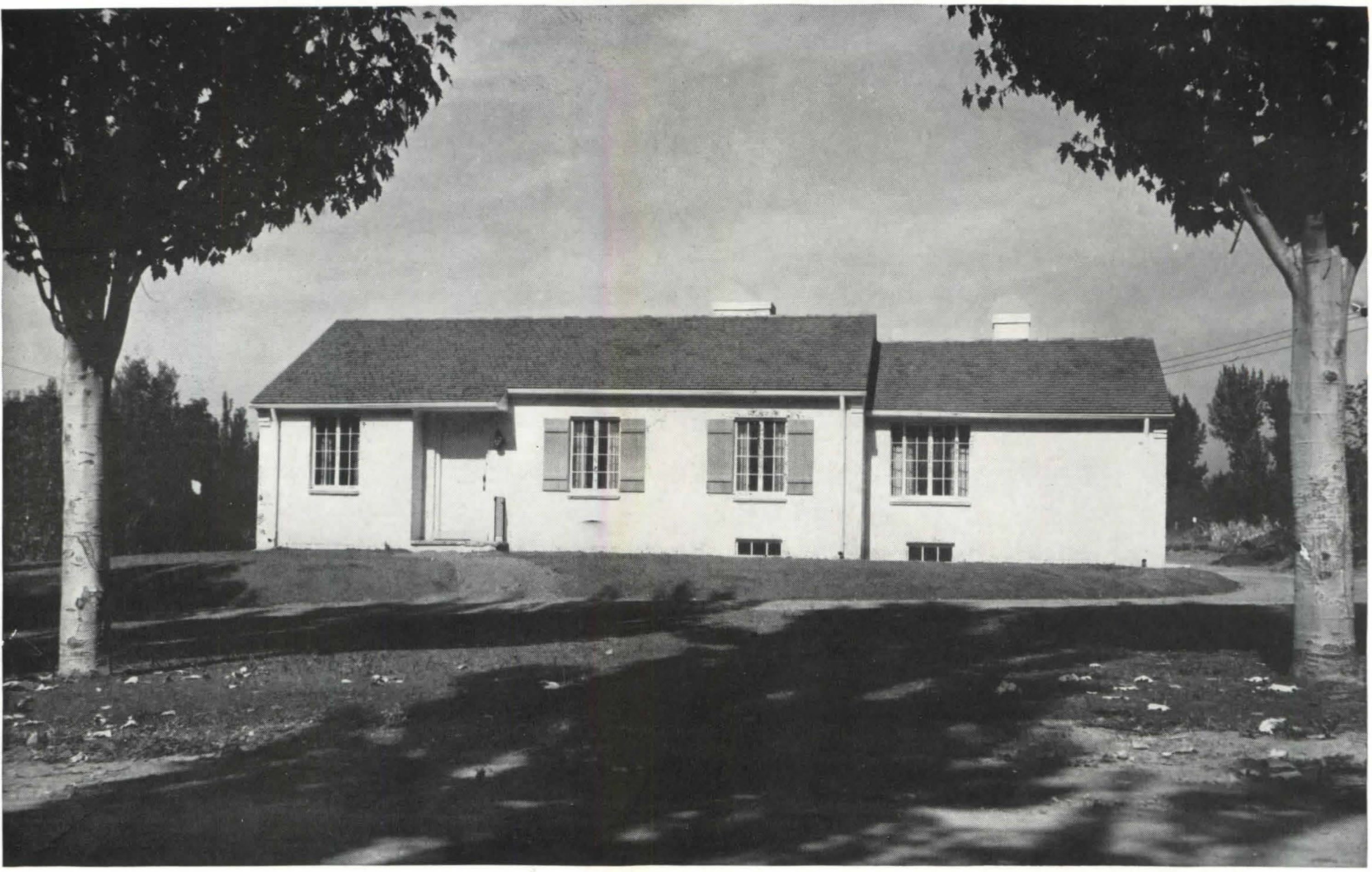
J. LINERD CONARROE, ARCHITECT

The plan is ingeniously oriented to obtain east and south exposure for the living rooms, as well as a view of Gulph Creek, running about 50 ft. in front of the house. Painted masonry and clapboard walls are combined in an interesting manner. A masonry retaining wall surrounding the terrace provides an effective, if not economical, base for the house, and is given good scale by the contrasting lightness of a picket fence. Beams from a demolished barn and half-timbered walls are appropriate to the rugged informality of the interiors. In view of the excavation and filling required, the incorporation of the garage with the house might have been economically accomplished. Cubage: 21,735. Cost: approximately 24 cents per cubic foot.

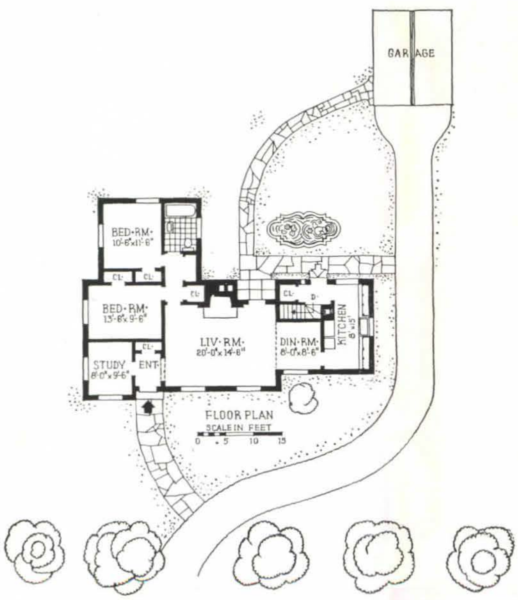
CONSTRUCTION OUTLI

FOUNDATION
Walls—stone, cement mortar.
STRUCTURE
Exterior walls—stone painted with Bondex, Rea Co. Interior partitions—rock lath finished in text plaster. Large old beams in living room section t from a demolished barn. Attic floor—unfinished, vision made for two rooms and bath.
ROOF
Covered with Royal wood shingles.
SHEET METAL WORK
Flashing, gutter and leaders—16 oz. copper.
INSULATION
Outside walls and ceiling of second floor—½ in. borite, Atlantic Gypsum Products Co. Weatherst ping—zinc and spring.
WINDOWS
Sash—double hung wood. Glass—double thick, qu A. Screens—full length wood frames with copper m
FLOORS
Living rooms—random width white oak, pegged. rooms and halls—2¼ in. face, oak, ⅞ in. t Kitchen—pine, covered with linoleum. Bathrooms—
WOODWORK
Living room and dining alcove—knotty pine pane Interior doors—pine, special design. Garage doo overhead type.
PAINTING
Interior: Floors—stained and waxed. Trim and sa stained in living room, painted in remainder of ho
ELECTRICAL INSTALLATION
Wiring system—BX.
KITCHEN EQUIPMENT
Stove and refrigerator—electric, General Electric Sink—built-in dishwasher and washing machine, Conover Co.
PLUMBING
All fixtures by Standard Sanitary Mfg. Co. Soil pip cast iron. Water supply pipes—copper.
HEATING
Hot water system, oil fired boiler, thermostat trolled. Radiators—convector type. Hot water heat electric.

HOUSE FOR LLOYD A. SPRINGETT, SALT LAKE CITY, UTAH



A. H. EHLERS, DESIGNER



ne-story houses are apt to lack privacy within. The arrangement of this house, however, permits of proper segregation of ctivities with but little sacrifice to light, air and convenience. The walls of painted used brick are treated with directness and reedom from the sentimental designs which this material too ften inspires. Cost: $4,800.

CONSTRUCTION OUTLINE

FOUNDATION
Walls—concrete. Cellar floor—concrete.
STRUCTURE
Exterior walls—used brick, plaster inside.
FLOORS
Oregon pine joists, 2 x 10 in., 16 in. on center, fir subfloor, oak finish floor.
ROOF
Tile composition.
CHIMNEY
Common brick.
HEATING
Coal furnace with automatic stoker.

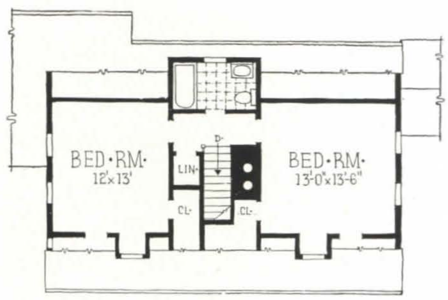
HOUSE FOR MRS. JAMES A. WARD, EGYPT, MASS.

Arthur C. Haskell Photo

The nucleus of this interesting composition is a modified Cape Cod plan, to which has been added the garage and studio. The utilitarian character of the latter is emphasized by the random vertical siding, reminiscent of barn construction. The many roof slopes have been organized to give a picturesque but predominantly low appearance to the various masses. The large chimney also contributes to the homogeneity of the silhouette. What was considered the best orientation for the studio was apparently unnecessary for the living quarters. Cubage: 30,856. Cost: approximately $8,100 at about 38 cents per cubic foot.

NORTH ELEVATION

FIRST FLOOR



SECOND FLOOR

CONSTRUCTION OUTLINE

FOUNDATION
Walls—concrete, continuous. Cellar floor—cinder concrete.

STRUCTURE
Frame construction, exposed studs inside studio, wood floors and plaster ceilings.

ROOF
Wood frame covered with cedar shingles.

SHEET METAL WORK
Flashing—copper. Gutters—wood. Leaders—2 in. round Toncan iron, Republic Steel Corp.

INSULATION
Outside walls—Celotex lath, The Celotex Co.

WINDOWS
Sash—wood, double hung. Glass—single strength, quality A.

STAIRS
Treads—soft pine. Risers—country pine.

FLOORS
Living room, bedrooms and halls—wide soft pine. Kitchen and bathrooms—fir, covered with linoleum.

WALL COVERINGS
Living room, bedrooms and halls—wallpaper.

WOODWORK
Trim, shelving and cabinets—country pine. Doors—white pine.

HARDWARE
Interior—hand wrought. Exterior—some hand wrought, remainder P. & F. Corbin.

PAINTING
Interior: Ceilings—calcimine. Floors—3 coats spattered. Trim and sash—3 coats enamel. Exterior: Walls—double white, Samuel Cabot, Inc.

ELECTRICAL INSTALLATION
Wiring system—BX. Switches—stock tumbler.

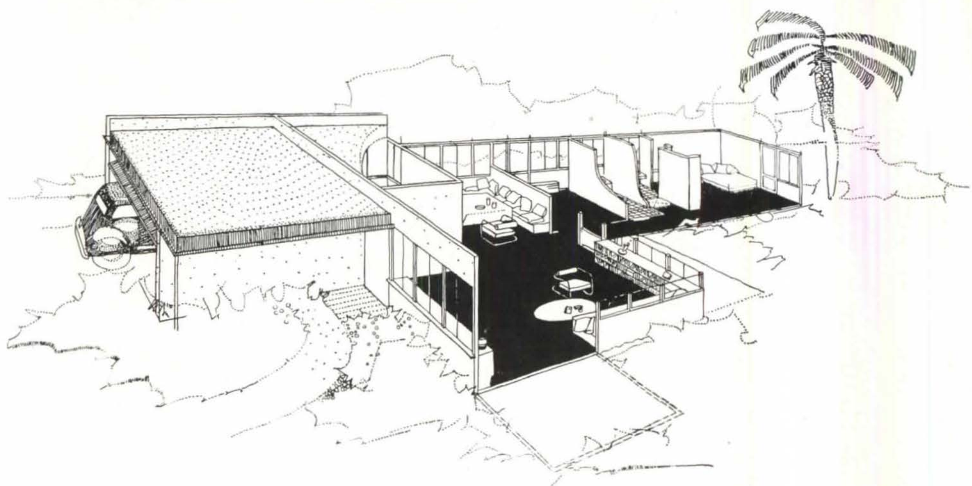
PLUMBING
All fixtures by Crane Co. Soil pipes—cast iron. Water supply pipes—copper.

HEATING
Oil furnace, General Electric Co.

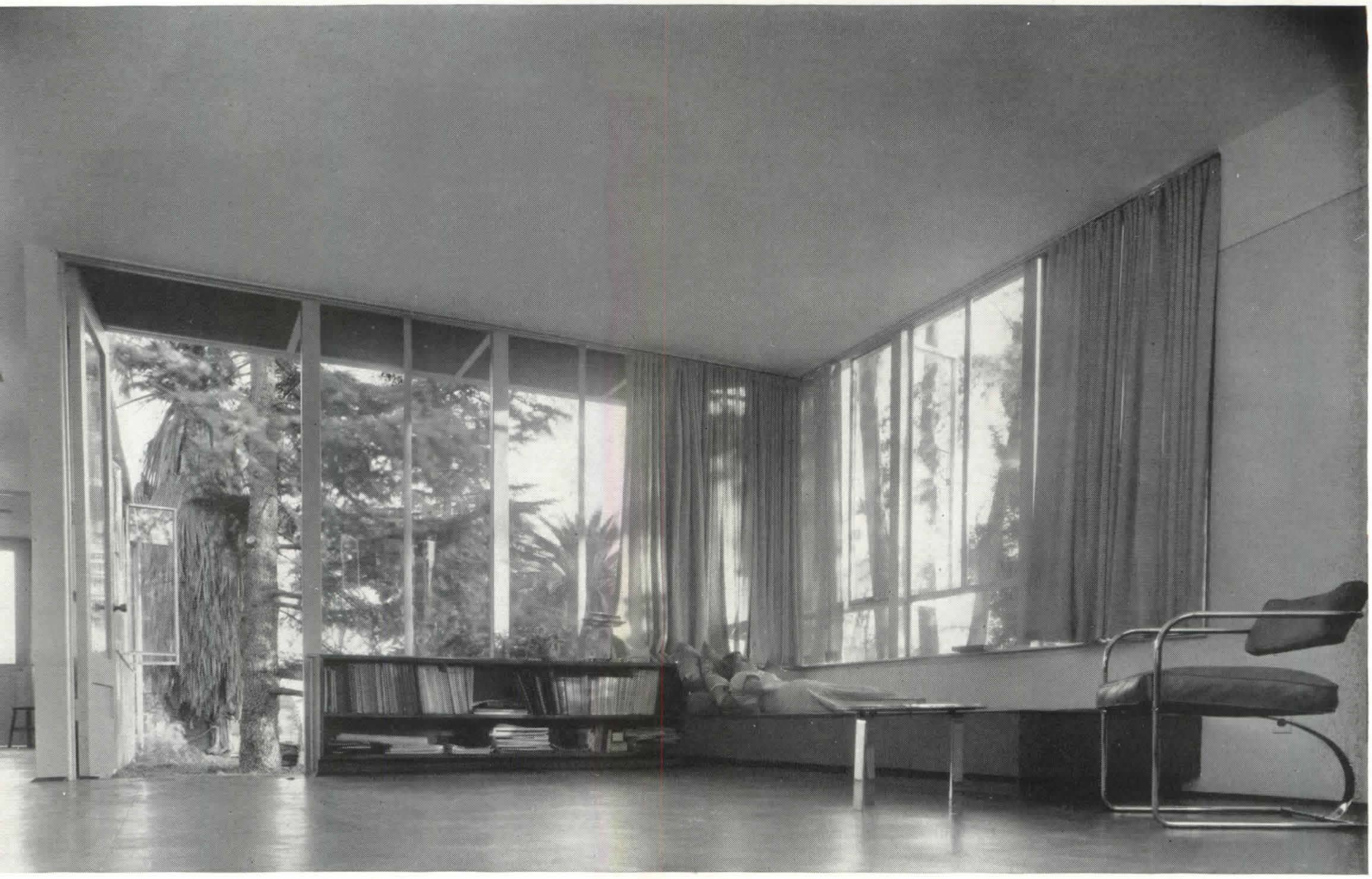
LIVING ROOM

HOUSE FOR DR. CHARLES RICHTER, PASADENA, CALIF.

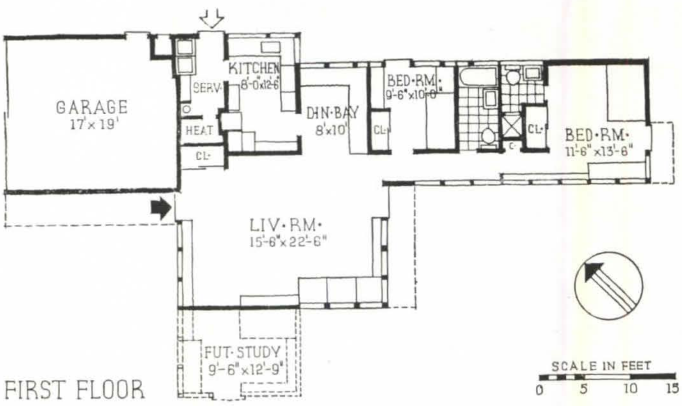
Luckhaus Photos



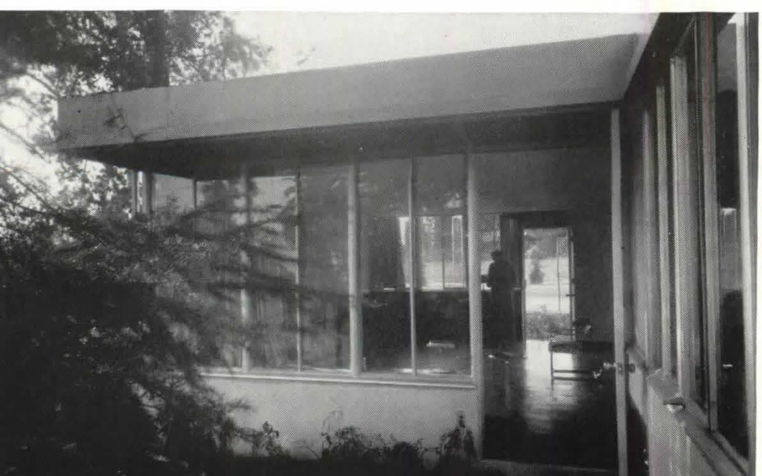
The architect's approach to the problem avoids a common pitfall of small house design. "The level site is richly embellished by magnificently tall trees with which the small residential building is naturally unable to compete in height." The requirements of a professional couple and one child are met by a carefully oriented plan, capable of future expansion. The timber "chassis" rests on an earthquake-proof floor slab. The built-in furniture and easy circulation should reduce housekeeping to a minimum and contribute to the restful atmosphere created by simplified construction and close harmony with the natural environment. Cubage: 14,600. Cost: $4,700 at 31 cents per cubic foot.



LIVING ROOM



FIRST FLOOR



CONSTRUCTION OUTLINE

FOUNDATION
Continuous concrete footings with reenforced concrete slab and integral finish. Waterproofing—Anti-hydro admixture in floor slab, Anti-Hydro Waterproofing Co.

STRUCTURE
Continuously truss-braced standard wood chassis, milled rabbetted posts spaced 40½ in. Interior—sheet-rock lathing with smooth putty plaster. Exterior—felt, wire netting, ⅞ in. cement stucco. Ceiling—wood construction with Celotex lath.

ROOF
Covered with 4 layer gravel roof.

SHEET METAL WORK
Flashing and gutters—24 gauge galvanized iron, Armco, American Rolling Mills Co.

INSULATION
Roof—insulated with Celotex.

WINDOWS
Sash—steel casements. Glass—double strength, quality A, Libbey-Owens-Ford Glass Co. Screens—copper roller, automatic tension.

FLOORS
Accotile, throughout, Armstrong Cork Products Co.

WALL COVERINGS
Kitchen and bathrooms—Sanitas, Standard Textile Products Co.

PAINTING
Interior: Walls and trim—2 coats oil paint. Exterior: Walls—waterproofing brush coat.

ELECTRICAL INSTALLATION
Rigid steel conduits, General Electric Co. Switches—tumbler. Fixtures—built-in with diffusing glass.

KITCHEN EQUIPMENT
Stove—Magic Chef, American Stove Co. Refrigerator—General Electric Co. Sink—Washington-Eljer Co., linoleum covered drainboard.

PLUMBING
All fixtures—Washington-Eljer Co. Soil and waste pipes—cast iron. Vent and water pipes—wrought iron.

HEATING
Circulating air, gas wall heaters, with fresh air intake, Andrews Heating Co. Hot water heater—gas fired.

All photos, Harkins Commercial

KANSAS CITY has the second largest, and most completely equipped auditorium in the country. To see why, turn to a map of the U.S., put the point of a compass at the spot marking the city, and draw a circle with a radius of 600 miles. It will touch the Canadian border on the north, the Gulf of Mexico on the south, and will include almost half of the 48 States. Add to this some 40-odd railroad lines, the convergence of important national highways and almost all transcontinental air routes, and you will have several very good reasons why this sprawling metropolis has become the great mid-western convention center. The city has long been conscious of its peculiarly favored location, and over 30 years ago built a hall to attract convention goers. When Bryan was campaigning for the presidency Kansas City was selected for the convention, only to have its auditorium burn to the ground. It is of more than historical interest to note that when Mr. Bryan arrived 45 days later, the hall had been entirely rebuilt; something of the same popular temper is displayed in the building which has just replaced it.

This mammoth structure—it is 426 x 332 ft.—has been designed as more than a convention hall, however. It can house exhibitions of canned goods or heavy machinery; its theater will take any size play or opera; it is suitable for chamber music recitals, auto shows, small committee meetings, wrestling matches. The separate units can function separately or together; in either case there is no confusion or crossing of circulation. A capacity crowd of 45,000 could be removed in eight minutes, if need arose. To have produced a building of such remarkable flexibility was no mean achievement.

As for the architectural quality of the building, the illustrations speak for themselves. No pho-

KANSAS CITY AUDITORIUM

ALONZO H. GENTRY, VOSKAMP & NEVILLE;
HOIT, PRICE & BARNES, ASSOCIATED ARCHITECTS
ERWIN PFUHL, STRUCTURAL ENGINEER
W. L. CASSELL, MECHANICAL ENGINEER

tograph, perhaps, could do justice to the arena, a stupendous blue interior whose decoration consists of 14,000 seats and a ceiling studded with lighting and air conditioning equipment. No ornamentation was added or needed to make this one of the most distinguished large interiors in the country. Color was freely used through the rest of the building, producing an appropriately festive appearance and serving the additional purpose of clearly differentiating the various types of circulation. It is impossible to get lost in the building.

The exterior, as shown by the preliminary sketches, was originally conceived as a conventional collection of windows and the usual "architectural" motives; when the plans made it increasingly clear that a nearly windowless block was the solution, the architects had the courage and good sense to design one.

Behind the scenes lies an exceedingly complex set of electrical and mechanical installations, but here, as in the plan, there is a basic simplicity in the various layouts. Miles of lights, ducts, pipes, and wiring can be reached instantly and easily. An elaborate theater switchboard has been reduced to the size of an organ console and is worked from the orchestra pit.

One man at a control board takes care of the air conditioning of innumerable spaces of all sizes. There is no large opening apparent on the exterior, but a steam shovel could be brought into the exhibition space without being dismantled. If a prime test of good modern architecture is that it works efficiently and unobtrusively, the Kansas City Municipal Auditorium is good modern architecture.

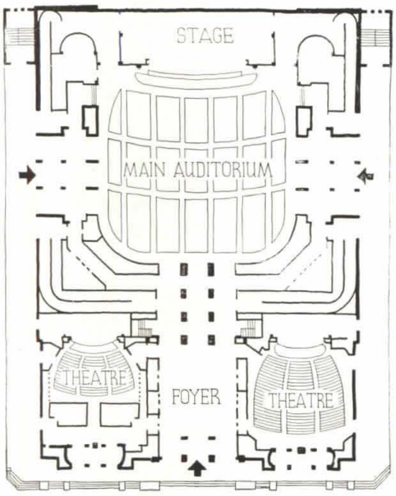
Director of Public Works: Matthew S. Murray. Painters: Ross Braught, Walter Alexander Bailey, Larry Richmond. Sculptors: Albert Stewart, H. F. Simon.

THE PROBLEM

To provide the following accommodations:

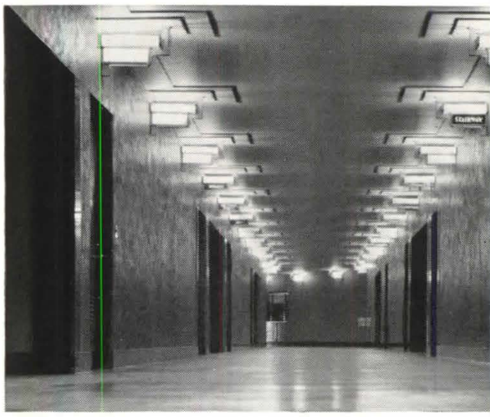
1. An arena to seat about 15,000 persons.
2. A number of committee rooms, seating from 25 to 500 persons.
3. An exhibition area of approximately 150,000 sq. ft., suitable for exhibitions of every description.
4. A theater for plays, operas, and concerts, to seat about 3,000 persons.
5. A little theater for functions, music recitals, and small performances.
6. Administration offices and the usual dependencies and services.

PLAN DEVELOPMENT

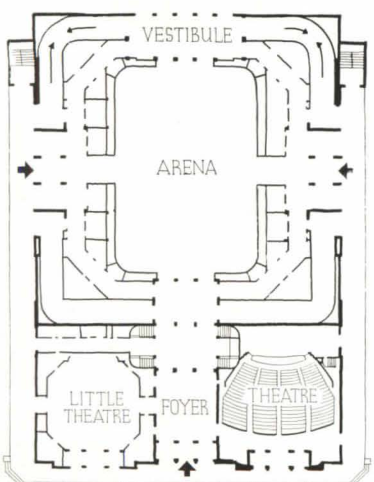


It was at first planned to place a stage in the main auditorium, as had been done elsewhere. This attempt to gain added flexibility was discarded because it interfered with other uses of the space, and because the huge size of the interior (5,000,000 cu. ft.) made a stage impracticable. Considerable difficulty was met in placing the small theaters so that they might be of ample size and still have adequate circulation. An intermediate step eliminated these two theaters, and introduced a small plaza in front of the building; it was felt, however, that the need for theaters was greater than the advantages of a plaza, and the problem of their placing was finally solved by locating them on two levels.

UPPER BALCONY PROMENADE

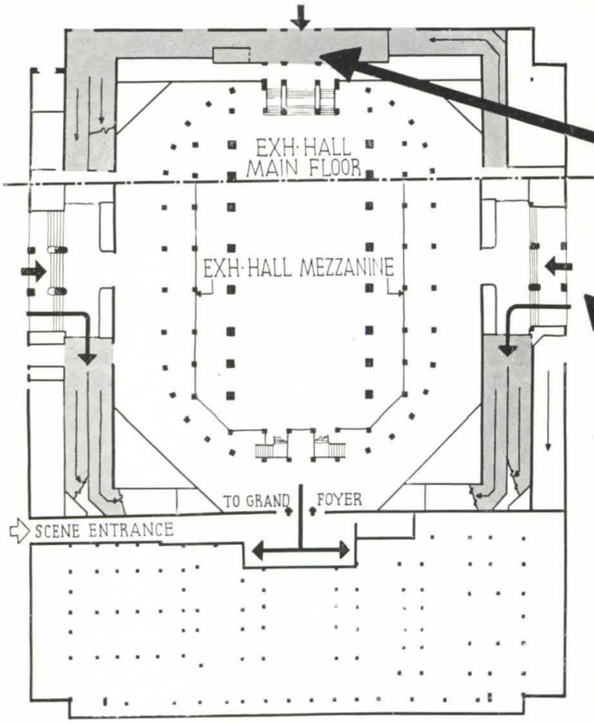


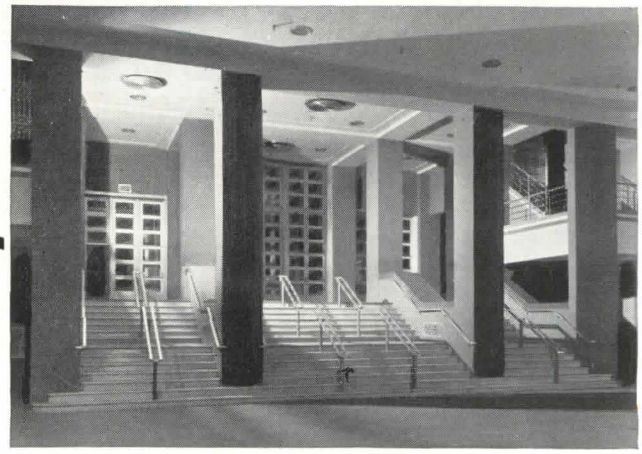
LOWER BALCONY PROMENADE



Attempting to squeeze in two theaters on one level reduced the arena to a shape that was nearly square. Subsequent study of other large auditoriums revealed that such a shape was preferable for reasons of visibility and acoustics. When increased space became available through the removal of one theater to another level the square shape was maintained. It also made possible a roof construction carried on only four points of support, with 250-ton trusses carrying the load in each direction. On this plan the excellent system of circulation appears: as finally developed it became the most notable single feature of the entire layout.

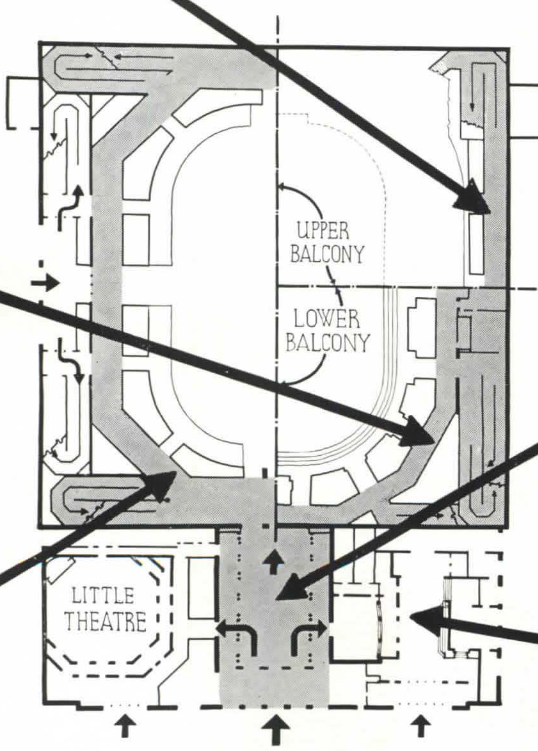
ARENA PROMENADE





ENTRANCE TO LOWER LEVEL

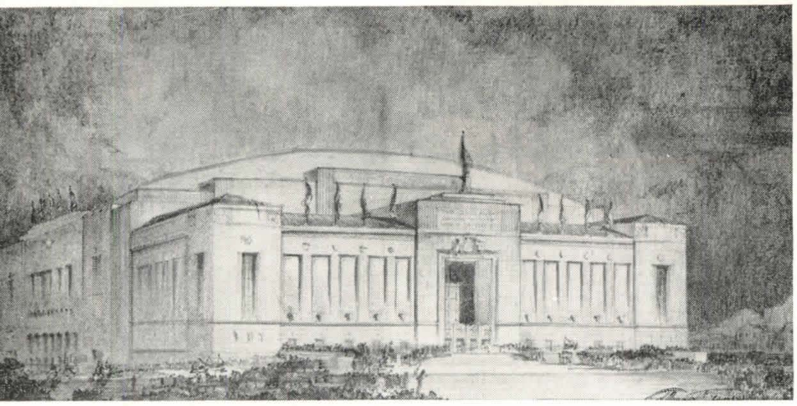
ENTRANCE TO MEZZANINE



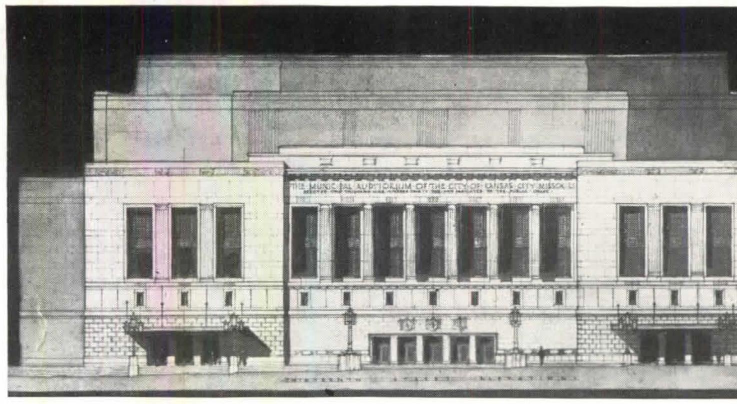
GRAND FOYER

THEATER FOYER

EXTERIOR DEVELOPMENT

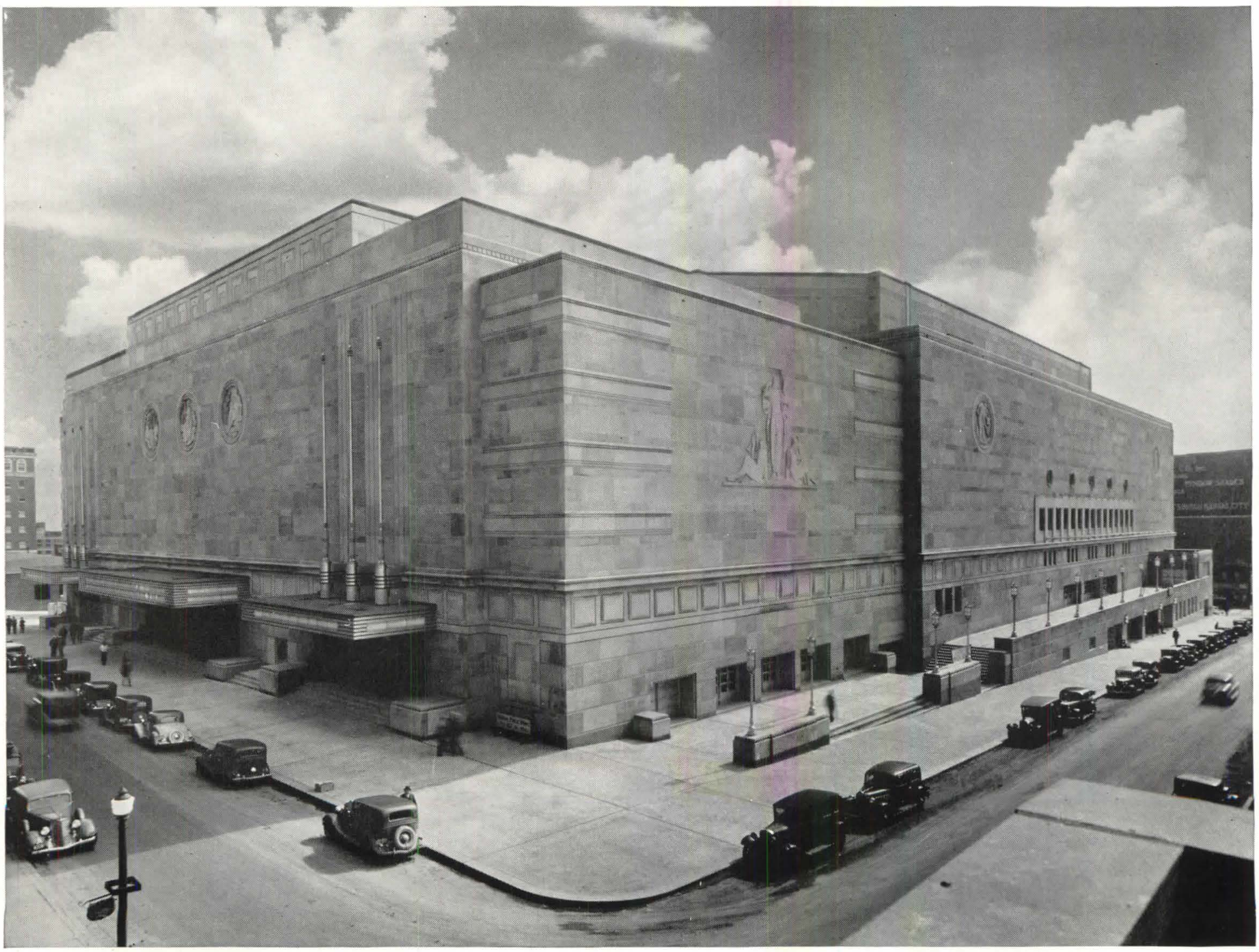


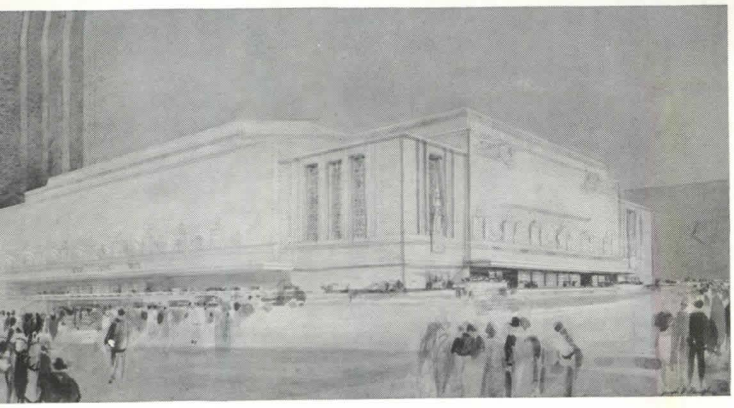
Between the first sketch and the finished building there is a remarkable contrast, showing how development of the plan forced the original obvious exterior treatment into a consistent expression of plan and the building's general character.



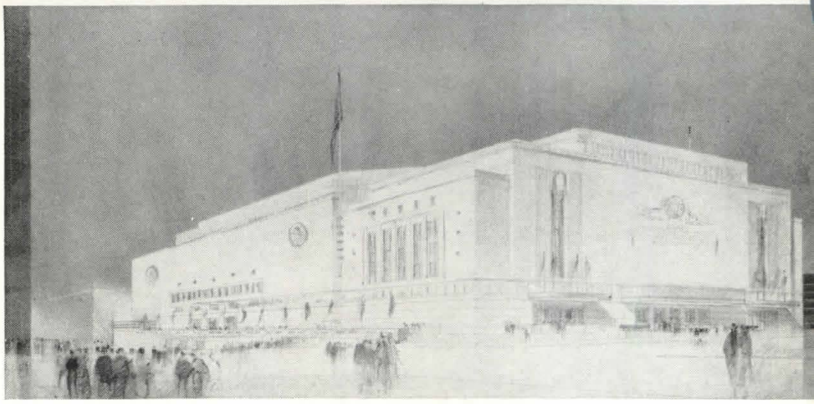
This later sketch still shows the windows which were maintained throughout the early stages. As the size of the building became more and more apparent, the multiplicity of motives gradually diminished.

VIEW, THIRTEENTH AND CENTRAL STREETS





As windows and columns were abandoned, it was attempted to fill their place with strong bands of terra cotta or carved stone. Here the building approximates its final form, but still lacks the decisiveness of the final solution.



As studies approached the final stage there was a notable increase in vigor and clarity of expression. The functional approach once again produced a solution that was more than merely functional. Between the first and last studies here shown, there was about a year of work.

GREAT ARENA

ENTRANCE LOBBY — 1.

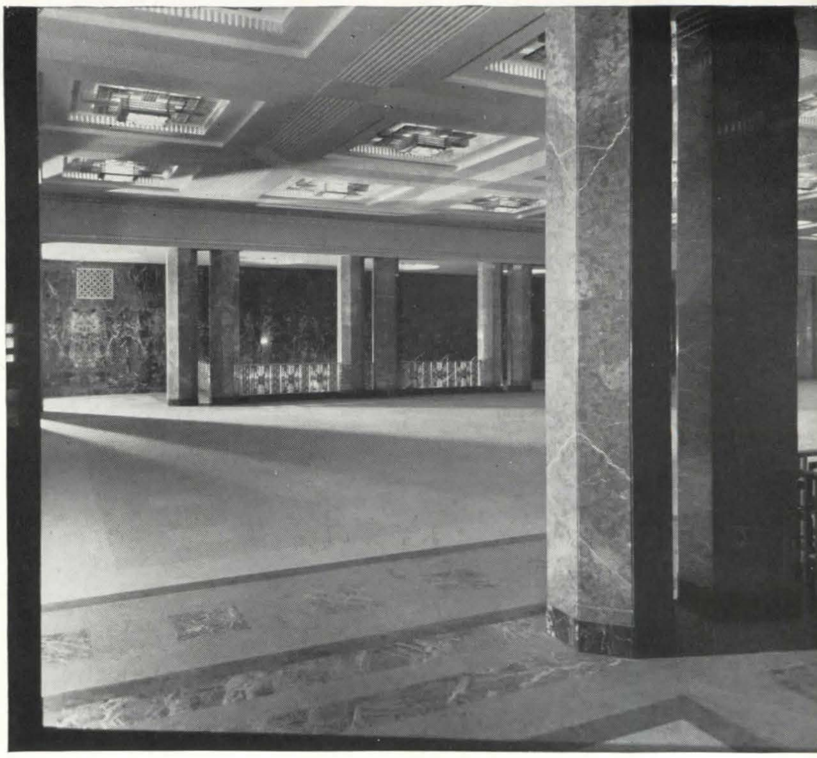
EXHIBITION HALL

1. Walls: Breche d'Alep marble; bronze and aluminum bands. Doors: aluminum. Ceiling: red-brown, with small amount of gold leaf. **2.** Walls and columns: red-brown glazed terra cotta. Ceiling: chrome yellow. Doors: turquoise blue with black trim. **3.** Back walls: red-brown. Columns: light gray tan on two sides, orange on other two. Ceiling: in main exhibit space, ivory, over mezzanines, bright chrome yellow.

ENTRANCE WYANDOTTE STREET — 2.

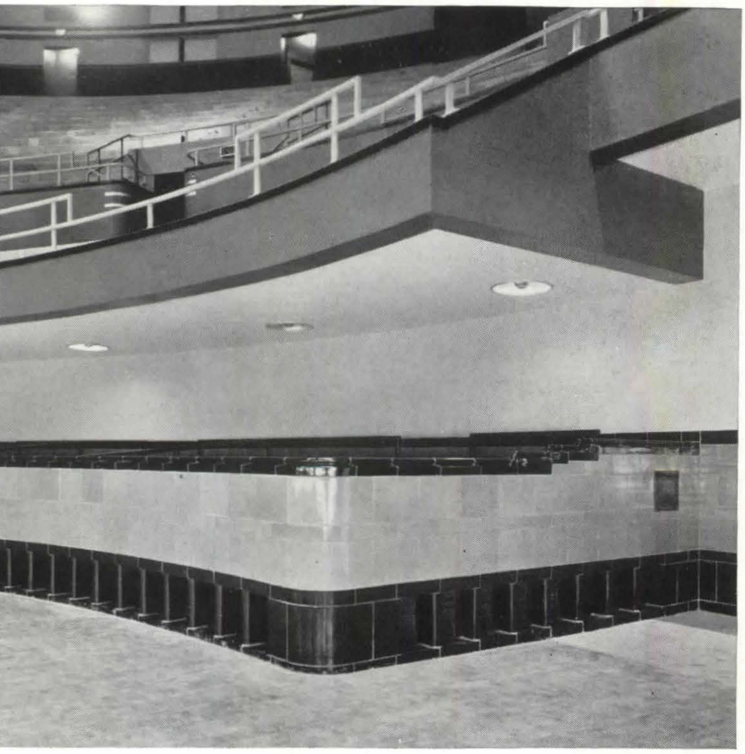
EXHIBITION HALL — 3.

AIN TICKET LOBBY — 4.



GRAND FOYER — 5.

4. Walls: Roman travertine with bands of Sienna travertine. Ceiling: purple gray, with black and aluminum lighting fixtures. Doors: aluminum. Floor: brown and yellow terrazzo. **5.** Walls: red Levanto marble. Columns: reddish brown Rojo Alicante. Ceiling: gold and ivory. **6.** Exhaust ventilation grille and handrail: black glazed terra cotta, remainder orange-red terra cotta. Back wall of boxes: light gray green, with chrome yellow ceiling. **7.** Wainscot: brown-red Ark Fossil marble. Walls above: dull orange. Ceiling: pale green. Floors: green terrazzo.

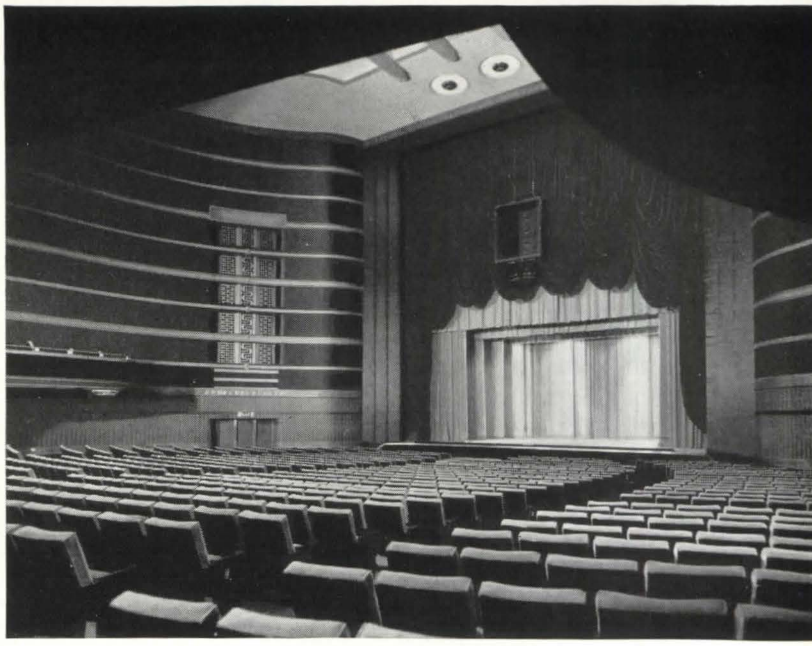


TAIL OF BOXES, ARENA — 6.

ARENA PROMENADE — 7.

DETAIL LITTLE THEATER

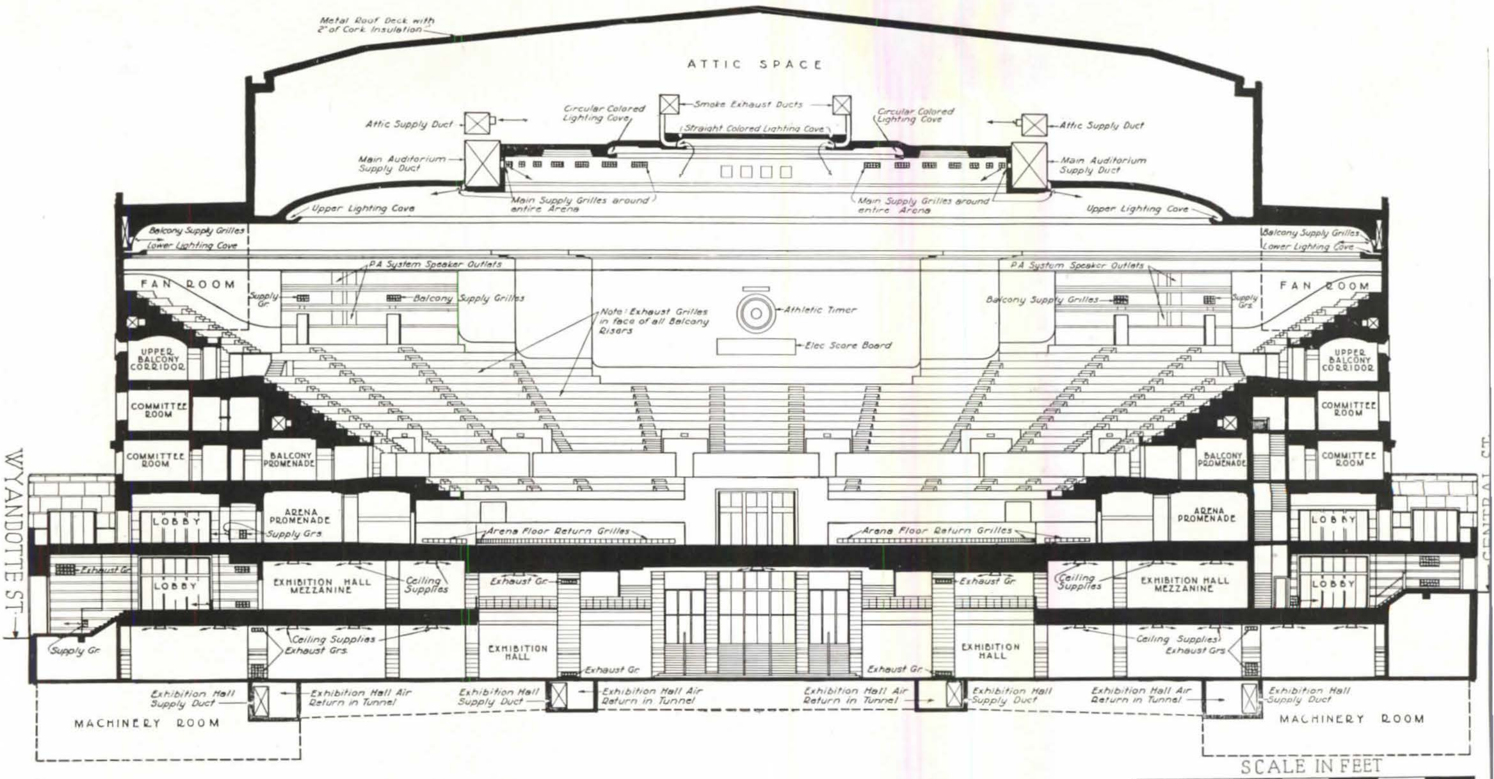
Rear walls: walnut Flexwood. Mezzanine railing: bronze, panels under, Montana travertine. Columns: Breche Orientale marble. Floor: light and dark maple strips. Doors: black Formica. Ceiling: ivory and gold.



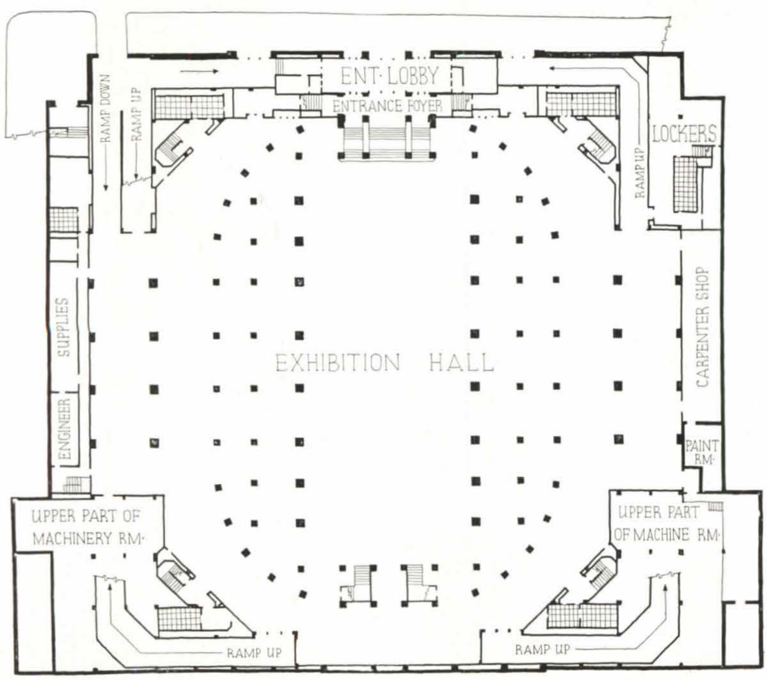
GRAND STAIRWAY—1.

1. Walls: Wainscot of Sienna Melange marble with bands of Breche Orientale; walls above orange-red with gold leaf on horizontal plaster moldings. Ceiling sculpture by Albert Stewart. Painting by Ross Braught. 2. Walls covered with plum-color corded silk fabric, horizontal bands gilded plaster. Wainscot: quartered walnut. Ceiling: unpainted acoustical plaster. Seats: coral mohair. Carpets: green, gold, and black on plum-color background.

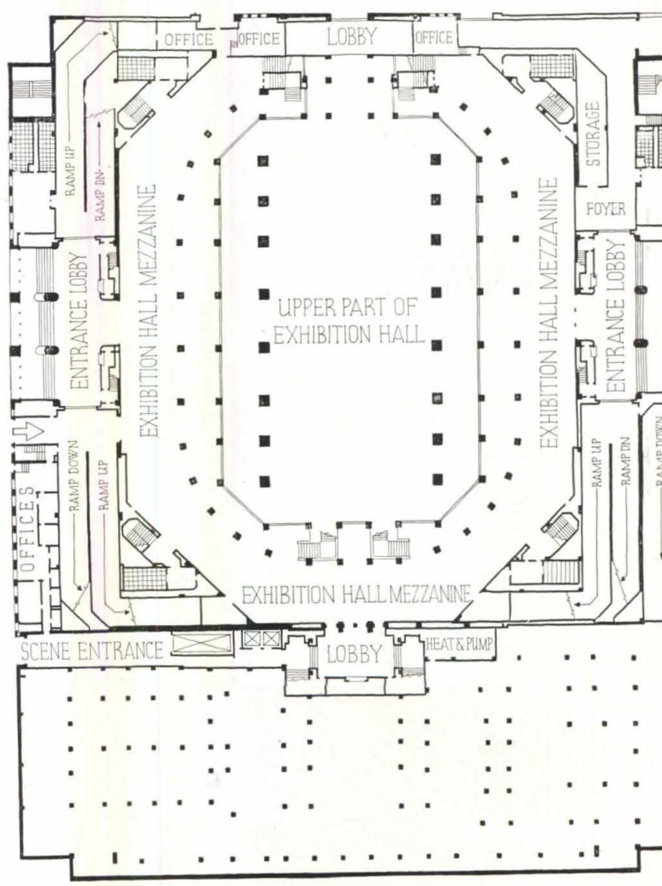
MUSIC HALL—2.



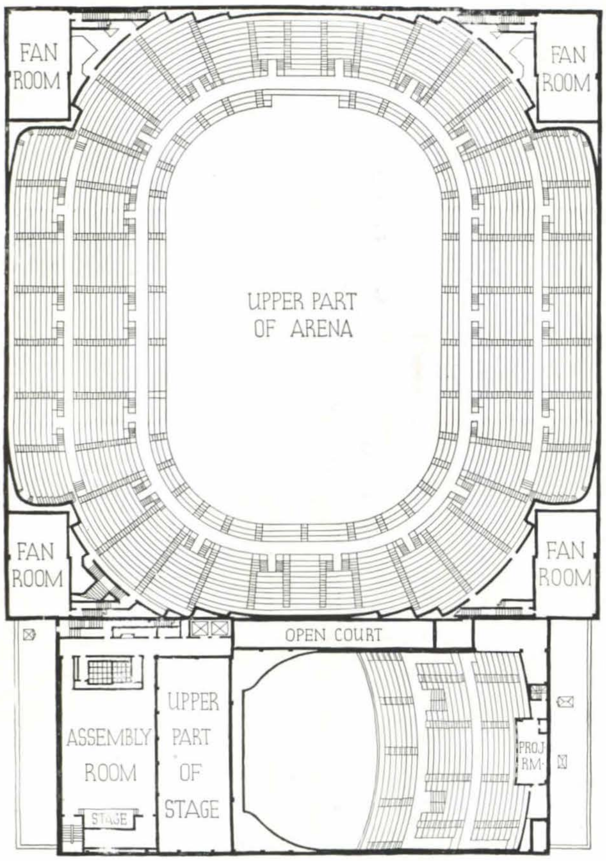
SECTION THRU MAIN AUDITORIUM



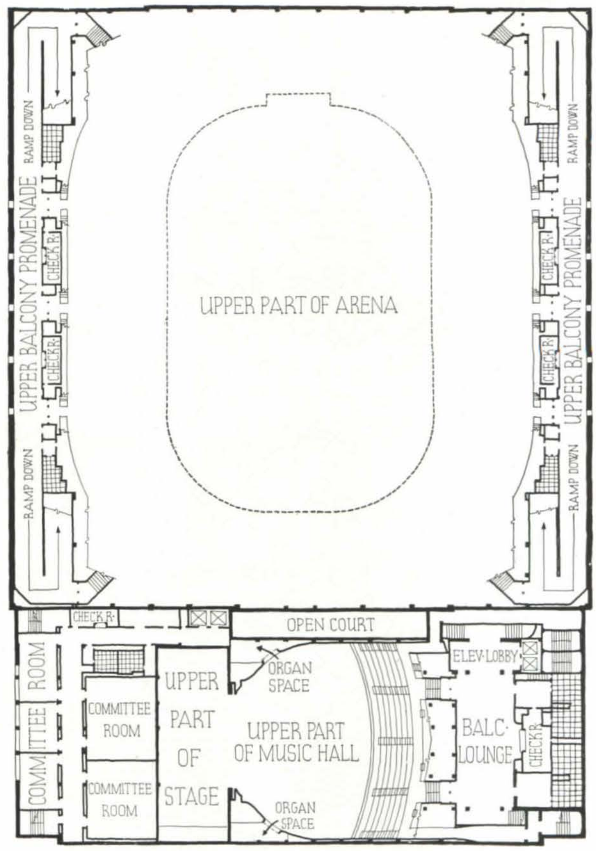
EXHIBITION HALL FLOOR PLAN



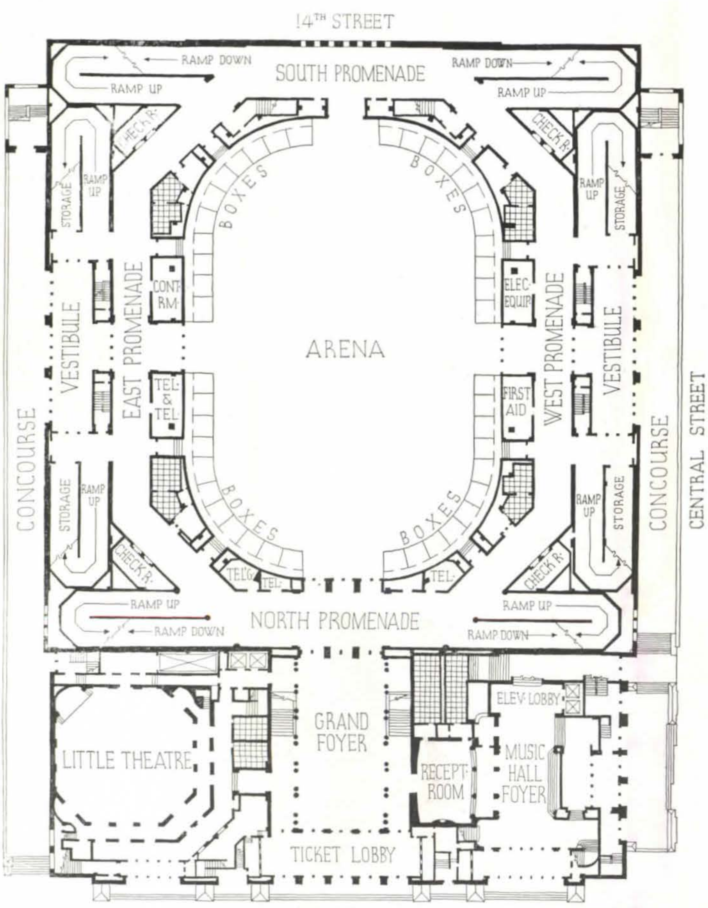
EXHIBITION HALL MEZZANINE FLOOR PLAN



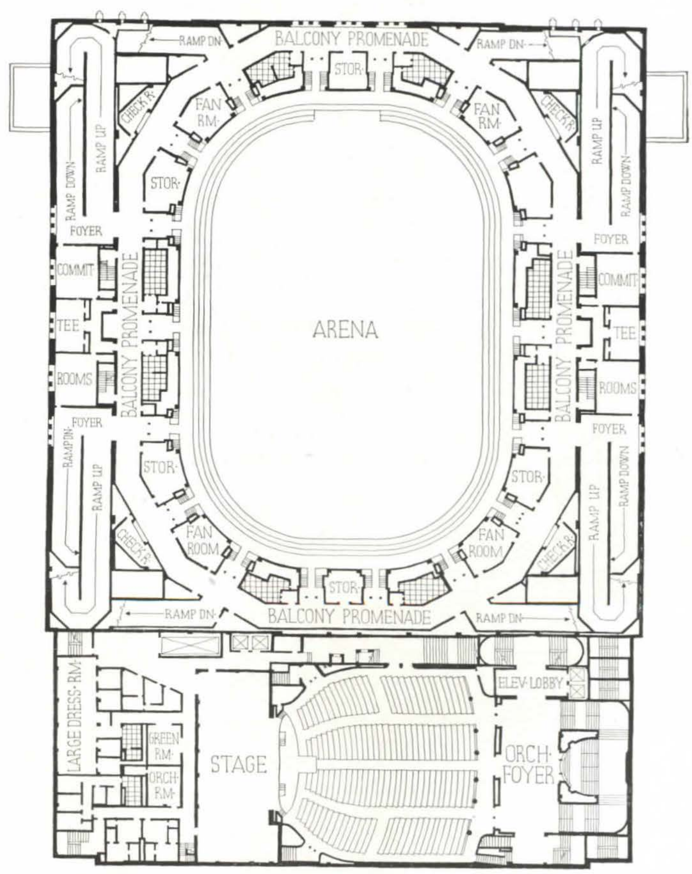
UPPER BALCONY FLOOR PLAN



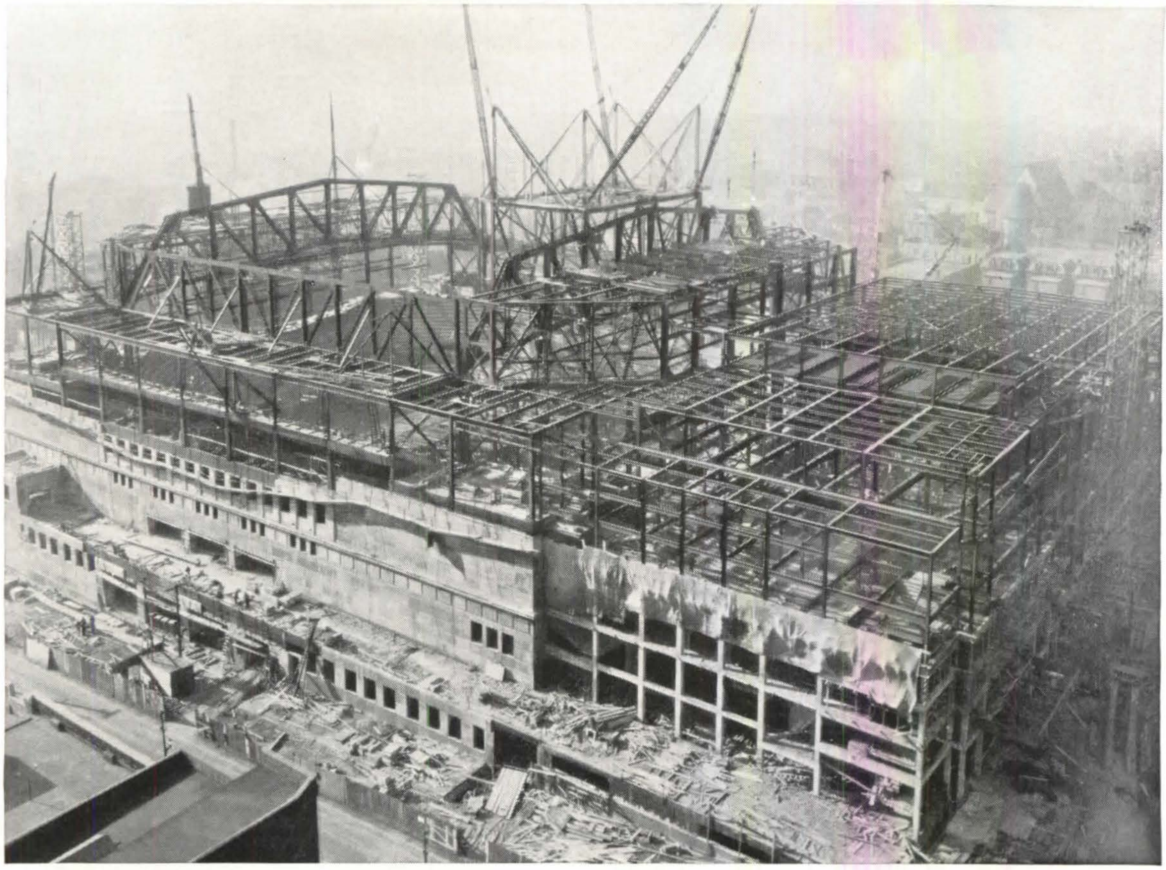
BALCONY-LOUNGE FLOOR PLAN



ARENA FLOOR PLAN



LOWER BALCONY OF ARENA & ORCH PLAN



CONSTRUCTION OUTLINE

CONTRACTORS
For main portion of building, Patti-Fleisher-Ring Engineering and Construction Company; for finish of Music Hall and Little Theater, the Swenson Construction Company.

STRUCTURE
Steel—fabricated by Kansas City Structural Steel Co. Granite—Cold Springs Granite Co. Cut Stone—Indiana Limestone Corp. Waterproofing—membrane and pitch; Ironite by Western Waterproofing Co. for basement walls.

ROOF
Roofing materials—Old American Asphalt Roofing Co. Deck—steel, Truscon Steel Co. Insulation—Armstrong Cork Products Co.

SHEET METAL WORK
Ornamental aluminum, bronze and iron—Southwest Ornamental Iron Co.

PAINTING
By Cook Paint Co. and Seidlitz Paint Co.

HARDWARE
Interior and exterior—Russell & Erwin Mfg. Co., Vonnegut Hardware Co., Oscar C. Rixson & Co., Richards-Wilcox Manufacturing Co., Chicago Spring Hinge Co.

WINDOWS
Metal — Hope-International Casement Co. Glass and glazing—Pittsburgh Plate Glass Co.

WOODWORK
Hollow metal doors and trim—Niedringhaus, Inc.

FLOORS
Wood flooring—Carter Bloxonend Co.

FLOOR COVERINGS
Carpets—Bigelow-Sanford Carpet Co., Inc.

INTERIOR FINISHES
Glazed terra cotta tile—Northwestern Terra Cotta Co. Marble—Carthage Marble Corp. Flexwood—U. S. Plywood Co. Furring, lathing and suspended ceilings—U. S. Gypsum Co.'s materials, including Sabinite acoustical plaster.

ELEVATORS
By Shepard Elevator Co. Cabs—The Tyler Co. Passenger elevator enclosures—Flour City Ornamental Iron Co. Freight—Richmond Fireproof Door Co.

ELECTRICAL INSTALLATION
Transformers — Westinghouse Electric Co. Switches and breakers—General Electric Co. Bussway system and power panels—Trumbull Electric Co. Lighting panels—William Wurdack Co. Electrical conduit — Buckeye, Youngstown Sheet & Tube Co. Light control boards—Ward-Leonard Electric Co. and Trumbull Electric Co. Cove and stage lighting for theater—Major Electric Co. Cove lighting for auditorium—Curtis X-ray. Floor lighting over the main arena—General Electric Co. Light fixtures—Livers Lighting & Bronze Co. Motion picture equipment—Simples projection machines; Hall & Connelly spotlights; Hertzner motor generator sets. Public address system—Graybar Electric Co. Electric trucks and tractors—Automatic Transportation Co. Electric storage batteries—Exide Battery Co.

GENERAL EQUIPMENT
Stage equipment—Peter Clark, Inc. Steel furniture—Metal Office Furniture Co. Seating—American Seating Co. Upholstering material—L. C. Chase & Co., Inc. Check room equipment—Vogel-Peterson Co.

PLUMBING
All plumbing fixtures—Standard Sanitary Mfg. Co. Pipes: Wrought iron—Byers Pipe Co. Steel—Spang-Chalfant Co. Copper—Chase Brass & Copper Co. Vacuum pumps—Dunham Co. Gate and globe valves—Pratt & Cady Co. Fittings—The Walworth Co. Sprinkler system—Walton Biking Co. Ice water circulation pumps for air-washers—Gould Pump Co.

HEATING AND AIR CONDITIONING
Air filters and fiber glass pipe insulation—Owens-Illinois Glass Co. Duct insulation—Johns-Manville, Inc. Air conditioning compressors—York Ice Machine Co. Fans and air washers—American Blower Co. Radiation—American Radiator Co. Temperature regulation system—Johnson Service Co. Remote temperature control board—The Brown Instrument Co. Fan motors—Wagner Electric Co. and General Electric control. Texrope fan motors drives—Allis-Chalmers Co.

THE EARLY ARCHITECTURE OF WESTERN PENNSYLVANIA

A RECORD OF BUILDING BEFORE 1860. BASED UPON THE WESTERN PENNSYLVANIA ARCHITECTURAL SURVEY, A PROJECT OF THE PITTSBURGH CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS AND THE BUHL FOUNDATION.

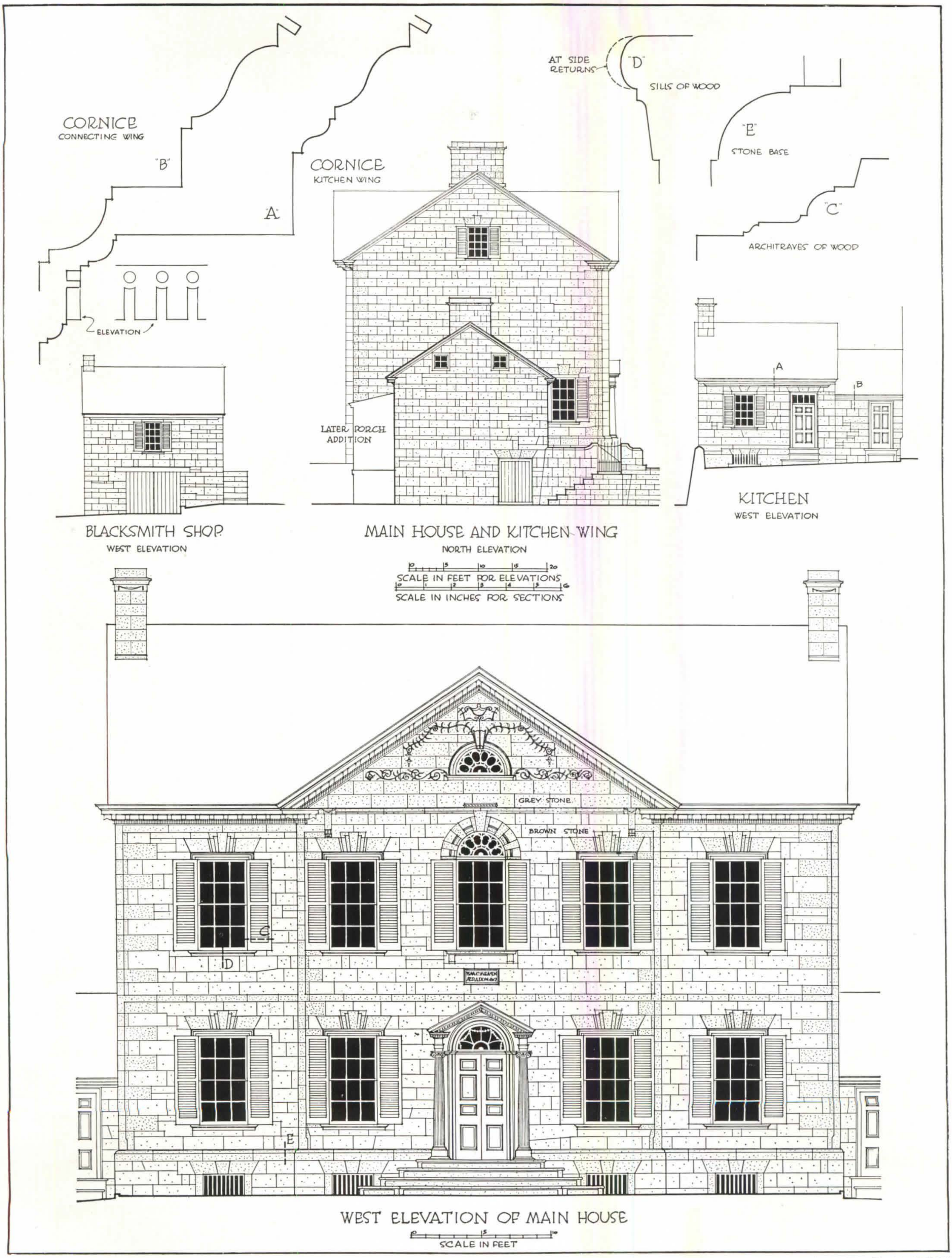
NUM 10 BER

This study of the early building in Western Pennsylvania* is the prototype of the Historic American Buildings Survey. One of the first organized efforts to obtain a complete record of a regional architecture which is slowly disappearing through neglect, abuse, fire, and the pressure of new building, it deserves recognition not only because it represents a difficult task well done, but because it set the pattern for the similar work mentioned above, now being done on a national scale under the auspices of the Government.

Western Pennsylvania was penetrated early in the country's history. The settlers were English, Scotch, Irish, Scotch-Irish, and German. Most of them came in from Virginia and Maryland, and their houses and churches showed the influence of the architecture in these colonies. The earliest structures, many of which still remain, were built of logs; later, as the population increased, a more finished architecture made its appearance, showing the characteristics of the work in the East, with the same Georgian and other European influences. The circulation of builders' handbooks through the Colonies did much to standardize the architecture, but in Western Pennsylvania as elsewhere local materials and standards of craftsmanship produced variations which soon developed into a building tradition peculiar to the locality. Here stone was available and its use became common. Brick was also easily manufactured and by 1830 had become the most popular building material. Frame was slower in gaining a foothold, and it was used little before the beginning of the nineteenth century. While the region eventually displayed examples of all the types of construction mentioned, it is perhaps most commonly associated with the use of stone, two excellent examples of which are shown here. The Meason house, built about 1802, was one of the first local examples of domestic architecture in the grand manner; its builder was imported from England. The less formal Johnston house was built a few years later, and displays the local style at its best. Both, until their publication by the Buhl Foundation, were virtually unknown.

(*See BOOKS, page 26.)

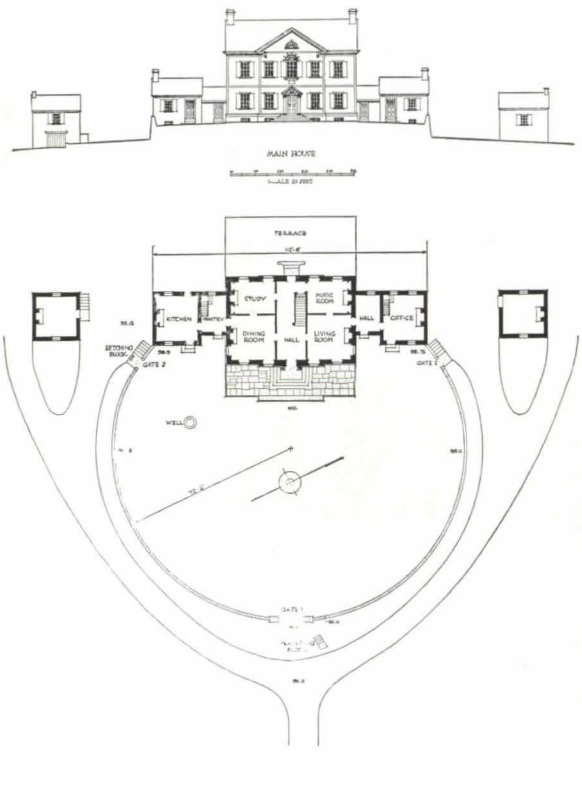
THE MEASON HOUSE NEAR UNIONTOWN—FAYETTE COUNTY



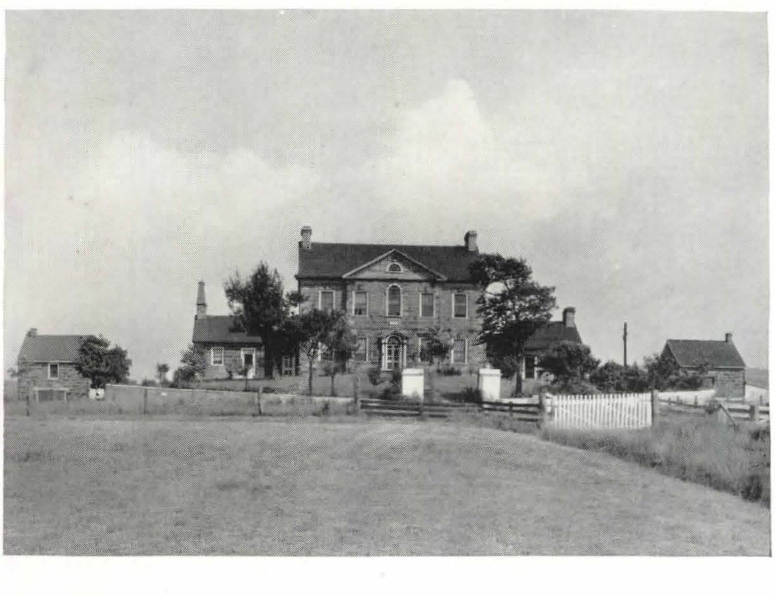
DRAWN BY RAYMOND C. CELLI

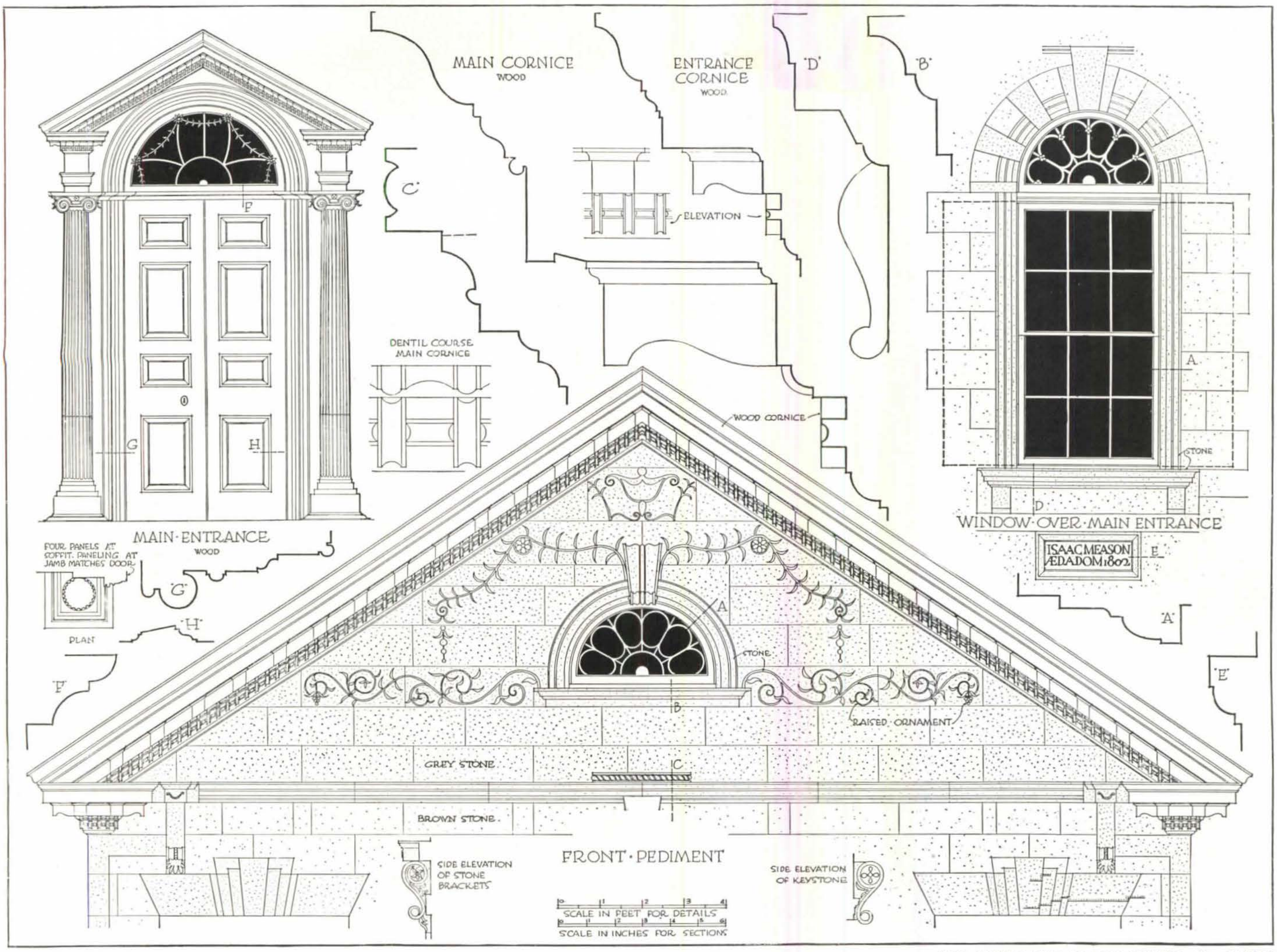
SOUTH SERVICE BUILDING

ADAM WILSON, ARCHITECT AND BUILDER

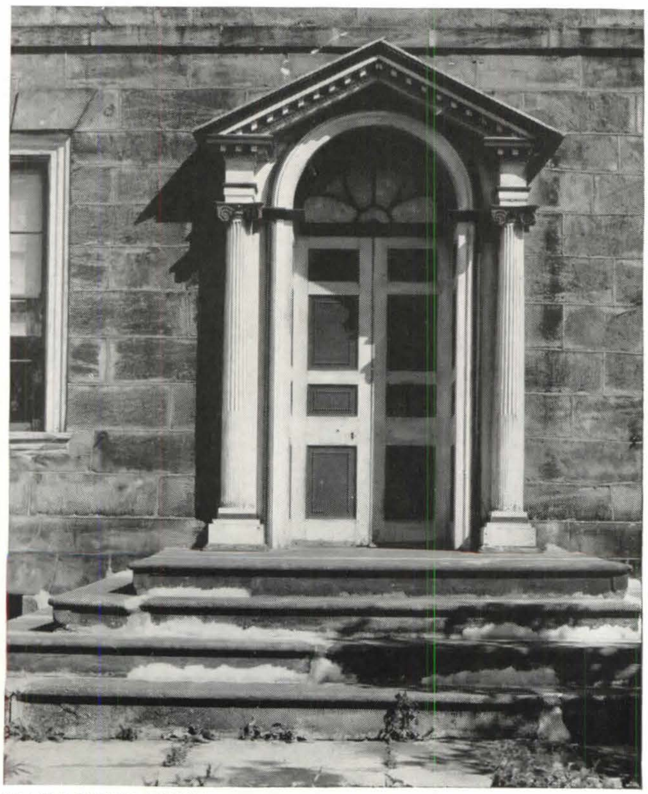


Adam Wilson was one of the outstanding craftsmen-architects of his time. Brought over to America for the express purpose of building the Meason house, he was an expert carpenter, stonemason, and landscape designer. That Wilson, with unskilled labor and a local sandstone ill-suited for carving, could produce so excellent a house is no small tribute to his many abilities.

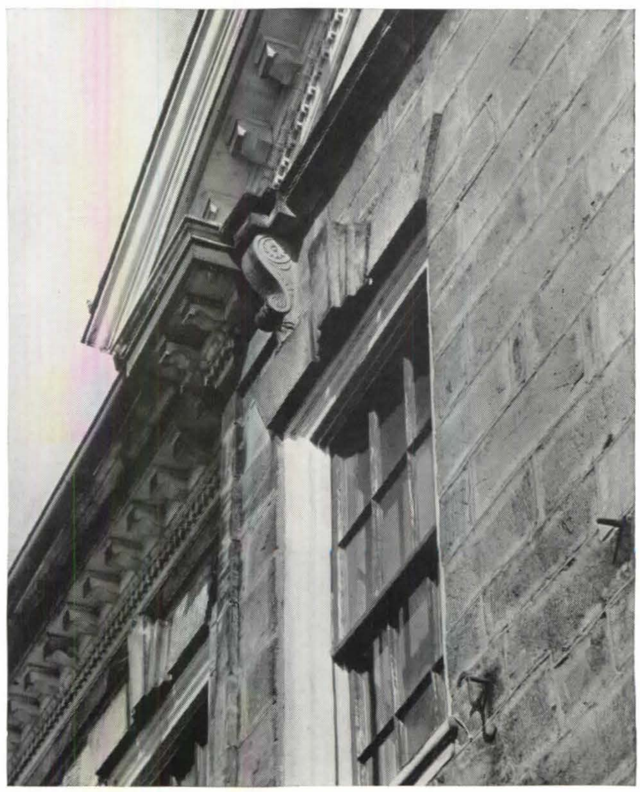




DRAWN BY RAYMOND C. CELLI



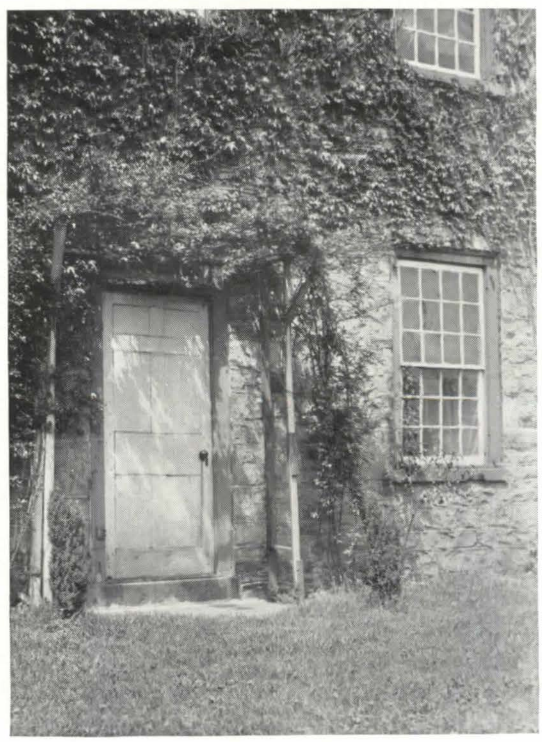
MAIN ENTRANCE



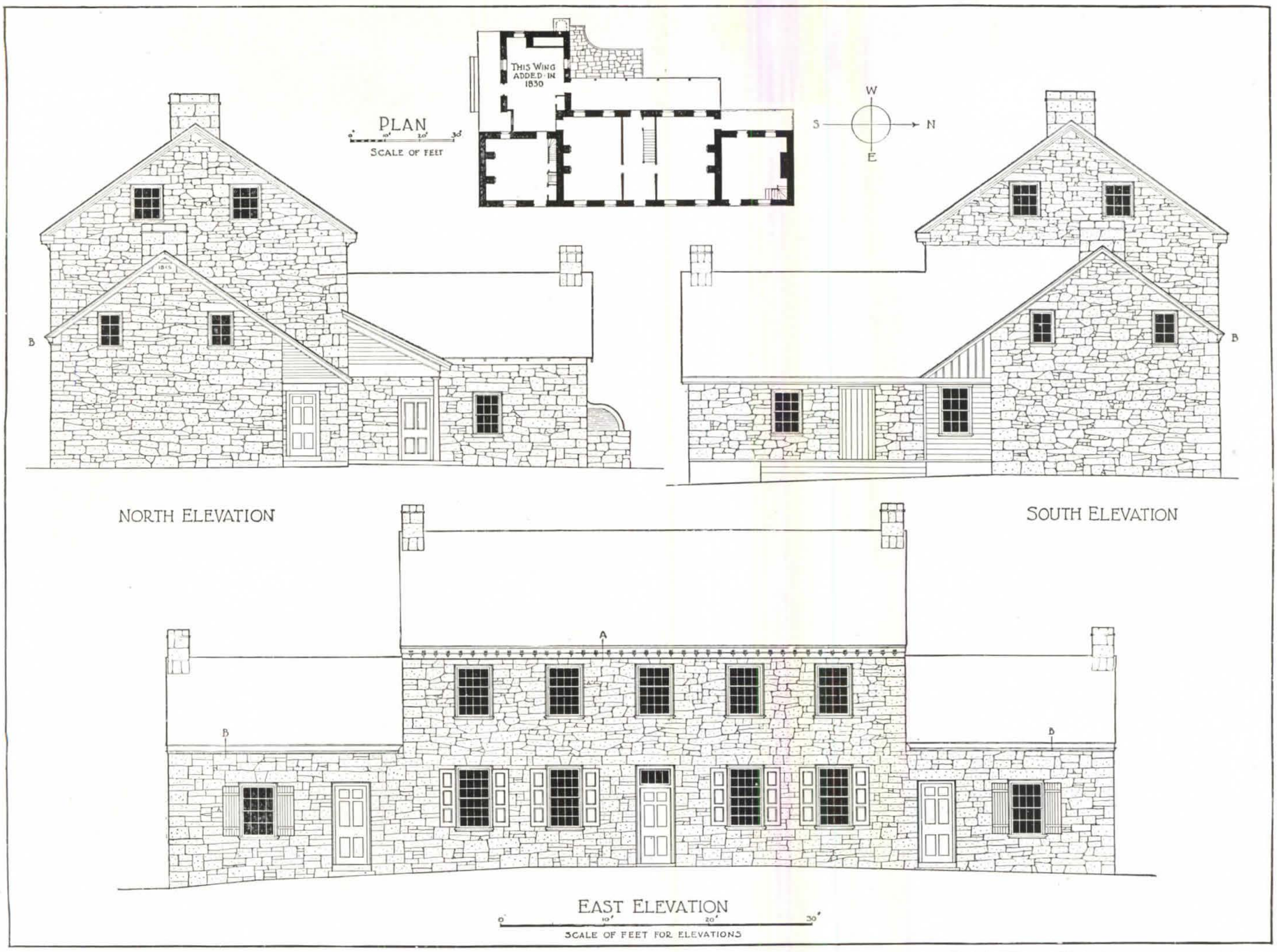
CORNICE DETAIL

THE JOHNSTON HOUSE — WESTMORELAND COUNTY

MAIN ENTRANCE



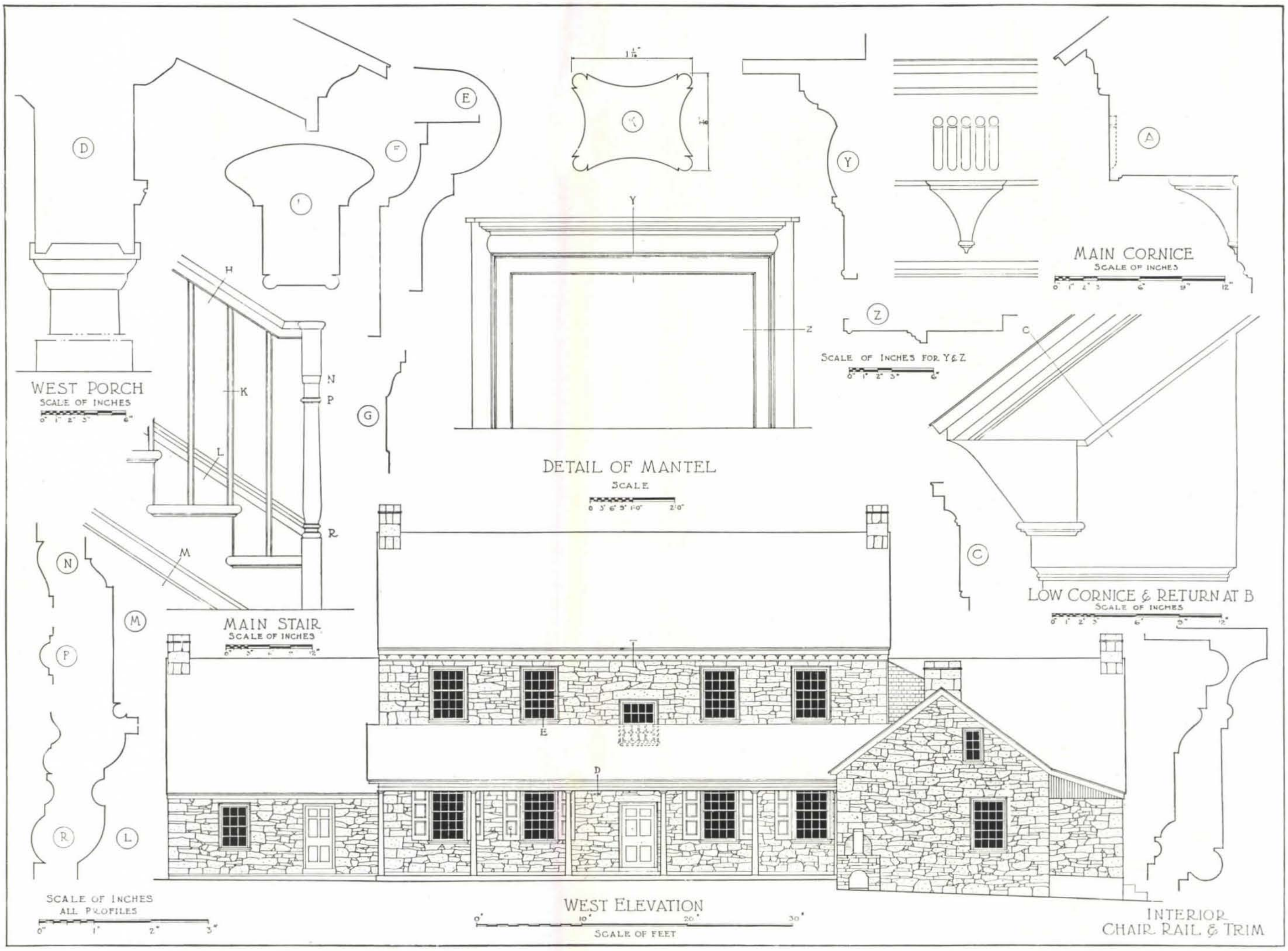
The strength of the local tradition by 1815 is well illustrated here. When Alexander Johnston built this house it was his intention to reproduce his old homestead in County Tyrone, Ireland; neither he nor his workmen, however, were able to escape the influence of a developed American style of building. In its symmetry the house recalls the work in the eastern Colonies, although a view of the sides and rear shows more of the farmhouse character of native dwellings. Typical, too, is the use of white plaster in conjunction with exposed stonework, and there is a pleasant contrast between the accented joints of the masonry under the rear porch and that above. The Johnston house is a superlative example of local building, which, by virtue of its indigenous quality, its proportions, and its relation to the surrounding landscape, assumes the stature of fine architecture. So completely successful were the houses of this sort that it is small wonder that they have continued to dominate the residential design of more than a century.



DRAWN BY RALPH M. REUTTI

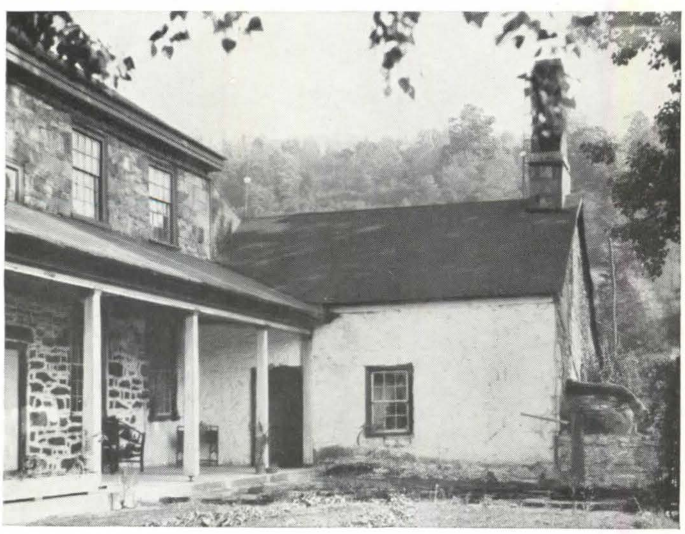
PORCH DETAIL

SOUTH ELEVATION

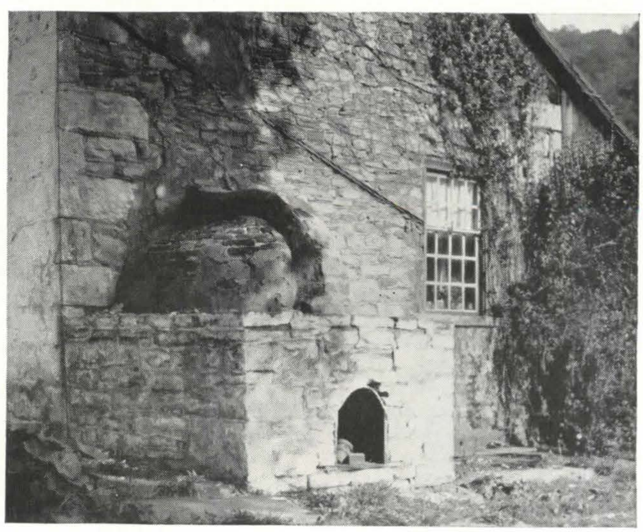


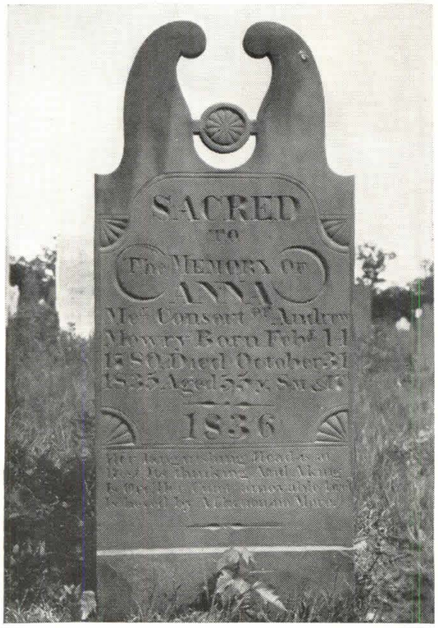
THE JOHNSTON HOUSE, WESTMORELAND COUNTY

REAR PORCH

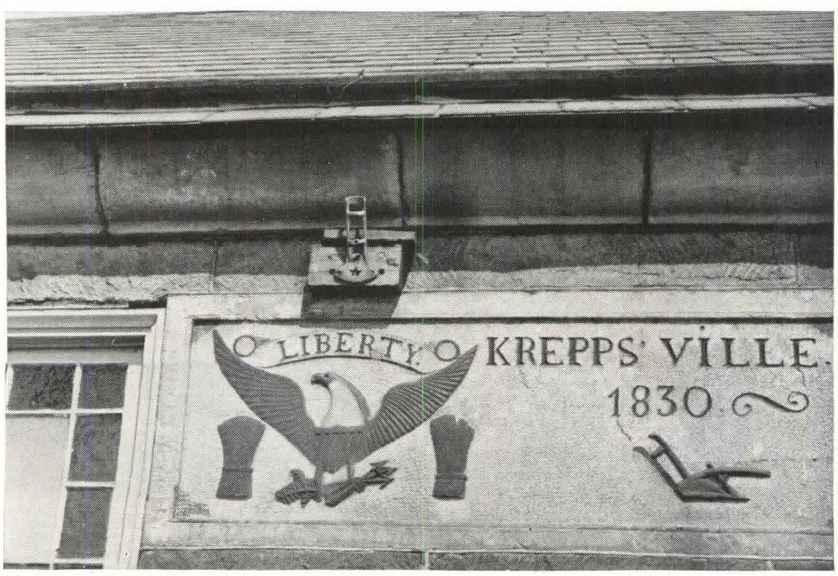


OUTSIDE OVEN

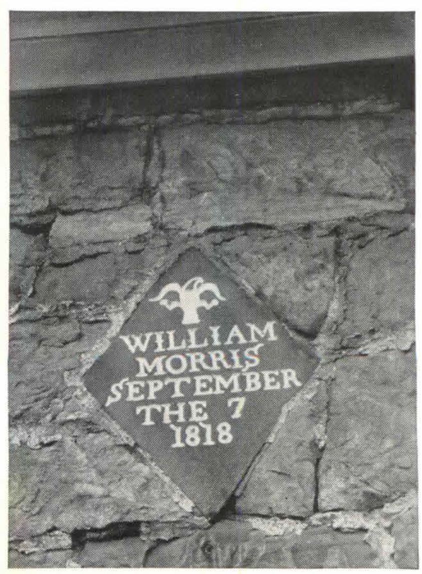




The by-products of builders' craftsmanship are always revealing. In the small communities, where the local stonemason was also the sculptor and stonecarver, a high degree of skill and imagination was displayed in tombstones, signs, gateposts, and other miscellaneous carvings. The memorials and signs illustrated here represent free flights of fancy on the one hand, and the inspiration of architectural forms on the other. The lettering, while often carelessly spaced and frequently combined to produce some very curious misspellings, was carved with great delicacy and a fine feeling for material, and the design, even in such odd displays of virtuosity as the tombstone on the left, was almost invariably satisfying.



MALDEN TAVERN



MORRIS TAVERN

BUILDING MONEY

A monthly section devoted to reporting the news and activities of building finance, real estate, management and construction

CONTENTS

International News

THE APPRENTICE, MAN OF 1940 (see Page 242)

FLOOD FACTS FOR BUILDING

An appraisal, based on the experience of 1936, of the construction damage done by the Flood of 1937.

By last month the greatest flood in the history of the U. S. had crept back to the river beds of the Ohio and the Mississippi. Four hundred people were dead, and thick muck lay over scores of riverside cities and towns. The total damage was literally incalculable, but conservative estimates placed it at upwards of $500,000,000. For architects, contractors, and material dealers, the question this year was the same as it had been last year after the disastrous Eastern seaboard floods: What will it mean in new construction, in alterations and in repairs for Building?

In order to find a realistic answer to this question, The Architectural Forum has made an effort to gauge the probable benefits to Building of this year's flood by examining the known results of last year's. For this purpose it made a survey of the 1936 flood results in Pittsburgh and Hartford, the center of last year's damage. For comparison with this year's estimate of $500,000,000 worth of damage, remember that last year's was estimated at $200,000,000. Additionally, it made an extensive examination of building permits in the two cities, plotting them in each case against the national average. The results appear below. The U. S. fluctuations from one month to the next are taken as the norm. Thus, if building permits in either town show a month-to-month rise or fall greater or less than that of the whole country, this deviation will appear on the chart as a rise or fall below the straight line representing the U. S. norm month by month.

In the chart showing the deviations which occurred in Residential Building during the year, notice first that the general level in Pittsburgh was consistently higher and that in Hartford consistently lower than the U. S. level. In Pittsburgh the month following the flood showed a marked rise above the national level, then quickly leveled off. During July, August, and September it then rose once again above the national level, a movement almost certainly without reference to the flood damage, inasmuch as large metropolitan centers invariably show larger than national residential totals during the summer months because of the large amount of subdivision building which they attract to themselves. The dollar volume in Pittsburgh rose from $57,000 in the flood month of March to $112,000 in April, a relatively small increase. In Hartford, as the chart shows, the results of the flood were even more negative, only a very slight increase being observed for the next four months. The dollar volume figures for permits rose from a minute $14,000 in March (not more than three houses) to a mere $39,000 in April, then dropped to $20,000 in May.

The chart showing Non-residential Building deviations from the U. S. norm is somewhat more erratic. The total dropped in both cities below the national level in January, stayed there through the flood month of March. Pittsburgh then showed a sharp rise, a drop, and a continued rise throughout the rest of the year. (The April level has been corrected to exclude a steel mill contract for Jones & Laughlin for $850,000 which was planned long before the arrival of the flood.) This big rise was mostly due to the fact that Pittsburgh was the manufacturing center for the great activity in steel which featured last year's industrial expansion. In Hartford the reaction in non-residential building was delayed a month, and then the relative rise was greater than Pittsburgh's. Investigation reveals that most of this contra-national rise was due to three large building contracts, all the result of flood damage to property of the Hartford Electric Light Company, Colt's Patent Firearms Company, and the Connecticut Power Company. In Hartford the dollar volume of permits rose from $64,000 in March to $134,000; in Pittsburgh from $149,000 to $261,000.

The chart for Additions, Alterations, and Repairs shows first that both Hartford and Pittsburgh habitually enjoy a greater volume in this category than the country as a whole. In Pittsburgh the reaction to the flood was immediate and pronounced, rising from a March level of $149,000 to a June peak of $717,000. In Hartford, the results of the flood in this category of building were practically nonexistent.

A more detailed examination of Pittsburgh and Hartford revealed these interesting flood facts:

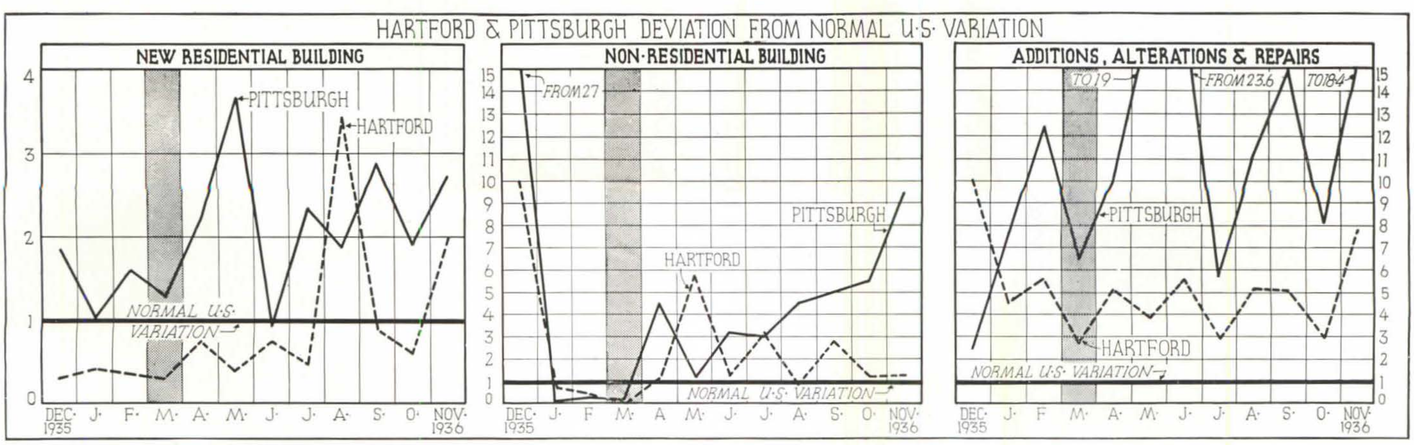
¶ It is the current, not the depth of flood waters, which causes the most damage.

¶ The average two-story home in good repair, when flooded to the top of its first floor in a slow current, sustains comparatively little damage. Its repair bill will average $350.

¶ The same house when flooded to its roof tree will probably be in a fairly strong current. Result is that the house is often shifted from its foundations, sometimes washed away.

¶ Largest flood damage to homes occurs on the low river banks, where are usually located the poorest houses in the community. None of the tenements destroyed in Hartford or Pittsburgh has been replaced, nor has its site been used for anything but parking lots.

Consensus is that the Flood of 1937 was not only more extensive than the Flood of 1936, but more severe. Its current was stronger, its duration longer, its rise higher. In estimating flood repairs this increased severity is an important factor; it is not how wet a house gets that counts, but how long it stays wet and how severely the current buffets it. Thus, though the relative property damage is $200,000,000 for 1936 as against $500,000,000 for 1937, the amount of new building along the Ohio and Mississippi this year will be more than two and a half times greater than it was in the Pittsburgh and Hartford areas last year. A conservative estimate for new building as a result of this year's disaster: $20,000,000.



PITTSBURGH

Pictures Inc.

On March 17, 1936, the large corner building immediately above the boat was flooded out, stands vacant today. Across the street, to the right, the Dean Phipps Auto Store had 33 in. of water, but it stayed too briefly to cost the owner a cent for repairs. Owners of the 25-story building paid out $100,000 after the flood, mostly for electrical equipment. Next, to the right, is the Pittsburgh Paint Supply Co., whose manager spent $450 for repainting, new fixtures, and new doors.

Pictures Inc.

A Pittsburgh Suburb that is flooded up to the first floor ceiling like this one costs about $300 a house to repair. Notice the flotsam floating near the second floor windows. Most of the money spent on these houses went for furnace repairs, new paint, and whitewashing in the basement and wiring. Only about 150 houses were rendered completely useless by the flood in Pittsburgh. But the ones that got wet will smell bad for years.

HARTFORD

Acme

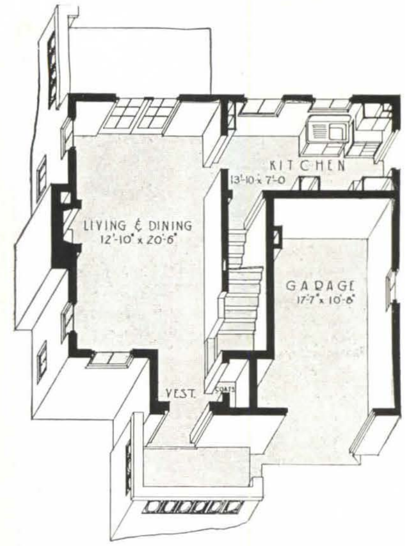
The Main Street of Hartford was wet only as high as a man's shins. The Hotel Bond and the Hotel Garde (whose black and white sign can be seen one block above the Bond) together spent nearly $100,000 in repairs. Most of this money went into electrical equipment. Lobby and facade repairing accounted for less than a third of the sum. The Sport Radio Center, visible at the extreme right of the picture, lost heavily in stock, but suffered no structural damage. Its repairs consisted of a new coat of plaster and a coat of paint.

Acme

The Railroad Embankment which cuts diagonally across this picture saved the houses from serious damage. In the row of seven houses to the right, none had a serious repair job, most of them running to new wiring, the revarnishing of floors, and furnace repairs. But some of the houses faintly visible at the upper left of the picture were washed away. Others, flooded above the second floor level, had to be replastered, relathed, have their warped uprights replaced Repair costs on this group ran high, all the way from $1,000 to $4,000.

PURDUE'S HOUSE NO. 3

is an experiment in concrete. Cost of five rooms and garage: $4,997.50.



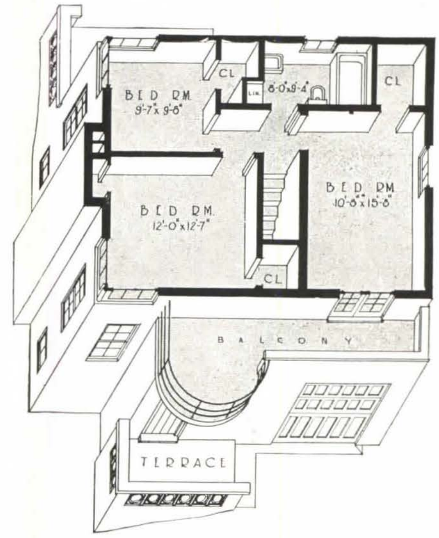
On a 143-acre plat of Indiana land near the campus of Purdue University there stand five houses, each a test-tube of labor and material costs, construction, plan, depreciation, running expenses, and adaptability for living. The Purdue Housing Research Project, sponsors of this unique housing experiment (Arch. Forum, Dec. 1936, p. 556, et seq.), have in past months submitted the five houses primarily to the objective test of construction costs, affording the industry its first look at a detailed and comprehensive set of breakdowns on varying types of house designed to cost less than $5,000. Last month the fifth and last such breakdown was released: ready for examination were the costs of a reenforced concrete house labeled House No. 3.

House No. 3 was sponsored by the Portland Cement Association, designed by Chicago's Burnham Brothers and Hammond. It narrowly slipped under the wire, with a contract cost of $4,997.50. This figure, as pointed out by the Research Project's officials, does not reflect the true price since the quoted figure includes the cost of renting concrete mixer, hoist, boiler, but not of renting steel forms.

This house, in common only with the wooden house, has a basement, providing a considerable addition to the square and cubic foot areas. Further research into the cost of the basement showed that a saving of some $345 would have been effected by its elimination.

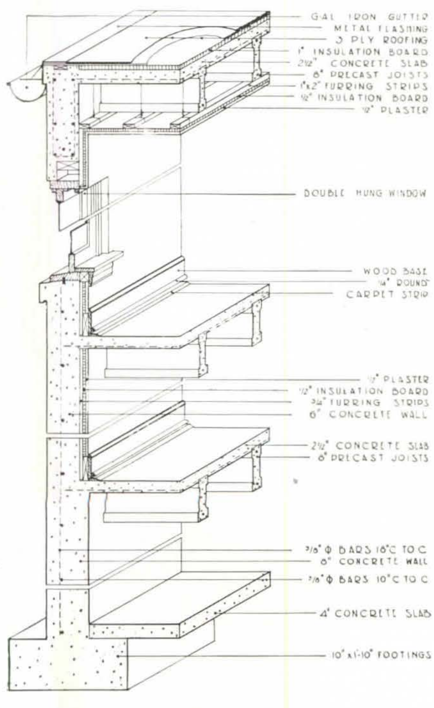
The comparative table for the five houses indicates:

	Area sq. ft.	*Cost per sq. ft.*	*Area cu. ft.*	*Cost per cu. ft.*
House No. 1 (wood frame and stucco)	1,330	$3.65	12,712	$.38
House No. 2 (prefabricated)	1,409	3.28	12,959	.36
House No. 3 (reenforced concrete)	1,615	3.09	13,965	.358
House No. 4 (steel)	1,289	3.90	13,850	.36
House No. 5 (wood)	1,564	3.18	12,790	.31

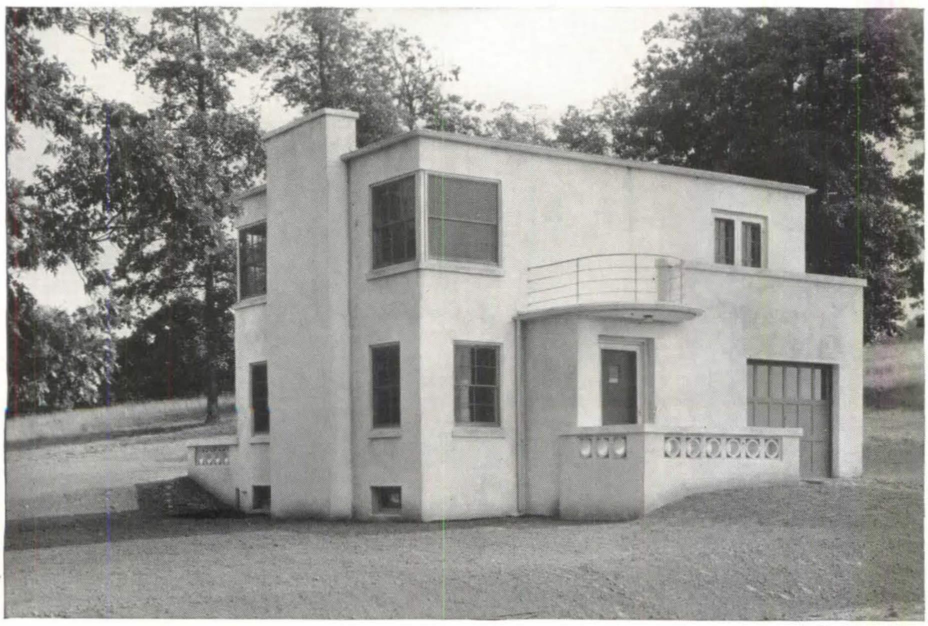


Project officials make no bones about the high cost of House No. 3, point out further that since the general contractor was able to reserve only 1.2 per cent of the contract cost for his overhead and profit, he sustained an actual loss on the house, a loss which would have been further increased by including the cost of renting the steel forms. Subcontracts totaled $1,267.85. Labor costs, probably due to the time spent in erection of steel forms and completion of masonry, were higher than with the other four Purdue houses, amounting to 37.8 per cent of the contract price.

The arrangement of the kitchen, which seems narrow, makes it a thoroughfare between basement, living room, and outdoors. Heating, which is by hand-fired coal heater, requires trips from the basement through the kitchen to the outside.



TYPICAL WALL AND FLOOR SECTION



J. C. Allen & Son

House No. 3: Reenforced Concrete.

CONSTRUCTION COST SUMMARY: HOUSE NO. 3

GEN. HEADING OF WORK	SUB-HEADING OF WORK	SPECIFIC JOB	Labor	Material	Labor & Material	Profit & Overhead	Sub-Total	Total Cost	Percent of Cost
EXCAVATION			$ 220.70	$ 15.75	$ 236.45	$	$	$ 236.45	4.7
FOUNDATIONS	FOOTINGS		25.05	80.35	105.40		105.40		
	BASEMENT	FORMING & REENFOR'G	85.20	59.10	144.30		144.30		
		CONCRETE WORK	44.25	195.05	239.30		239.30		
		FINISH	12.25	2.35	14.60		14.60	503.60	10.1
CONCRETE WALLS	CONCRETE WORK	FORMING & REENFOR'G	174.50	111.50	286.00		286.00		
		CONCRETE	74.35	249.40	323.75		323.75		
		FINISH	99.85	30.75	130.60		130.60		
	FURRING		11.00	9.50	20.50		20.50		
	INSULATION		21.45	75.30	96.75		96.75		
	PLASTERING		86.80	57.50	144.30	*	144.30		
	EXTERIOR FINISH	SPRAY COAT	39.55	23.25	62.80		62.80	1064.70	21.4
PARTITION WALLS	FRAMING		22.85	20.45	43.30		43.30		
	LATH		11.25	25.85	37.10		37.10		
	PLASTERING		34.90	23.15	58.05	*	58.05	138.45	2.8
BASEMENT & GARAGE FLOOR	BACKFILL		7.00		7.00		7.00		
	CONCRETE SLABS	FORMING & REENFOR'G	2.05	4.50	6.55		6.55		
		CONCRETE	25.05	34.65	59.70		59.70		
		FINISH	5.55	3.75	9.30		9.30	82.55	1.6
1ST FLOOR	JOIST		4.75	15.70	20.45		20.45		
	CONCRETE SLAB	FORMING & REENFOR'G	16.10	8.20	24.30		24.30		
		CONCRETE	16.20	37.45	53.65		53.65		
		FINISH	6.50	1.45	7.95		7.95		
	FLOORING	LINOLEUM	4.30	22.60	26.90	†	26.90	133.25	2.7
2ND FLOOR	JOIST		4.60	25.20	29.80		29.80		
	BEAMS & SLAB	FORMING & REENFOR'G	27.30	25.10	52.40		52.40		
		CONCRETE	22.35	47.55	69.90		69.90		
		FINISH	4.85	2.00	6.85		6.85		
	FLOORING	LINOLEUM	3.00	29.40	32.40	†	32.40		
	FURRING		2.00	3.95	5.95		5.95		
	INSULATION		2.25	17.90	20.15		20.15		
	PLASTERING		5.65	3.75	9.40	*	9.40	226.85	4.5
ROOF	JOIST		10.75	27.20	37.95		37.95		
	CONCRETE WORK	FORMING & REENFOR'G	28.65	6.00	34.65		34.65		
		CONCRETE	17.50	36.95	54.45		54.45		
	FURRING		13.50	5.50	19.00		19.00		
	INSULATION		21.30	55.05	76.35		76.35		
	ROOFING		8.65	32.70	41.35	5.60	46.95		
	PLASTERING		21.45	14.25	35.70	*	35.70	305.05	6.1
METAL WORK	FL'SH'G, GUTTER, S'D'W'SPT		22.80	21.20	44.00	10.70		54.70	1.1
MILLWORK			213.35	736.15	949.50			949.50	19.0
STAIRS	BASEMENT		15.40	8.45	23.85		23.85		
	MAIN STAIRS		35.80	10.60	46.40		46.40	70.25	1.4
ACCESSORIES	FIREPLACE & CHIMNEY		14.75	29.80	44.55		44.55		
	BALCONY & PARAPET		26.55	43.75	70.30		70.30		
	PORCH & TERRACE WALLS		34.70	22.60	57.30		57.30	172.15	3.4
HEATING	DUCTS		57.15	87.10	144.25	24.20	168.45		
	FURNACE		3.30	106.40	109.70	21.75	131.46		
	MISCELLANEOUS		4.00	14.90	18.90		18.90	318.80	6.4
PLUMBING	ROUGH		74.70	86.55	161.25	16.95	178.20		
	FINISH		11.10	153.30	164.40	17.10	181.50	359.70	7.2
ELECTRICAL	ROUGH		30.40	40.40	70.80	28.45	99.25		
	FINISH		19.50	55.95	75.45	30.30	105.75	205.00	4.1
PAINTING	EXTERIOR TRIM		17.70	7.80	25.50	*	25.50		
	INTERIOR TRIM		49.40	12.35	61.75	*	61.75		
	CEILING—L. R.		6.75	6.00	12.75	*	12.75		
	PAPERING		4.30	8.00	12.30	3.20	15.50	115.50	2.3
TOTALS			$1886.90	$2891.35	$4778.25	$ 158.25		$4936.50	
			General Contractor's Overhead and/or Profit					61.00	1.2
GRAND TOTAL AND CONTRACT PRICE								$4997.50	

* Sub-contractor sustained loss.
† Profit and overhead included in material cost.

THE BUILDING LABOR SHORTAGE

surveyed from rumor to fact. Contractors and Labor disagree, spotlight the Government's efforts on behalf of the apprentice.

DISCONNECTEDLY last month, as in the full year previously, there were spotted through newspapers and magazines stories of labor shortage in building, shadows of a dilemma which could well deflate Building's prosperity before it was fairly out of the red. The articles reported either specific instances or foreboding prophecies. In either case, they were not considered seriously by the majority of those who share in Building's dollar.

There are plenty of arguments to support the contention of a labor shortage—but very few facts. No individual or organization in the building industry has an accurate picture of the nation's statistics on building mechanics and their numerical Depression decrease; there is no clearing-house for futures. But gradually all the signs, intangible though they are, local though they may be, have begun to point to the possibility of a shortage.

Shortage. The easiest way to argue in support of imminent scarcity in skilled building mechanics is to cite current examples. Four months ago the National Association of Building Trades Employers reported a rash of building labor shortages all over the country (ARCH. FORUM, Dec. 1936, p. 4). By chapter and verse, they were: of bricklayers in Duluth, of bricklayers and iron workers in Kansas City, of all trades in Des Moines, of scattered trades in a scattered seventeen cities. At that time the Association's Secretary E. M. Craig concluded that a skilled labor shortage "cannot be averted," based this gloomy prediction on the assumption that there were 1,500,000 skilled mechanics employed in 1929, only 1,000,000 available in 1936. These figures he revised last month to "1,100,000 [potential jobs] . . . before the end of 1937 . . . only a possible 900,000 [mechanics] available."

During the spring and summer of 1936, further scarcities had cropped up in Birmingham, Tucson, Los Angeles, Stockton, Cal., and Syracuse. In New York City, a builder advertised in the papers for men, could not find enough. In Denver a local boom resulted in such a demand that contractors were forced to wait from two weeks to two months for the type of skilled labor they demanded. Fairfield County, Conn. and Washington, D. C. both reported that contractors with buildings under construction were finding it harder and harder to complete them, one Washington contractor, employing 275 men, claiming the need for an additional 100. Kentucky announced: "A recent survey in this State reveals that in every community building tradesmen are all employed and there is an acute shortage." Baltimore reported difficulties. Ann Arbor began to find it impossible to hire anyone until after a long and expensive wait. New Jersey reported that every building contractor was loaded with work and that labor would have to be imported to meet the demand. There were shortages in Altoona and Charleston, S. C.

The pinch has come most sharply with the bricklayer and the carpenter. But the painters, plasterers, electricians, plumbers, steamfitters and lathers could also have gotten bonus wages had they known the right place to go.*

Further factual, if inferential, proof of a growing lack of workers lay in the growing demand and the rising price. *Engineering News-Record* two months ago released a survey of building wages which showed that the unskilled worker is getting more per hour now than ever before, that the skilled laborer's January wage was 89 per cent of his 1930 top. And, during Depression, mechanics would work for less than union rates. Now they are demanding pay on the regular scale. In Wichita Falls, Kans. and Greensboro, N. C. wage increases over the 1928-1929 level were shown. Factors that conspire to bring about a shortage of building tradesmen number five. Few would argue that *apprenticeship training* has been slim, if not non-existent. *Departure from the field,* either from death or from old age, or from disability, affects some 5 per cent each year. Today, it is interesting to note that 40 per cent of the 1,000,000-odd skilled building mechanics are 45 years old or older. The ratio: 12.8 per cent are between the ages of 10 to 24, 22.4 per cent between 25 and 34, 27.7 per cent between 35 and 44, 21.2 per cent between 45 and 54, 12.9 per cent between 55 and 64, 5.2 per cent 65 and older. Absorption of eligibles by the *work relief* rolls, which is the bugaboo most consistently conjured up by the New York Building Trades Employers' Association, has probably not had the effect imagined. WPAdministrator Harry Hopkins claims that there are few eligibles on his rolls; that most building tradesmen in WPA would be considered too old by private capital. In this President Harry C. Bates of the Bricklayers, Masons, and Plasterers, concurs. *Boom,* the demand for more labor, is merely serving at present to render any scarcity more acute. Fifth factor is the *occupational shift,* engendered by Depression.

It is estimated, curiously, that the biggest occupational shift has been to filling stations, where building mechanics are now attendants. Many others have returned to the farm, or have entered such young industries as air conditioning. It is this factor which has been most important in reducing the number of craftsmen.

Granting that these five factors militate towards a shortage, the shortage must be approaching apace. Prosperity has by no means attained the proportions of a 1928-1929, when workers on their way to one job would be pirated by the contractor of

* Last month railroad car loadings began to exceed the number of freight cars in good condition, led to the intriguing speculation that one future field for bonus wages might well come when carpenters are enticed from construction to repair freight cars.

M. J. McDONOUGH, Secretary-Treasurer, Building Trades Department, American Federation of Labor: "The industry with its present large unemployed army of workers should not be discouraged with magazine and newspaper headlines advising of the shortage of building trades workers, which [is] not a fact."

HARRY C. BATES, President, Bricklayers, Masons and Plasterers International Union of America: "There is no shortage of labor as far as the members of our organization are concerned. The propaganda that has appeared in reference to a shortage is malicious . . .

"It is the custom of our organization that there should be one apprentice to each ten mechanics in the industry. This organization [is] ready to cooperate in seeing that apprentices are inducted into the industry. "Neither the PWA nor WPA has caused any shortage of labor in the field of contract work. The WPA projects employed a preponderance of unskilled labor and a great majority of the mechanics employed on these projects are men over the age of 45 or 50 who, normally, find it hard to secure employment on outside contract work."

C. HOLMES RAPP, of Charles T. Wills, Inc., Builders: "There is a labor shortage of skilled workers in masonry work. This is particularly apparent in western Massachusetts, where we are at present working.

"We have very few apprentices, the fraction being less than 1 per cent. There is no doubt but PWA and WPA projects do interfere with the amount of labor."

L. P. LINDELOF, General President, Brotherhood of Painters, Decorators and Paperhangers of America: "So far as [we] are concerned, there is no labor shortage whatsoever. True, many of our members have been compelled to take up other vocations but skilled men are and will be available.

"I cannot state authentically what percentage of our men are now serving as apprentices. However, under the new set-up that has been endorsed by the National Association of Master Painters as well as our another job for higher wages. But the bonus wage is no airy dream, even in the first months of 1937.

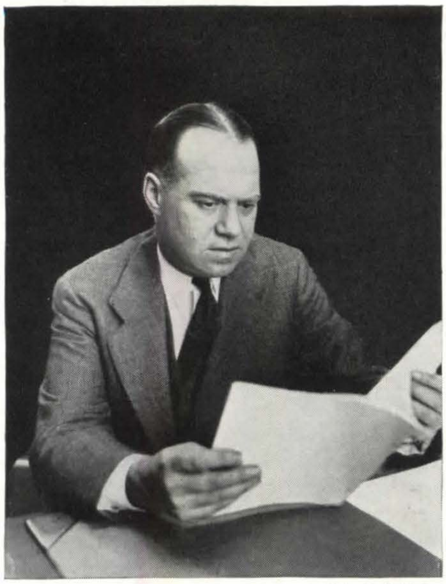
No Shortage. One way to dispose of such specific instances of building labor shortage is to take them up categorically and examine them for causes. Not all, but a good many, of them can be termed artificial. Any competent observer of the industry in a given city will explain that a complaining contractor notes a shortage simply because building mechanics will not work for his low wages because he is against union labor, because the working conditions are unpleasant, because he cannot be trusted, because he is unpopular, because he uses the kick-back. Some such contractors, the observer will maintain, will forever report a shortage of labor.

The current controversy between the 30-hour and the 40-hour week is another factor impelling the artificial shortage. There are plenty of painters in New York City who want a 40-hour week at the going rate, very few for the 30-hour week.

The third creator of the artificial shortage is the big contract in a small city. PWA awards a $750,000 contract for a "Hall of Waters" in Excelsior Springs, tiny Missouri spa. Of necessity it will take a long time to import the necessary skilled labor to that locality, but the report of shortage has gone out.

To cite the best recent specific instance in denial of shortage, New York's Building Trades Employers' Association about a month ago tired of reading hasty evidence of an imminent scarcity of labor, appointed a committee to explore the problem exhaustively in relation to the metropolitan district. Their findings were illuminating. They assumed an annual decrease in available labor of 5 per cent, a generous estimate. Taking as their base year 1926, when labor and contracts were at an apparent par in New York City, they projected two lines similar to those in the chart on page 244, concluded that there could be no shortage until 1938, and then only if the situation were abetted by a rise in contracts awarded during 1937 and 1938 consonant with the 1936 increase.

The Unions. Most vociferous of those who insist that no shortage is on the way are the unions, officially through their presidents, actually through their locals, 90 per cent of which are not considering taking on any apprentices. And in this dogged insistence lies the most difficult aspect in the problem of alleviating a potential shortage.


Harris & Ewing

Secretary Patterson.

There are very few, if any, who are so rash as to say that there will never be any shortage of labor. Union presidents (see below) reiterate their willingness to see that apprentices* are trained, but refuse to consider the question one for immediate action. Clearly to understand organized labor's attitude toward apprenticeship, one must remember this fact: the union presidents and such officials as J. W. Williams, president of the A. F. of L.'s Building Trades Department, and his secretary-treasurer, Michael J. McDonough, have only the power of moral suasion. No absolute authority is set up over the locals of a building trades union to force them to take on apprentices. An official stand is taken by the presidents of the national or the international unions, editorials in the official organs of those unions take up the cause for apprenticeship and urge it in their columns. But no apprentice will be indentured unless the local so rules.

And the locals are not inclined to give any young man a card. In good times, it will be hard enough for a union man to come to a strange city and get a card from the local. An outsider will find it doubly hard. It was not so long ago that a man had to be the son of an electrician to be apprenticed to an electrician. This attitude is expressed by scholarly John P. Frey, president of the A. F. of L.'s Metal Trades Department, who, in the January issue of *American Federationist,* reveals a traditional attitude: "Have not conventions urged the American Federation of Labor to use every effort to further the educational opportunities of the *children of the workers?*" The italics are not his, but they might well have been.

The reaction of organized labor to fat times may be wrong, but it can be easily understood. As one man has phrased it: "The building business has always been one of a feast and a famine. They've had their famine, now they want their feast." There is no doubt that in the bigger crafts, in certain areas, there is still considerable unemployment. American Federation of Labor unemployment statistics of December, 1936, showed some 22 per cent of the building trades unions with no work in 24 key cities, as opposed to 8.25 per cent workless in all other trades. So when the locals fail to encourage apprentices, they are merely protecting their own.

Union leaders point out that with unemployment still existing, it is unfair to the apprentices to indenture them to a craft where they will not be able to find jobs later on. This is the argument against further apprenticeship advanced by *The Bricklayer, Mason and Plasterer,* which took *Building Supply News,* a trade periodical, severely to task for recommending a program of further apprenticeship training in order to keep wages down and thus keep the boom alive. The editor of the union magazine also wrote to *Building Supply News:* "In all my life I have never seen such a brazen proposal," kept up the intramural wrangling by pointing to rising material costs as the real danger.

Material Dealers. Whether rising wages or rising material costs would contribute more of a bar to building activity, whether or not it would be a wise economic policy for the unions to encourage apprentices in order to keep wages down, the material dealers and the labor unions are rallying together in common opposition to one dread enemy: prefabrication.

The material men were the first to see

* Apprenticeship ratios vary with the craft: in theory some espouse as high a ratio as two apprentices to five journeymen; in actual practice the unions will probably insist on one apprentice to ten mechanics.

Brotherhood, we expect to have a much better system. We are cooperating fully with the Federal Committee on Apprentice Training and during next year, we will have increased the number 100 per cent . . . The PWA and the WPA has caused no shortage."

R. C. WHITING, Vice President, George A. Fuller Co., Builders: "We have noticed a shortage of skilled labor in Cleveland, Milwaukee and Washington, particularly plasterers, metal lathers, roofers, cement finishers, carpenters and ironworkers.

"The percentage of apprentices is not more than 2 per cent. It is our opinion that the WPA projects particularly cause a shortage of labor on private work."

D. W. TRACY, International President, International Brotherhood of Electrical Workers: "There is no labor shortage in our craft except where employers are hesitating to employ our members because such employment involves the payment of a proper wage rate.

"The nearly uniform percentage of our members serving as apprentices is one apprentice to each three journeymen. We do not expect to increase this.

"Neither PWA nor WPA projects precipitate a shortage of labor in the field of private contract work. We do expect the wages in our craft to be increased upon the expiration of local agreements [to former levels]."

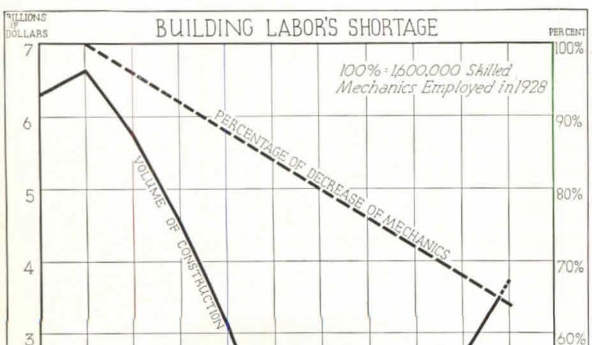
A LARGE-SCALE NEW YORK BUILDER: "While there is a spotted shortage occasionally, it does not seem to be serious and is quickly overcome. This applies to practically all crafts except certain of the larger ones, where there still seems to be an oversupply.

"We are not using apprentices at the present time and the machinery for carrying on the apprenticeship movement has virtually been at a standstill for some time and does not seem to be receiving the cooperation of organized labor. [Shortages] are very seriously affected by the WPA projects."

how a shortage of labor might well raise the cost of building to the point where prefabrication would get a big push. They promptly started training and educating young men in the crafts. A building supply dealer in a Southwestern state has encouraged nine young men in his town to take up carpentry. In Minnesota and Iowa, manufacturers are urging young men to go to Minneapolis's Dunwoody Institute. One manufacturer is putting ten boys through school, others are helping with tuition. In North Carolina a survey is being conducted to find how many apprentices are needed, with an eye to sending boys to the State Engineering Experimental Station. In Chicago, four vocational schools are planned, some impetus having been supplied by the unions. Significant though these moves are locally, they make no national splash.

The unions have taken the material men's lead. Most manufacturers and dealers who are doing anything to alleviate the potential shortage, are, in common with the employers, doing it in decided secret, so as not to arouse the opposition of organized labor, which they note with satisfaction is now moving ahead under its own steam anyway, without having been antagonized or driven into it. For a time, the unions were inclined to insist that, with prosperity in building, those who had drifted to other occupations would come back, that this would end forever the danger of a shortage. Now the argument of the material men, that even if they do come back they will not be nearly so efficient, is beginning to prevail.

Government. The need for a centralized bureau of apprenticeship training has been recognized for a long time. In 1930, Harvard's Professor William Haber, in his thoughtful "Industrial Relations in the Building Industry," pointed out the need for an agency which "can correlate the large aspects of the industry's economics with the program from training skilled mechanics." Nothing has been done.



Nearest thing to what Professor Haber and every other thinking person in the building industry has deemed necessary was launched, as an emergency program, in June, 1934, when Franklin Roosevelt signed Executive Order No. 6750-C. Thereby established was the Federal Committee on Apprentice Training, under the executive secretaryship of hard-boiled young William F. Patterson. Promptly it set to work—but in an advisory capacity.

The Federal Committee on Apprentice Training does not establish schools, it merely acts as an intermediary between national employe and employer groups in setting up apprentice training standards. Any such organization might well meet with an antagonism from the building trades unions, who are prone to think that the employer groups seek to reduce the union hold on the building trades by starting employer-controlled schools. The A. F. of L. dreads, as well it might, a large supply of trained workers beyond its jurisdiction, suddenly dumped on the market.

But the C. A. T. has won favor on all sides. Currently its greatest contribution is in the establishment of national apprenticeship standards. At an apprentice training conference held in Washington in 1923, chaos was recognized, by organized labor as by all other parties. Recommendations were passed advising the trades to set up national standards in order to assist their locals. No standards were adopted.

Into this welter of conflicting interests and jealousies waded the C. A. T. As testimonial to its ability to carry water on both shoulders and still accomplish something constructive, it will serve to note briefly that nearly every employer plan for apprenticeship training involves advisory leadership by the C. A. T., and that even the aforementioned *Bricklayer, Mason and Plasterer,* strong in editorial opposition to a large apprenticeship program, saw fit to laud the C. A. T. as "trying to protect apprentices from exploitation, protect the trades from overcrowding, serve the public through turning out journeymen skilled in all branches of the trades . . . "

Considerable of the C. A. T.'s success in industrial relations is due forceful Secretary Patterson, whose seventeen years since graduation from the University of Wisconsin have been packed with experience in employment, vocational training, dealings with labor. Both labor and industry have lent him support since his appointment to the C. A. T. in 1934.

Working through State and local apprentice training committees, the C. A. T. has effected reforms which are of historical significance. First was the recent National Plumbing Apprenticeship Plan, which defined standards in making the indentured apprentice a journeyman after five years, detailed how the plan was to operate, set down minimum apprenticeship safeguards. The plan was officially endorsed by the National Association of Master Plumbers of the U. S. and by the United Association of Journeymen Plumbers and Steamfitters of the U. S. and Canada. Other accomplishments include the plan for employment of apprentices by the Resettlement Administration on its Greendale, Wis. project, where currently a score of young men are learning carpentry, and the plan for training apprentices in painting and decorating in the San Francisco area. Such programs are important in the industry for two big reasons: they are models for later programs, and show that a consistent and orderly plan can be worked out to train young men in the building trades; and they enlisted in their formulation and official approval both the employe and the employer groups. They are prime examples of the successful function of a much bedeviled principle in industrial relations: collective bargaining.

Shortage by Fall. If any shortage ever develops, it will not have been the fault of William F. Patterson and his C. A. T. Whether or not a national shortage will develop in the near future or ever is an interesting speculation. Broadly, the employer says it will, the employe says it will not. And both realize that an apprenticeship program demands three years to bear fruit, that 1940 will be graver than 1937, that the problem is one not of tomorrow, but of the day after tomorrow.

For those who like to think by figures alone, THE ARCHITECTURAL FORUM has prepared a chart (Col. 1), presents it here with a caution against taking it too literally, and against trying to make it prove more than the little it does. It was based on several mildly risky assumptions, all tenable to some extent. First assumption was the existence of 1,600,000 skilled building mechanics in the boom year of 1928. Second assumption was a labor market just sufficient for the needs of all-time high 1926, no wide guess in light of the many local shortages of that year. Third assumption was labor's mortality from the five reasons detailed in columns 2-3, page 242. This was estimated at 4 per cent, weighted optimistically by the number of apprentices currently indentured.* Conclusions, based on the final assumption of a 1937 building volume of $3,715,000,000 (ARCH. FORUM, Jan. 1937, p. 1): the shortage will be evident in the late summer and early fall of 1937.

* The nation-wide apprentice enrollment in the major building trades, as recorded by the vocational Training Division of the U. S. Office of Education, is:

	1935	1931
Carpenters	1,267	1,100
Electricians	2,520	4,907
Painters	638	862
Steamfitters	158	374
Plumbers	1,187	1,696
Plasterers	152	303
Sheet Metal Workers	444	1,782
Total	6,366	11,024

The total number of workmen engaged in these trades in 1929 approximated 750,000.