

THE
ARCHITECTURAL
FORUM
IN TWO PARTS

ARCHITECTURAL ENGINEERING
&
BUSINESS

PART TWO

JANUARY

1929



*Keep elevator door
responsibility
in one spot*

Unit installation of Richards-Wilcox elevator door hardware makes this possible. R-W closers, checks, interlocks, hangers, electric door operators are separate mechanisms, independently regulated. Installed as a unit—one responsibility for safety, silence, speed and security.

*We will be glad to send
data for your files.*

A few of the many New York Buildings enjoying *Richards-Wilcox Service*

Richards-Wilcox Mfg. Co.
"A Hanger for any Door that Slides."

New York . . . **AURORA, ILLINOIS, U.S.A.** . . . Chicago
Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines
Minneapolis Kansas City Los Angeles San Francisco Omaha Seattle Detroit
Montreal · RICHARDS-WILCOX CANADIAN CO., LTD., LONDON, ONT. · Winnipeg

An innovation a year ago... an established favorite today!

AN insistent demand for an attractive, structural tile which would lay up in an interior load-bearing or partition wall with one or both faces finished, was recognized—and Natco Vitritile was developed to meet it. Its acceptance was immediate—its popularity amazing.

Natco Vitritile is furnished in several shades, ranging from a light buff to a rich dark brown. Its beautiful, glazed, sanitary finish is easily cleaned and kept clean, and requires no plaster, painting or maintenance.

Its field of use is in subways, basements, corridors, gymnasiums, garages and auto sales rooms, hospitals, laundries, laboratories, natatoriums, restaurants, substations and similar applications. Proper units for both 3-3/4 and 8" walls are available for wainscoting, lintels, bullnose corners, etc., making possible practically any desired form of construction. Units are also furnished kerfed or split for furring.

Natco Vitritile is shipped in corrugated wrappers, assuring its arrival in perfect condition. A folder showing sizes, shapes and shade ranges available will be sent on request.

NATIONAL FIRE PROOFING COMPANY

General Offices: Fulton Building, Pittsburgh, Pa.

Branch Offices: New York, Flatiron Bldg; Chicago, Builders Bldg; Philadelphia, Land Title Bldg; Boston, Textile Bldg.

In Canada: National Fire Proofing Co. of Canada, Ltd., Toronto, Ontario



NATCO VITRITILE

The standard grade of Natco Vitritile is first quality material and comprises a pleasing blending of all shades from a light buff to a dark rich brown.



Individual shade ranges may be obtained in the select grade. They are approved by samples before shipments are made.

NATCO

NATCO
THE COMPLETE LINE OF
HOLLOW BUILDING TILE

HOLLOW BUILDING TILE

TRUSCON

World's Largest Manufacturers of Permanent Building Products



STEEL WINDOW PRODUCTS

PIVOTED—
CONTINUOUS—
DOUBLE-HUNG—
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COUNTERBALANCED—
AND PROJECTED WINDOWS
MECHANICAL OPERATORS
STEEL CASEMENTS
BASEMENT WINDOWS
STEEL FRAMES
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VERTICAL FOLDING
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VERTICAL LIFT-SWING
FIRE DEPARTMENT
AIRPLANE HANGAR
COMPLETE BUILDING UNITS
FLAT ROOF TYPES
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STRUCTURAL STEEL
STEELDECK ROOFS
FERRODECK TYPE
I-PLATES TYPE
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A-METAL LATHS AND HY-RIB
STUCCO STEEL
CORNER BEADS
CHANNELS AND STUDS
MORTAR BOXES
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PRODUCTS OF THE
LABORATORIES, DETROIT
WATERPROOFINGS
TECHNICAL PAINTS
FLOOR HARDENERS
CEMENT ROOFING TILE

Truscon affords a single dependable source of supply for all permanent building products, simplifying operations, saving erection time and reducing costs. Truscon Products are of proved quality and nationally known. And Truscon's great manufacturing facilities and nation-wide warehouse system assure prompt deliveries.

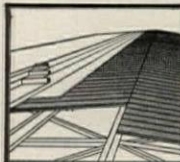
Truscon Leaders For Permanent Construction



Truscon Steel Windows. Modern windows of quality for every building. Complete line of Double-Hung, Projected, Donovan, Casement, Counterbalanced, Pivoted and Continuous Windows, Mechanical Operators. New edition Drafting Room Standards sent on request.



Truscon Steel Doors. All types of Folding, Slide, Swing, Lift, or Lift-swing Steel Doors for large openings or special conditions. Standard sizes of swing and slide doors carried in stock.



Truscon Steeldecks. Modern, fire-proof roofs—light in weight, insulated to any degree and waterproofed. Economical in cost and quickly erected from standardized sections. I-Plate and Ferrodeck Types.

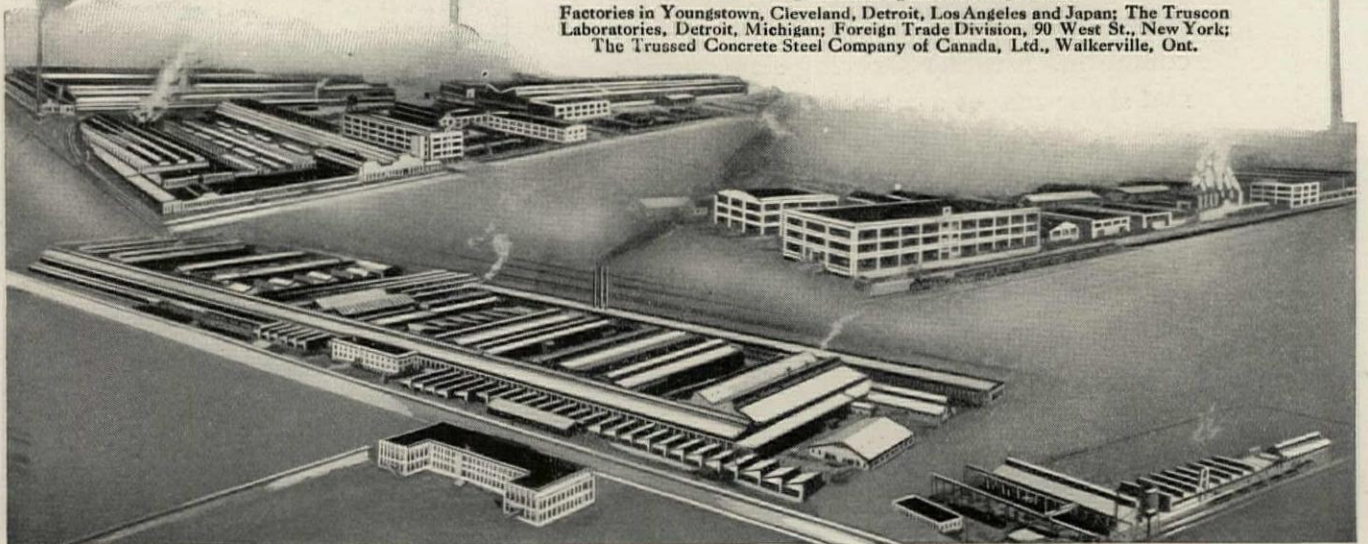


Truscon Steel Joists. (O-T) Open-Truss and (P-G) Plate Girder Types for economical, light-weight, fireproof floor construction. Truscon also furnishes Structural Steel including Trusses, Craneways, Purlins, etc.

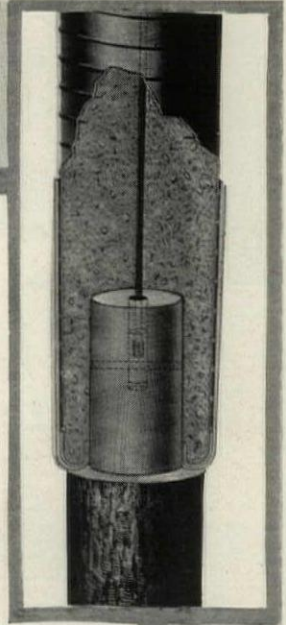
TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO

Engineering and Sales Offices in Principal Cities

Factories in Youngstown, Cleveland, Detroit, Los Angeles and Japan; The Truscon Laboratories, Detroit, Michigan; Foreign Trade Division, 90 West St., New York; The Trussed Concrete Steel Company of Canada, Ltd., Walkerville, Ont.



Yes—a steel shell
protects the
concrete in
COMPOSITE
piles, too...

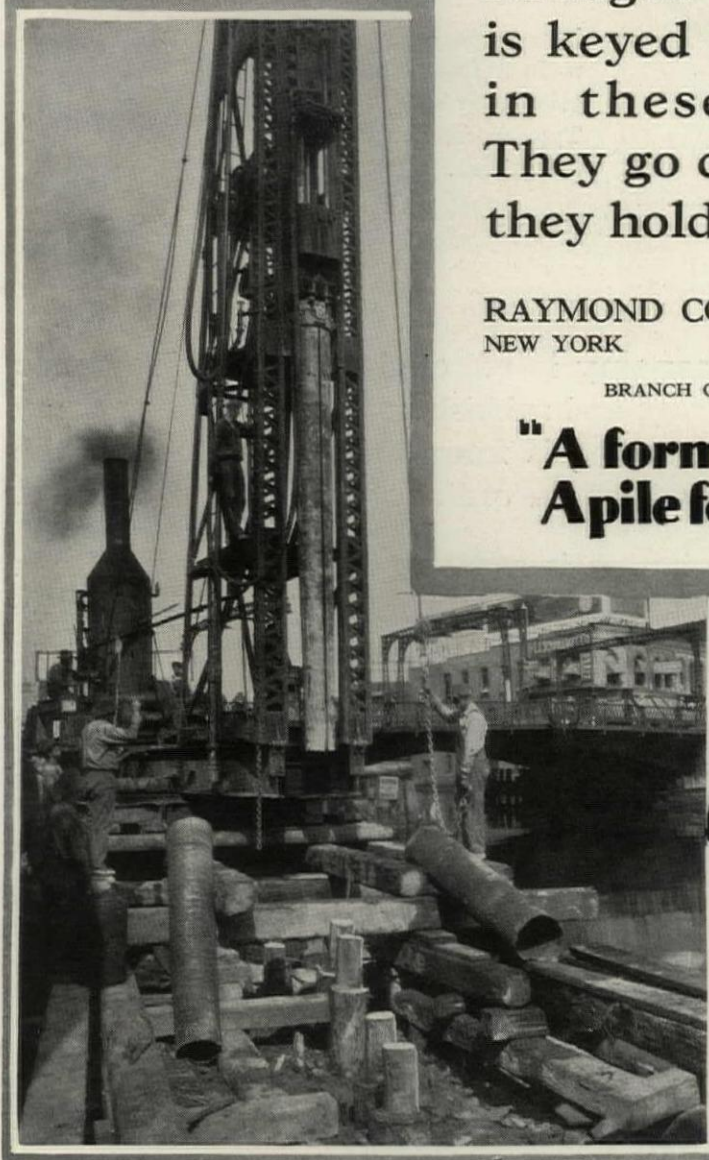


—and see, also, with what
strength the timber section
is keyed into the concrete
in these l-o-n-g piles.
They go down straight and
they hold up the load. . . .

RAYMOND CONCRETE PILE COMPANY
NEW YORK CHICAGO MONTREAL

BRANCH OFFICES IN PRINCIPAL CITIES

**"A form for every pile
A pile for every purpose"**



*Raymond
Composite*

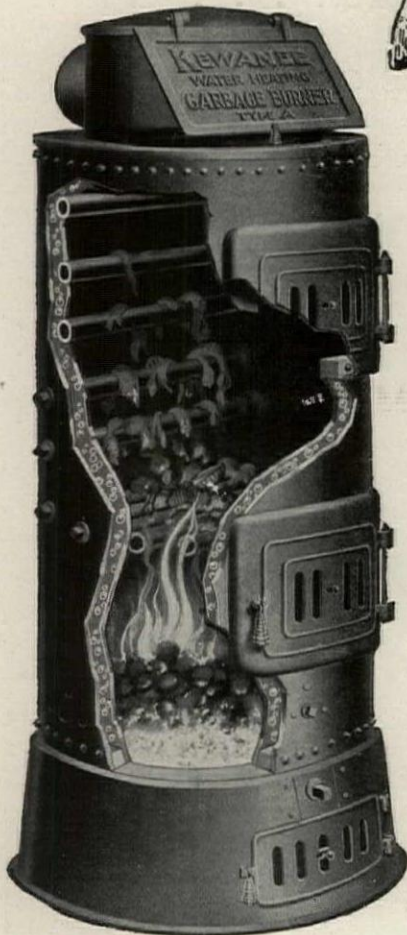
KEWANEE

*Water
Heating*

GARBAGE BURNERS



Three types—fourteen sizes to heat from 200 to 2600 gallons per hour. Shown is Type A, for heating 200 to 600 gallons.



Great economy is effected because a Kewanee uses garbage and rubbish as part of the necessary fuel. The saving is from 30 to 50 per cent of the fuel cost where an ordinary tank heater is used.

True sanitation is made possible because with a Kewanee all garbage and refuse is burned, on the premises, before it has a chance to decay.

Naturally — being made by Kewanee — they are built of steel, riveted. That guarantees long life with a minimum of repairs.

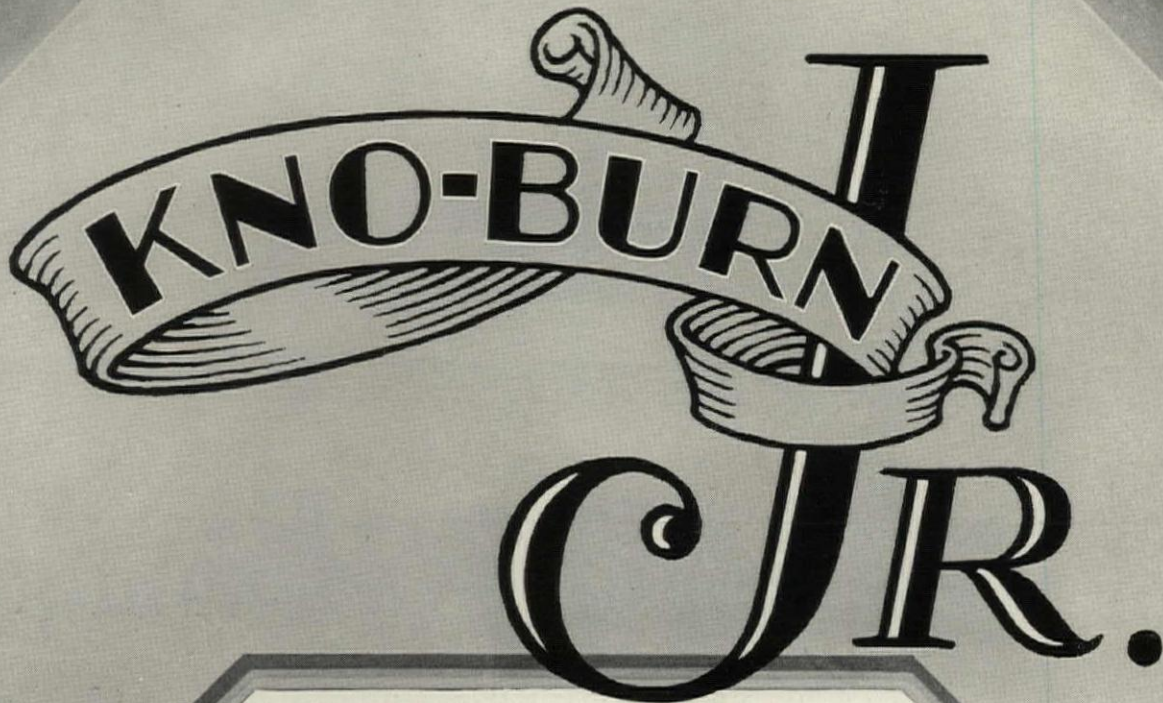
*Catalog No. 75 has the
details. Ask for it.*

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Kewanee, Illinois

Branches in 40 principal cities

STEEL HEATING BOILERS RADIATORS WATER HEATERS
TANKS AND WATER HEATING GARBAGE BURNERS



Smallest Mesh

"Diamond" Metal Lath Yet Made

Once more the North Western leads! With the trend of the market so strongly towards a smaller meshed plastering base, we are particularly gratified to be able now to present to the architects of America the *smallest* diamond meshed metal lath ever manufactured.

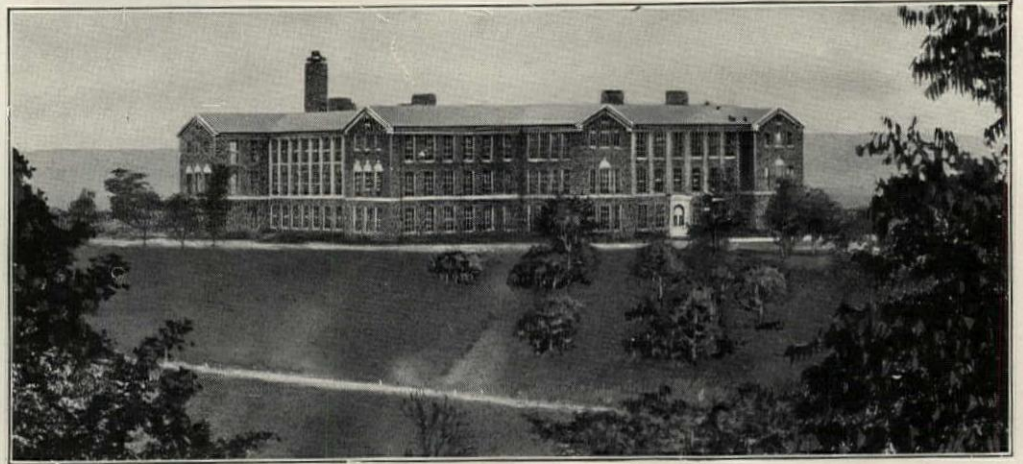
The reinforcing, bonding and *mortar-saving* advantages of KNO-BURN, JR. are so outstanding that it has the instant "acceptance" of architects and contractors wherever introduced. A sample of this remarkable new plastering base, with descriptive literature, is being held for you. *We suggest that you write immediately for it.*

**NORTH WESTERN
EXPANDED METAL CO.**

*1234 Old Colony Building
CHICAGO*

Master Mastic

T-M-B
FLOORING



MARIETTA HIGH SCHOOL, Marietta, Ohio
Garber & Woodward, Architects. 65,000 sq. feet of T-M-B used.

for Permanence *and* Economy

A permanent, attractive, comfortable floor need not cost a lot of money. For T-M-B has all of these qualities and more—yet the cost of T-M-B is less than other approved types of flooring.

There is a smooth rubbery, velvety feel to T-M-B. It can be invisibly retouched so as to remain in perfect condition without replacement or patches.

T-M-B is a long life, serviceable floor. It is furnished in several bright, attractive colors.

Write for descriptive booklet.

Other floors manufactured and installed
by the Moulding Company—

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Moulstone
Rubbercote
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THOS. MOULDING FLOOR CO.

(Flooring Division—Thos. Moulding Brick Co.)

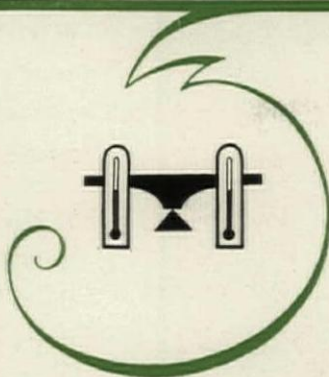
165 West Wacker Drive, Chicago, Ill.

Grand Central Terminal Bldg.
New York, N. Y.

Chamber of Commerce Bldg.
Pittsburgh, Pa.

Warren Webster & Company are the pioneers of vacuum steam heating. More than forty years ago they first introduced the Webster Vacuum System of Steam Heating, long recognized as standard.

Announcing a fundamentally new development in steam heating. A system which varies the quantity of steam delivered to the building as a whole and to each radiator in particular—balancing the supply of heat with every change in outside temperature and inside demand: **The Webster MODERATOR System of Steam Heating.**



“Controlled by the Weather”

— since 1888 —
Webster
Systems
of Steam Heating



Now, after forty years of continued leadership, Warren Webster & Company are introducing the Webster MODERATOR System — the result of pioneering, long organization experience and three years of concentrated research—a system which *moderates* to the practicable minimum the wastes due to window-opening and overheating—and provides a new high level of heating service.

What is the Webster MODERATOR System of Steam Heating?

The Webster MODERATOR System of Steam Heating is a definite achievement in engineering. It is the application for the first time of certain fundamental physical laws to heating. It is a system in which the quantity of steam delivered to the radiators is varied automatically to accommodate changing demands.



The Webster MODERATOR System of Steam Heating delivers to all radiators, simultaneously and regardless of distance from the boiler, the quantity of steam necessary to heat, without overheating.

If certain radiators are shut off, the Webster MODERATOR System immediately and automatically alters the supply of steam to the remaining radiators to correct for the change in demand.

If the outside temperature goes up, the Webster MODERATOR System of Steam Heating immediately and automatically moderates the quantity of steam delivered to each radiator to meet the changed condition. Fuel is saved. Overheating is practically eliminated. Window-opening, a great source of waste in large buildings, is kept at a minimum.

If firing is uneven the Webster MODERATOR System automatically irons out the resulting variations in the steam supply. A "runaway" fire causes no overheating with its consequent waste.

Thus the Webster MODERATOR System of Steam Heating prevents overheating by balancing the steam supply with the need or demand for heat. Its operation is entirely automatic, except for a desirable amount of centralized manual control which allows you to heat up the building

— since 1888 —
Webster
 Systems
 of Steam Heating

Webster Systems of Steam Heating combine the services of a national organization of steam heating specialists with Webster System equipment—a complete line of steam heating appliances proven correct in design by test and use—and Webster engineering methods which insure correct application.

quickly during the early morning hours and to cut down the heat at night.

The Webster MODERATOR System of Steam Heating is adaptable to buildings requiring approximately 10,000 or more square feet of radiation. It may be applied either to new buildings or to the modernization of systems in existing buildings.

Because of certain characteristics of the Webster MODERATOR System of Steam Heating, production is limited and the number of additional orders that we can accept for early delivery is limited. But that is a matter that will soon be adjusted as production facilities are being steadily expanded.

In the meantime future installation of this system in new construction may be arranged for by installing a standard Webster Vacuum or Type "R" System, with provision for later addition of MODERATOR System equipment and advantages. We will be glad to provide architects, engineers and heating contractors with the engineering data required for this purpose.

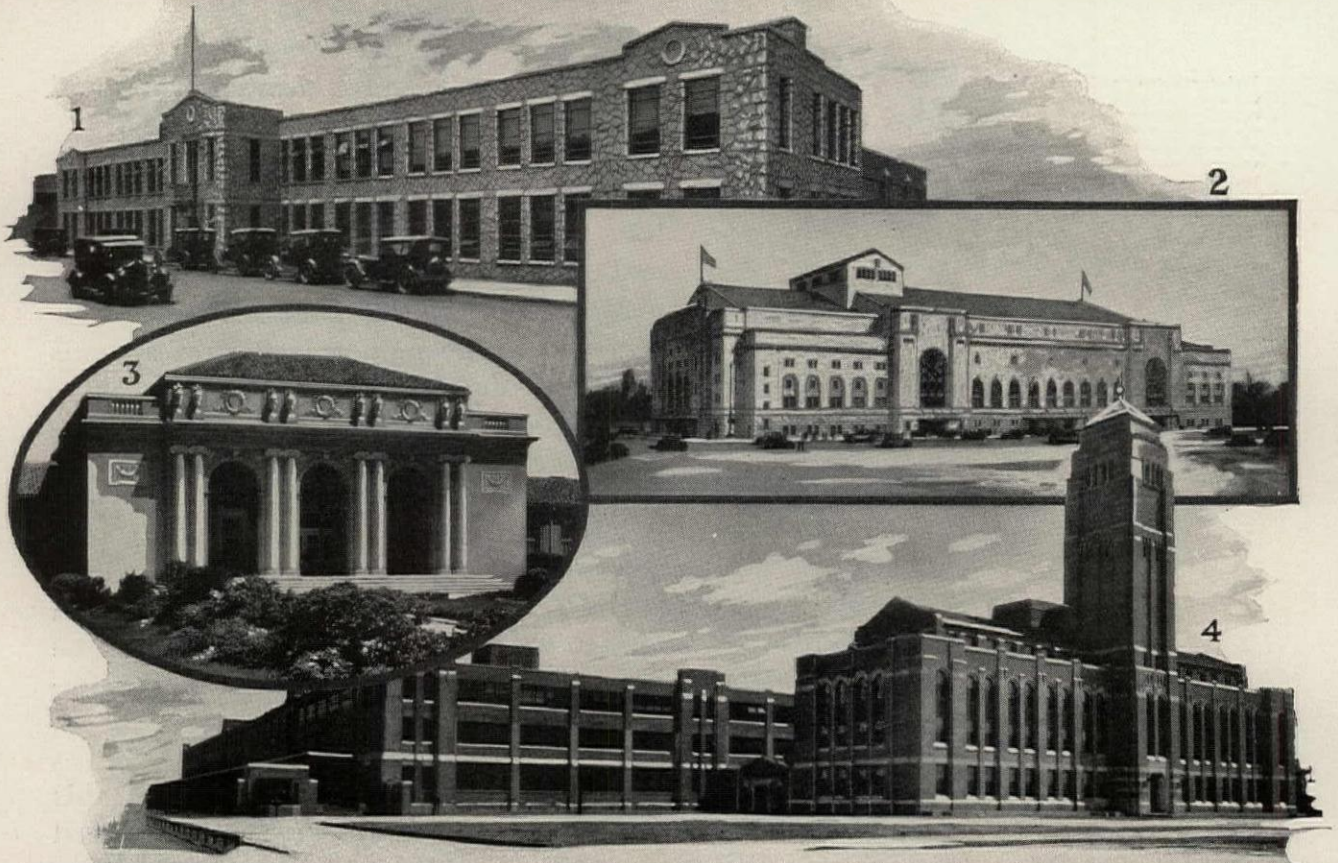
We will also be glad to undertake preliminary surveys of existing buildings for owners, building managers and operating engineers, in preparation for later conversion of their installation to a Webster MODERATOR System of Steam Heating.

Descriptive literature will be available in the near future. Write today for your copy of the first edition.



WARREN WEBSTER & CO., Camden, New Jersey
Pioneers of the Vacuum System of Steam Heating
 52 U. S. Branch Offices: *In Canada, Darling Bros., Ltd., Montreal*

—since 1888—
Webster
*Systems
 of Steam Heating*



1—The Ruralist Press, Atlanta, Ga. Lockwood, Greene & Co., architects and engineers; H. M. Jackson & Co., heating contractors.

2—Campbell Union Grammar School, Campbell, Calif. Mr. Wm. H. Weeks, architect, Leland and Haley, heating engineers; Mr. Carl T. Doell, heating contractor.

3—The Kelvinator Corporation Building, Detroit, Mich. Smith, Hinchman & Grylls, architects and engineers; Johnson, Larsen & Co., heating contractors.

4—Municipal Auditorium, Minneapolis, Minn. Croft and Boerner, architects and engineers; H. Kelly & Co., heating contractors.

Here—and in 30,000 others—

THIS auditorium in Minneapolis—this industrial plant in Detroit—a school in San Francisco—an office building in New Orleans! Whatever the purpose the building must serve; whatever the climatic conditions, controlled heat maintains healthful temperatures in more than thirty thousand notable buildings where Jennings Vacuum Heating Pumps are installed.

Jennings Vacuum Heating Pumps make possible the realization of the full effectiveness of return line heating systems. They regulate the distribution of heat over large radiation areas with evenness and adequacy. Operated by automatic control, these pumps save current and reduce heating costs appreciably.

Write for Bulletin No. 37 describing Jennings Vacuum Heating Pumps for use in every type of building.

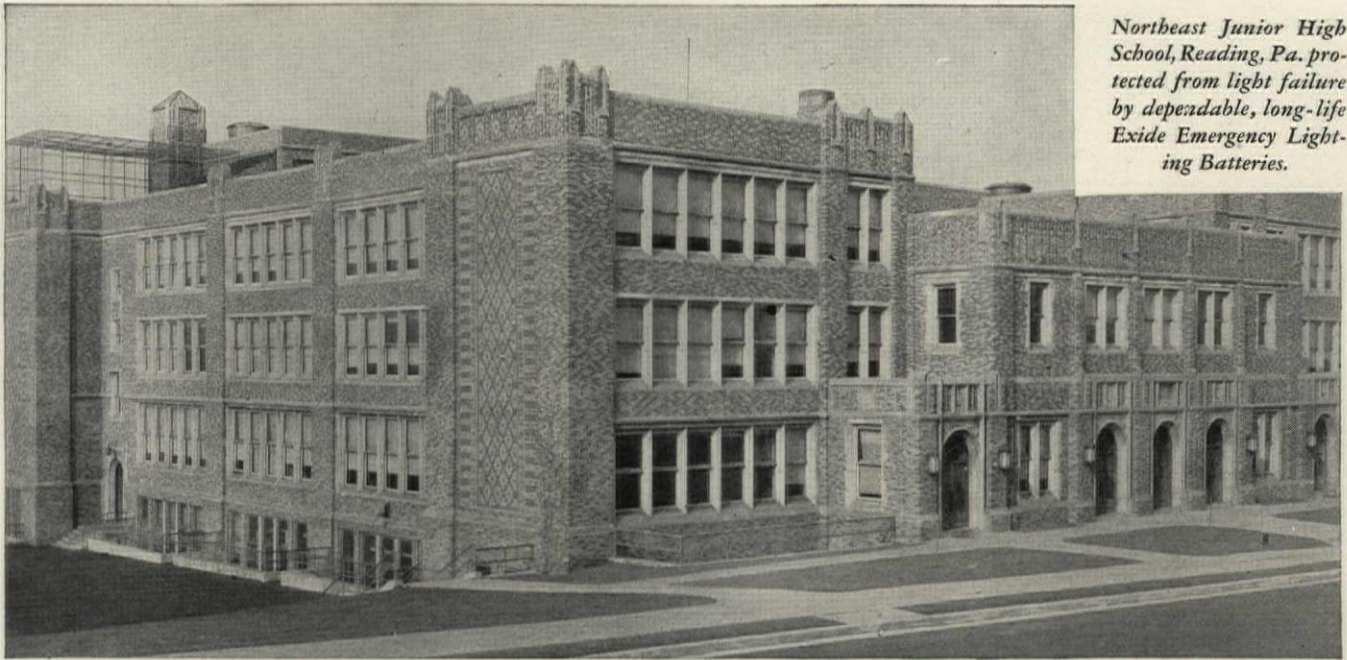
RETURN LINE AND AIR LINE VACUUM HEATING PUMPS CONDENSATION PUMPS COMPRESSORS AND VACUUM PUMPS FOR AIR AND GASES STANDARD AND SUCTION CENTRIFUGAL PUMPS



MARINE PUMPS SEWAGE EJECTORS SUMP PUMPS FLAT BOX PUMPS HOUSE SERVICE PUMPS

Jennings Pumps

THE NASH ENGINEERING CO. 12 WILSON ROAD, SOUTH NORWALK, CONN.



Northeast Junior High School, Reading, Pa. protected from light failure by dependable, long-life Exide Emergency Lighting Batteries.

No Sudden Darkness *in this building*

THE high school dance . . . crowds of eager students . . . youthful happiness. Would sudden power failure darken the entire scene . . . bring confusion and spoil the evening for everyone?

Not in the building pictured here. For emergency lighting protection was wisely installed. And to be sure of dependable protection, Exide Emergency Lighting Batteries were specified.

Auditoriums, hospitals, theatres . . . any place where the public gathers . . . must never be plunged into sudden darkness. Their varying needs call for lighting protection at once reliable and flexible.

Flexible Protection . . . The wide range of Exide Emergency Lighting Battery sizes makes

Emergency lighting was installed to guard against power failure

them adaptable to any plan. The devices necessary to control and keep them charged are extremely simple, and are automatic in operation. And these batteries are unfailingly reliable.

Forty Years' Experience

Exide's experience building dependable batteries covers forty years. Exide Emergency Lighting Batteries combine these five essential qualities to the highest degree: (1) Absolute power reliability, (2) long life, (3) freedom from trouble, (4) low first cost, (5) low operating cost.

Service to Architects . . . An experienced Exide Representative will be glad to consult with you. This entails no obligation. Your letter will bring him promptly.

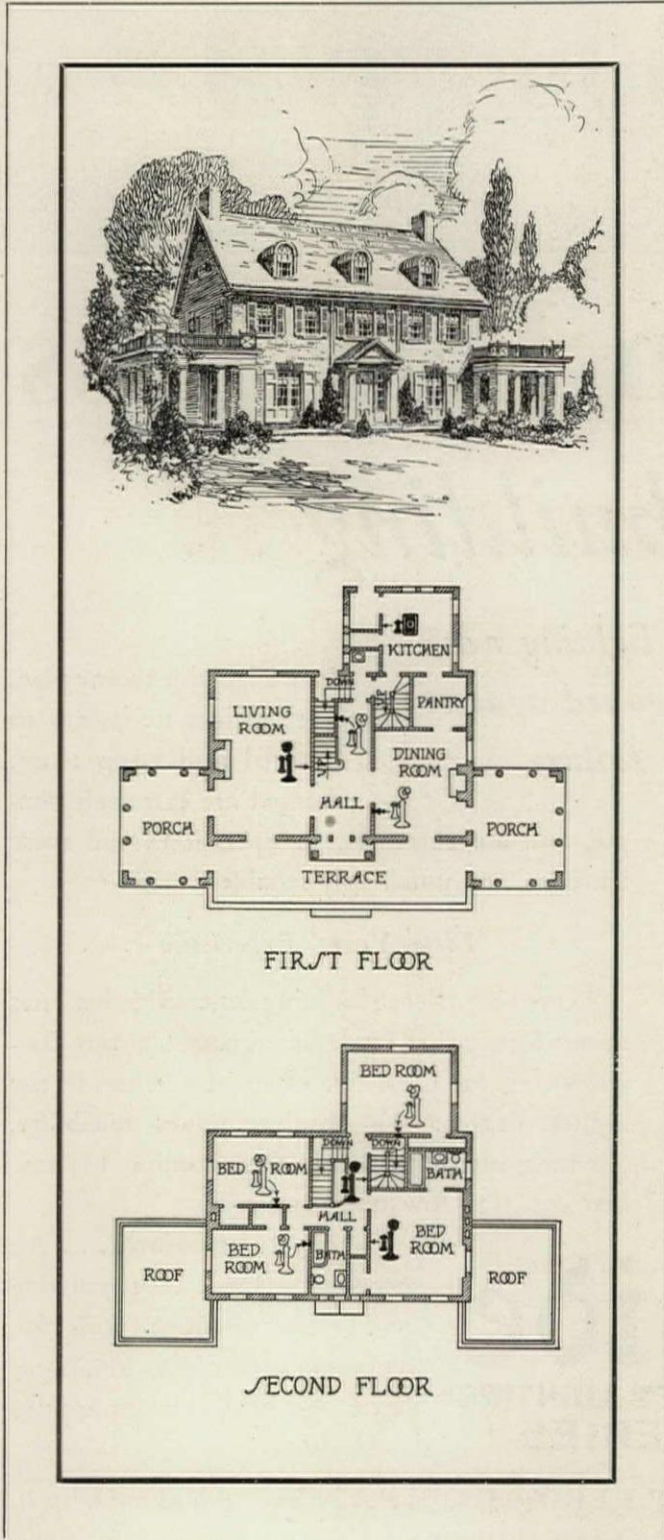
Exide
EMERGENCY LIGHTING BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, Toronto



Facilities for modern Telephone convenience are now *Built into* the Home



Owners want telephone service available throughout the house—planned in advance—for comfort, for convenience, for appearance

1 1 1

PEOPLE today want telephone convenience commensurate with their other comforts—telephones throughout the house, strategically located to save time and effort in placing or answering calls.

And they want this modern telephone convenience *planned in advance* . . . whether they are building new homes, or remodeling old ones.

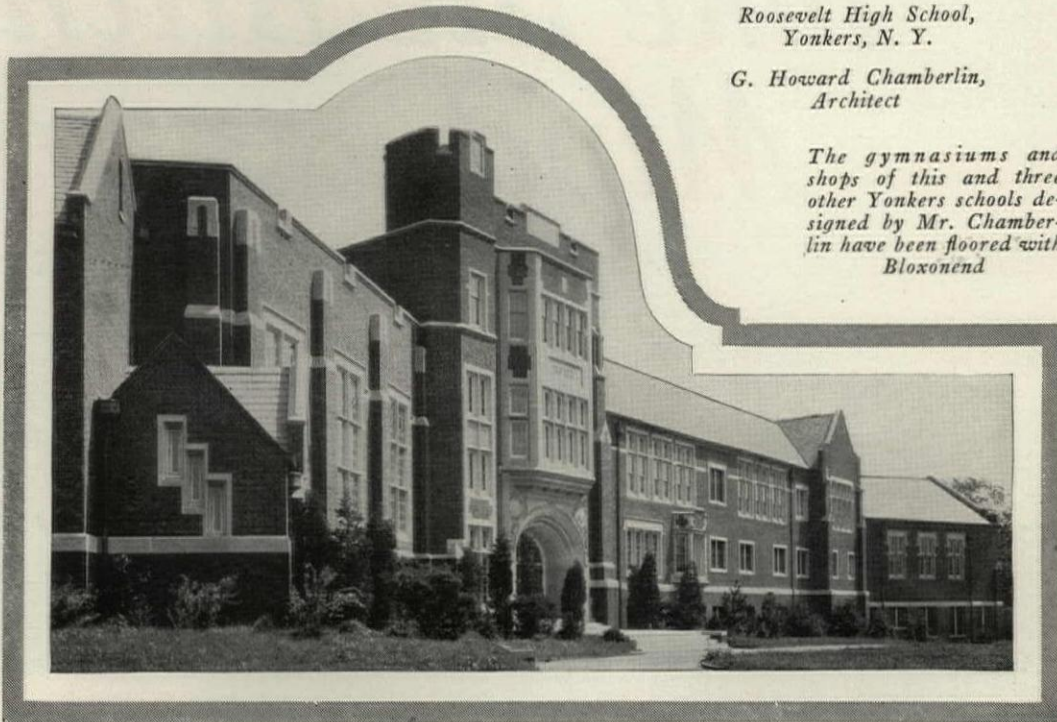
When adequate provision for telephones is included in such plans, many of the facilities for wires and apparatus can be concealed. Conduits can be so laid as to make telephone outlets available in nearly every room, allowing telephone service within the home to be expanded or rearranged as desired.

Built-in locations for telephones and bell boxes quite frequently make an attractive decorative feature. Underground service entrances, intercommunicating telephone service from room to room, and other advanced features, are desired by many home-owners.

These and other facilities are described in two booklets prepared by the Bell System to aid architects and others in planning telephone convenience for homes and buildings. If you have not already received your copies, call the Business Office of your local Bell company and they will see that you are supplied immediately.

In addition they will be glad to arrange conferences between architects, engineers, builders and representatives of the telephone company to discuss specific projects in detail.





*Roosevelt High School,
Yonkers, N. Y.*

*G. Howard Chamberlin,
Architect*

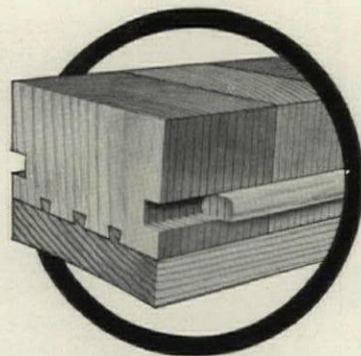
*The gymnasiums and
shops of this and three
other Yonkers schools de-
signed by Mr. Chamber-
lin have been floored with
Bloxonend*

School Officials *like* Bloxonend

Harry S. Richards, Principal of the Roosevelt High School, Yonkers, N. Y., writes: "It gives me pleasure to recommend BLOXONEND FLOORING as a type suitable for shops and gymnasiums. It has proven very satisfactory in our school."

School officials and athletes invariably are enthusiastic about BLOXONEND. Its surface is firm and fast yet resilient, durable, attractive and cannot splinter or splinter.

And because school officials *like* BLOXONEND, it is specified for gymnasiums and shops by most prominent school architects.



*Comes in 8 ft. flooring lengths
—the tough end grain up*

Write for sample and specifications

CARTER BLOXONEND FLOORING COMPANY

Kansas City, Missouri

Branch offices in Principal Cities—See Sweet's

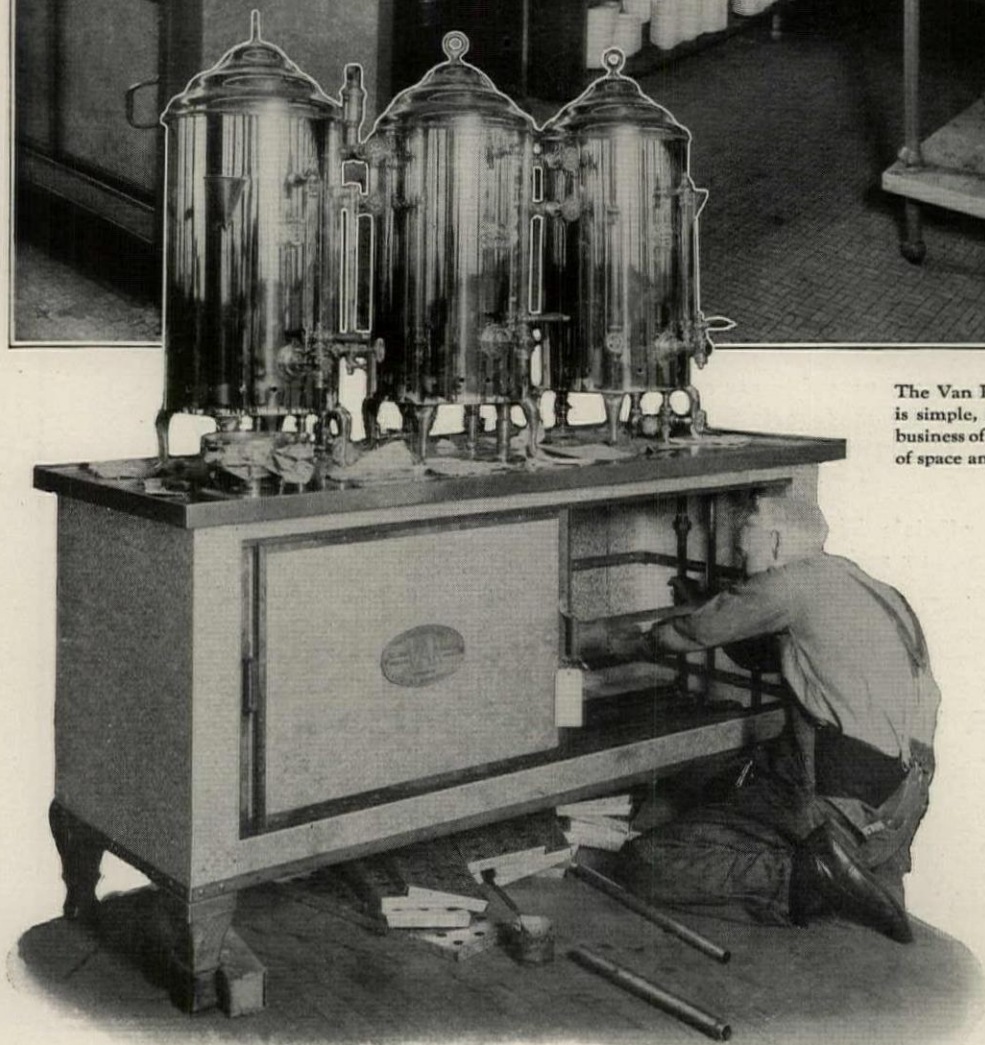
BLOXONEND
Lays Smooth **FLOORING** *Stays Smooth*



Take the "Kitchen Mind" ♦ ♦ with



The Van Kitchen of the Hotel Baker, St. Charles, Illinois, is simple, sturdy and efficient, capable of serving capacity business of the hotel without strain . . . yet with a minimum of space and equipment.



COMPLETING the hook-up of Van Coffee Urns on an urn stand. This Van Craftsman is typical of the superior workmen who have built into Van Equipment the calibre that has made it nationally respected and preferred. Nowhere will you find a more skilled or thorough organization. Their work is their pride.

Problem"off Your VAN Equipment ♦

REMEMBER one thing about kitchens in the beginning, and you can forget most things about them from that time on --- Specify Van Equipment! You and your client will then be sure of that trouble-free reliability and unfailing efficiency which go a long way toward guaranteeing success. And there will be no worries about speeding up service, replacing worn out equipment, or taking "time out" for repairs!

If you aren't planning a whole new kitchen—you can do wonders to an old one with the judicious addition of Van Equipment. A new range, coffee urn, dish warmer . . . whatever you need can be added at a minimum of expense, with a maximum return for the investment. Van Equipment meets any appropriation—keeps the operating budget low year-in-and-year-out!

The careful buyer compares before buying. We urge you to compare Van Equipment *with any other!* Judge it for price, construction, quality and appearance. Investigate its method of manufacture. Then ask users. We welcome any comparison. We know that you and your client will want Van Equipment and will be—like all Van users—even more enthusiastic as time goes on.

THE ALBERT PICK-BARTH COMPANIES

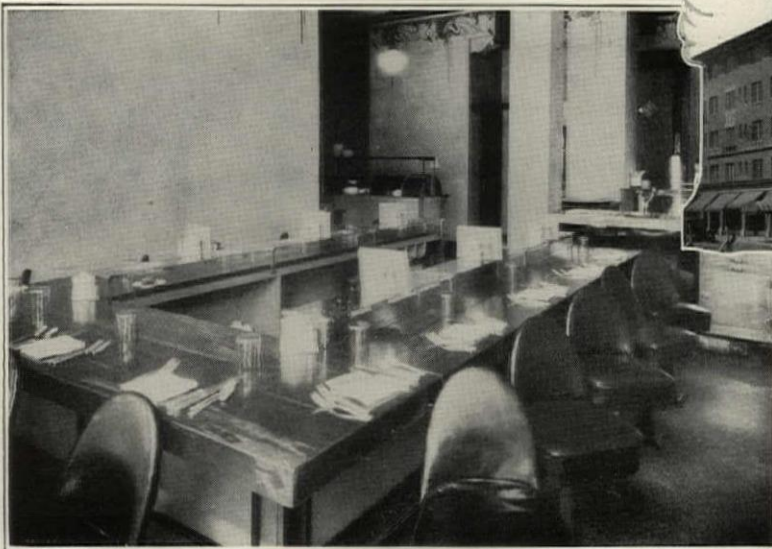
ALBERT PICK & COMPANY
1220 W. THIRTY-FIFTH STREET, CHICAGO, ILL.



L. BARTH & CO., INC.
COOPER SQUARE, NEW YORK, N. Y.

THE JOHN VAN RANGE CO., CINCINNATI, OHIO, Manufacturing Division

Coffee Shop Equipment is one of the specialties in the Van plant, where miles on miles of counter are constructed annually. This view shows the recently installed counter of the Hotel Baker, St. Charles, Ill.



THE HOTEL BAKER,
St. Charles, Illinois.

Wolf, Sexton, Harper & Trueax, Inc., Architects

For seventy years and more, Van Equipment has been built up to a standard. Every piece must measure up to the same rigid requirement! This is your assurance of superlative quality.



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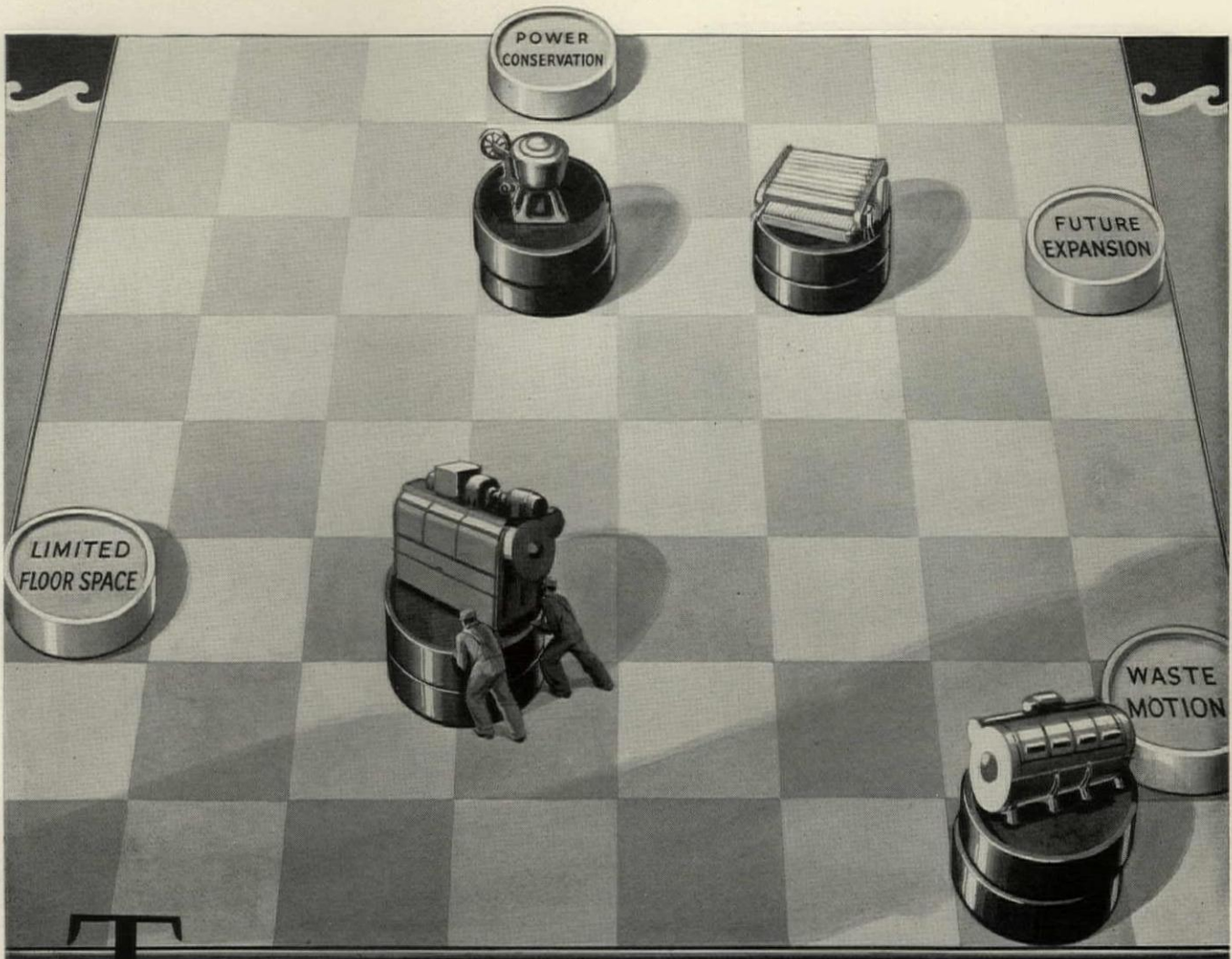
The earlier the panelboard specialist is called in the better he can serve you. Avail yourself of his assistance today.



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LAUNDRY MACHINERY

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HIGHLAND PLAZA APARTMENTS, BIRMINGHAM, ALA.,
protected by Genasco Standard Trinidad Built-up Roofing.
Architects: Denham, Van Kuren & Denham, Birmingham.
General Contractors: Smallman-Brice Construction Co., Birmingham.
Roofing Contractors: Concrete Products Co., Birmingham.

The roof that resists weather and wear

A Genasco roof insures protection against the elements, against corrosion from industrial fumes, against the ravages of time—for Genasco Standard Trinidad Built-up Roofing is noted for its wear and weather resisting properties.

It owes these qualities to Trinidad Native-Lake Roofing Asphalt—that wonderful waterproofer made and seasoned by nature. Thoroughly saturating and binding together the layers of tough long-fibred rag felt, it makes a Genasco roof of such unequalled excellence that it is specified far and wide by leading architects for buildings of every description.

Genasco Standard Trinidad is smooth-surfaced—requires no slag or gravel to protect it from the sun. There's no clogging of drain pipes by loosened slag or gravel. No unnecessary weight to burden the roof structure.

Write us today for complete specifications for applying Genasco—free to architects and builders.

The Barber Asphalt Company

New York Philadelphia Chicago
Pittsburgh St. Louis Kansas City San Francisco

Genasco
REG. U. S. PAT. OFF.
STANDARD TRINIDAD
Built-up Roofing

SERVICE means a great deal when you know the record behind the promise.

SEDGWICK DUMB WAITERS and ELEVATORS *for all purposes*

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EVERY architect should have in his files for immediate reference the new portfolio on refrigerators which has just been prepared by the engineering department of McCray.

Complete, accurate, and thorough information regarding refrigerators of every type and for every purpose—both stock portable, and built-in refrigerators and cooling rooms—is here at your fingertips.

Send for your copy now; no obligation is involved.

McCray Refrigerator Sales Corporation
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*Salesrooms in All Principal Cities
See Telephone Directory*

MCCRAY
REFRIGERATORS
for all purposes

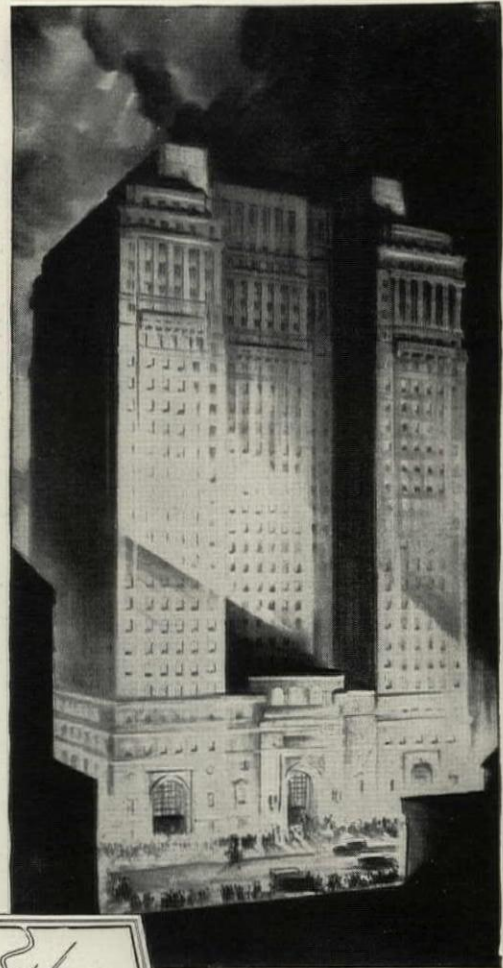
Mighty Metropolis and progressive Louisiana Parish top their finest buildings with this same famous Roof

DOWN in Shreveport, La., the striking new Caddo Parish Court House is topped with a Barrett Specification Roof. 1400 miles to the north, metropolitan Philadelphia uses a Barrett Specification Roof for its newest and finest skyscraper. Distance does not vary the nature or quality of

this famous roof. For in Shreveport, as in Philadelphia, the same high type of Barrett Approved Roofers, the same Barrett Inspection Service . . . the same Barrett materials . . . render these roofs precisely alike—typical of thousands of other Barrett applications in every section of the country.



Caddo Parish Court House, Shreveport, La. Architect: Edward F. Neild, Shreveport, La.; General Contractor: Glassell-Wilson Co., Inc., Shreveport, La.; Roofer: Monroe Roofing & Sheet Metal Works, Inc., Monroe, La.



Fidelity-Philadelphia Trust Building, Philadelphia, Pa. Architect: Simon & Simon; General Contractor: Irwin & Leighton; Roofer: Walter H. Tinney Co. All of Philadelphia.



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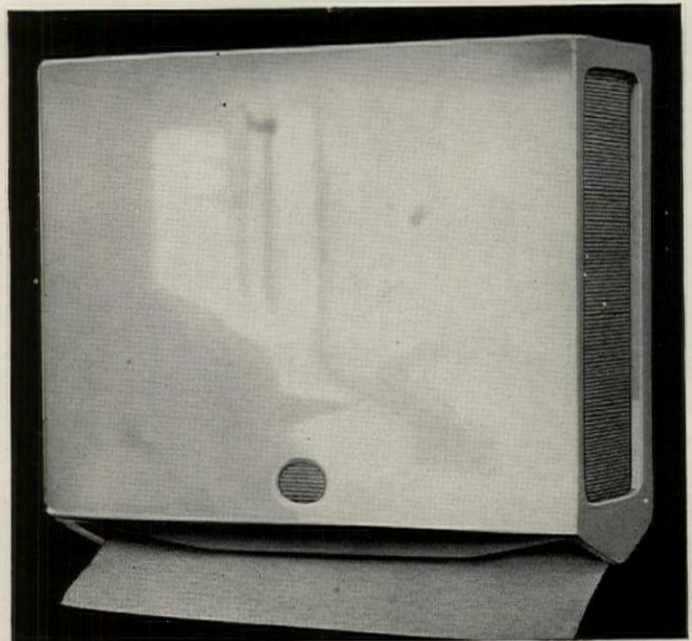
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BOOK DEPARTMENT

OLD HOUSES ON LONG ISLAND AND STATEN ISLAND

A Review by MARGARET NORRIS

SOME of the most valuable documents of American architectural history are found in the old manor houses built in colonial and revolutionary days by the early Dutch and English settlers on Long Island and Staten Island. A few of these are still standing in some show of their pristine pride; others are but ghosts of their former selves, if not wholly derelicts and eyesores; many more have vanished entirely, swept away by the relentless march of what is known as "improvement" in a growing neighborhood. But the traditions they represent are immortal, and the names of the men who lived there, many of them sustained throughout the generations, are still well known today. Many of these traditions and names belong to families prominent today in social, political and economic New York,—Vanderbilt, Lefferts, Cortelyou, DeWitt Clinton, Van Brunt.

In his book, "Manor Houses and Historic Homes of Long Island and Staten Island," the author has done much to reconstruct the early glory of these architectural treasures and also to revive their significance from a historical standpoint. Many of the stories he has retold form part of our richest traditions of the America of those early days,—rooms where General Washington actually passed a night; where Nancy Cortelyou waved her red petticoat to signal the British troops; and where the ghost of Lord Howe returned to stalk

the premises each anniversary of the Battle of Long Island. There are stories of pioneer struggling, of witchcraft and whipping posts, of gaiety and romance in war and peace, and of bargains made with the Crown and with the Indians at different times during the period.

Architecturally speaking, says the author, Long Island is like a block of Neapolitan ice cream,—divided into three distinct layers, one pure English, one pure Dutch and, joining the two, a third layer that partakes of both influences,—that is Anglo-Dutch. The architectural cleavage corresponds to the racial cleavage. Eastern Long Island architecture is largely of purely English derivation. This, the largest third, comprises the old East Riding section,—what is now Suffolk county, Southampton, Easthampton and that neighborhood. The western part, comprising the old Five Towns, is just as purely Dutch. Many of the original old houses here might almost have been transported from Holland. The middle section, now part of Nassau County, partakes of both English and Dutch, settled by people of both bloods.

The Dutch houses on the western end of the Island, including Brooklyn and Staten Island, show more variety of treatment, since the Dutch builder was an opportunist who very frankly made use of whatever material was readily at hand,—lumber, brick, stone or stucco. The eastern Long Island Englishman, however, was so

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entrenched in tradition that he would go to any amount of trouble to conform to the old ways, and was not happy unless he could do so. The chief difference between the two architectural styles is noted in the roofs. The English generally used the gable roof; the Dutch, the gambrel type. The gambrel roof, quite different from the gambrel often used in New England, is made in two parts with a sweeping curve in its longer or lower section and a graceful, bellwise flare over the eaves to shade the lower walls and shelter the tops of the windows. Sometimes these eaves projected still farther and were supported at their outer edges by pillars to form verandas. Such houses were generally of but one story, sometimes of a half-story in addition, lighted by windows in the gable ends,—less often by dormers. The English house usually had two stories, sometimes with dormer windows projecting through the roof to form a third-story attic. The Dutch houses, on the other hand, even the more pretentious as already said, had as a rule only one story and an attic. The long hollow slope of the gambrel would make a second story too airless. However, in some of the later houses that show Anglo-Dutch influences, we find dormer windows cut through a gambrel roof or a gabled wing added.

Many of Long Island's old English houses are of the "salt box" type so prevalent in Connecticut, the Island's next door neighbor, and in other parts of New England. The "salt box" is merely another name for the stack chimney house built around a great central chimney. The Dutch was flanked by two great chimneys, one at either end. The kitchen was the most spacious room. Its huge fireplace accommodated six 6-foot logs which were dragged from the forests by horses. Here were the old Dutch oven and those other now strange utensils with which the thrifty Dutch housewives worked such marvelous results. A typical example of the English "salt box" is the old Mulford house at Easthampton; or, better still, its more famous next door neighbor commonly known as "Home Sweet Home," because John Howard Payne, the author of that melody, lived here for a few of his early years. The now fashionable town of Easthampton recently acquired this house to preserve it as a literary shrine. This and the old Rufus King manor house at Jamaica, now known as "King Park," are the only two Long Island homes of famous men which have become public property.

In Brooklyn the original Lefferts house, built about 1685 in what was then the village of Flatbush, has been removed to Prospect Park for safe preservation. This house was partially destroyed by fire in 1776 but has since been quite perfectly restored. Other treasures of this era stand now either isolated and forlorn or have been entirely swept away by the ruthless onslaught of real estate booms. One house which, happily, has been preserved,—one of the most interesting from a social and economic standpoint,—is the old Vanderbilt house on Staten Island. It was here in 1794 that Commodore Vanderbilt was born, and from there that he first ran the ferry boat that marked the beginning of the family fortunes,—the wedge into transportation activities. His father before him, Cornelius I, had earned a meager living by running a ferry between Staten Island and New York, but he did it in a desultory fashion, as he did everything in life, for he was a restless person and

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with none of the persistence that distinguished his famous son. Discouraged by the long winters, when for days at a time he could not run his boat through the ice in the bay, he bought a bit of farm land in Port Richmond, built there a small Dutch house and thither brought his bride, Phœbe Hand, in 1787. It was there that their son was born. Phœbe was a remarkable woman. It is to qualities inherited from her that Cornelius II owed much of his success in life. He has been described by a biographer as a "lusty brat who from infancy was noted for his stature, his wilfulness and determination, his readiness to think for himself and go his own gait . . . of big body, rangy, tow-headed, blue-eyed, as Dutch as the house in which he was born." Interesting bits of his story and that of other famous men who were born or who dwelt in these old manor homes are given in this book. Among them is the story that still clings to the old summer home of Governor DeWitt Clinton at Maspeth or Newtown, now Brooklyn, and which has long since fallen prey to the city's greedy encroachments. Once it was a dwelling gracious and distinguished,—in its heyday one of the largest and finest houses at the western end of Long Island. Now it is a half-dismantled tenement with some of its members lopped off, a pathetic wreck about to tumble down, a poor ghost of its former self. Built about 1740 by Judge Sackett of the Court of Common Pleas, it was a little later purchased by DeWitt Clinton.

MANOR HOUSES AND HISTORIC HOMES OF LONG ISLAND AND STATEN ISLAND. By Harold D. Eberlein. 318 pp., 6½ x 9½ ins. \$12.50 Net. J. B. Lippincott Company.

HANDBOOK OF DOMESTIC OIL HEATING. Edited by Harry F. Tapp. First Edition. 383 pp., 4½ x 7 ins. Illustrated. Price \$3. American Oil Burner Association, Inc., New York.

THE interest which attaches to discussion of a subject as important as the use of oil as fuel has been considerably stimulated by the publications of one kind or another issued by the American Oil Burner Association, Inc., an organization composed of many of those interested in the marketing of oil and those concerned with the designing and manufacture of mechanism for its use. The matter has been the subject of countless articles in journals devoted to architecture and engineering, and those interested in the use of oil have sponsored research which has removed the subject from the realm of the superficial or theoretical and has brought it to a point where the use of oil in appropriate mechanism has been made almost an exact science.

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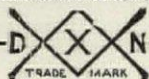
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Not content with giving a history of the use of oil as fuel, the editor has assembled all of the facts about petroleum that may be of practical use,—production figures, methods of recovery, distilling and refining, pumps and storage, and characteristics and properties of fuel oils. There is a discussion of fuel oils' com-

bustion and of the principles upon which modern oil-heating equipment is designed and built. A particularly well illustrated chapter is devoted to description and analysis of the different types of oil burners and controls. An excuse for its thoroughness,—if excuse be needed,—is offered in the opening lines of one chapter: "The rapid growth of domestic oil heating has been the inspiration for many engineers to spend much thought, energy, time and money, making for perfect oil-heating equipment. Much of this energy is wasted when the work is attempted without a background of knowledge of the experience of the pioneers who developed and applied the various methods of preparing fuel and air for efficient combustion."

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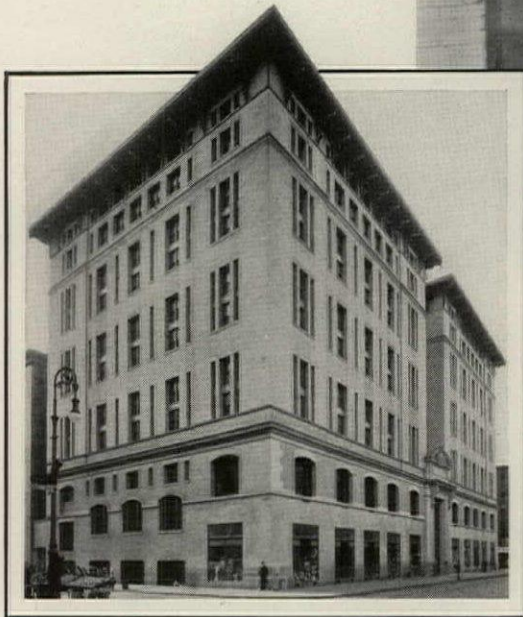
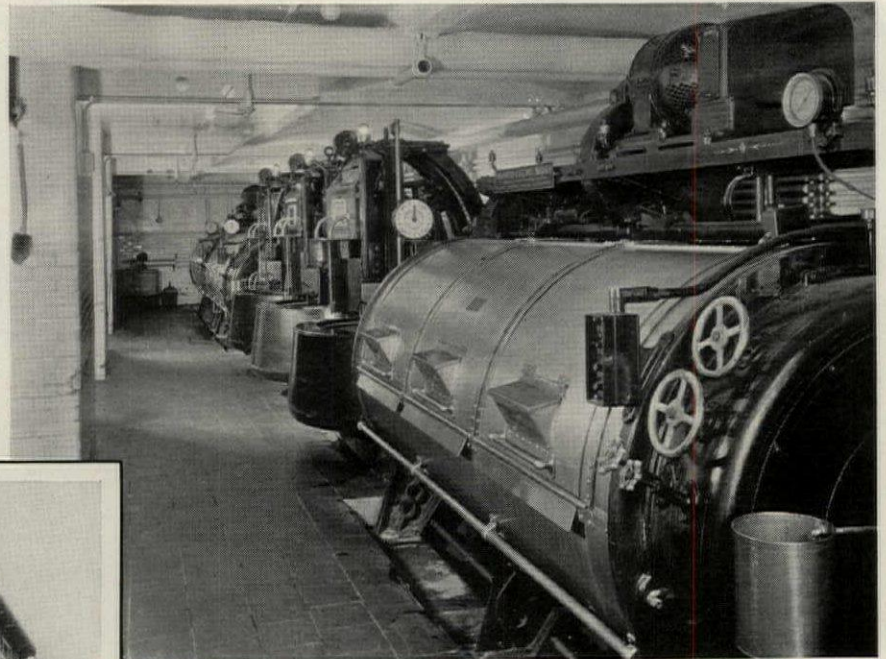
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THE 1929 EXHIBITION OF THE ARCHITECTURAL LEAGUE OF NEW YORK

BY

RAYMOND M. HOOD

I DOUBT if there are many people who realize that there are buildings going up in New York today that five years ago would have been considered freakish or too radical; and that today these buildings are accepted as a matter of course, without their being given a second thought. For within the past five years a change has occurred, so comprehensive and forceful that today buildings that would once have aroused only ridicule, are passed by without comment. The public, in an incredibly short time, has been educated to accept the architectural changes necessary to the growth of New York, and to regard its buildings in the light of reason, rather than to judge them by the standards of an era we have outgrown.

The movement which brought about this change took form after the close of the war. It arose from a universal restlessness and an unwillingness to accept things as they were merely because of habit. Besides manifesting itself in a social way, it very naturally showed itself in the fields of architecture and decoration. New problems, instead of being treated on the basis of tradition, were solved in the light of reason. Simplicity, practicality, directness, efficiency, became the watchwords of those who had new problems to work out. Skyscrapers, lifting their occupants out of the dust and turmoil of the streets, arose in crowded sections; interiors became more healthful; the products of the machine, conducive to greater happiness and prosperity, were welcomed by everyone. These were the elements of the modern movement that was slowly weaning the great mass of the people away from regard for traditions not pertinent to their life; but it was not until the European countries, particularly France, Holland, Germany and Sweden, had applied this new viewpoint to every phase of arts and decoration that America began to stir; and it was not until the Exposition of Decorative Arts in Paris in 1925 that America began to work along in the great movement to apply the principles of modernism to every phase of life. Our earliest efforts, based almost entirely upon European products, first showed themselves commercially in the shops in fabrics and in all manner of textiles. Then Lord & Taylor, Macy and Altman in New York, and Mandel and Marshall Field in Chicago, held expositions showing the modern treatment of interiors. All of this was looked upon as a novelty of the moment by the traditionalists,—as a fad that would soon die. But now the fact that the Metropolitan Museum of Art, the source to which all America turns for direction

in matters of art, is preparing an exposition of contemporary art; that the expositions of the Architectural League, the largest single exhibit of art and architecture that we have in this country, have swung to the contemporary trend; that the coming Chicago World's Fair has ignored traditional sources and is trying to solve its problems in the manner of today and not of yesterday, show that the modern movement is on solid ground.

It is this manifestation of modernism in all forms of art and industry that has helped to bring the equally rapid recognition of modern architecture. Only four short years ago, when I was building the American Radiator Building, I was very severely brought to task by one of the greatest banking institutions in the country as being ultra-radical, when a loan for its completion was applied for. I was told that even though I had clients willing or anxious to build such a structure, I must realize my responsibility as an architect to protect the public from such atrocities. Upon its completion, the building was ridiculed by a great part of the public, but today it has taken its place as a perfectly conventional structure, and other buildings of a more unconventional appearance have sprung up without arousing criticism.

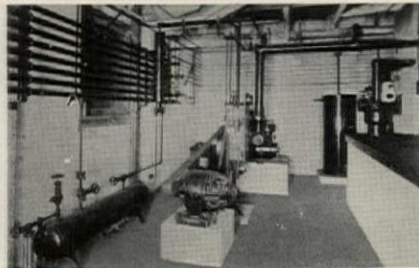
For over 40 years the Architectural League of New York in its annual exhibit has represented the most conspicuous movements of the time; and, although a very conservative body, its exhibits of the past three years have reflected the architectural and decorative methods in use today. But its exhibit in the Grand Central Palace next April is going further than ever in displaying under one roof the products of the material and supply men. Ever since the modern movement began, the producers of materials for building and decoration have kept pace with the architect; yet, until recent years their products, an integral and highly important part of the modern movement, have never been given a proper display. This was partly because the public was not yet in a mood to stop, look, and listen sympathetically, and partly because of lack of space. True, the League has always given space to special foreign exhibits, and to the most important works of native craftsmen; but it has never presented in a comprehensive way the various essentials that enter into the construction of a home or building. This April, however, products of all these various fields will be a part of the big show, and the public will be able to get a good idea of the strides made in those spheres, and of the vast equipment for increasingly beautiful and modern construction that is now available.

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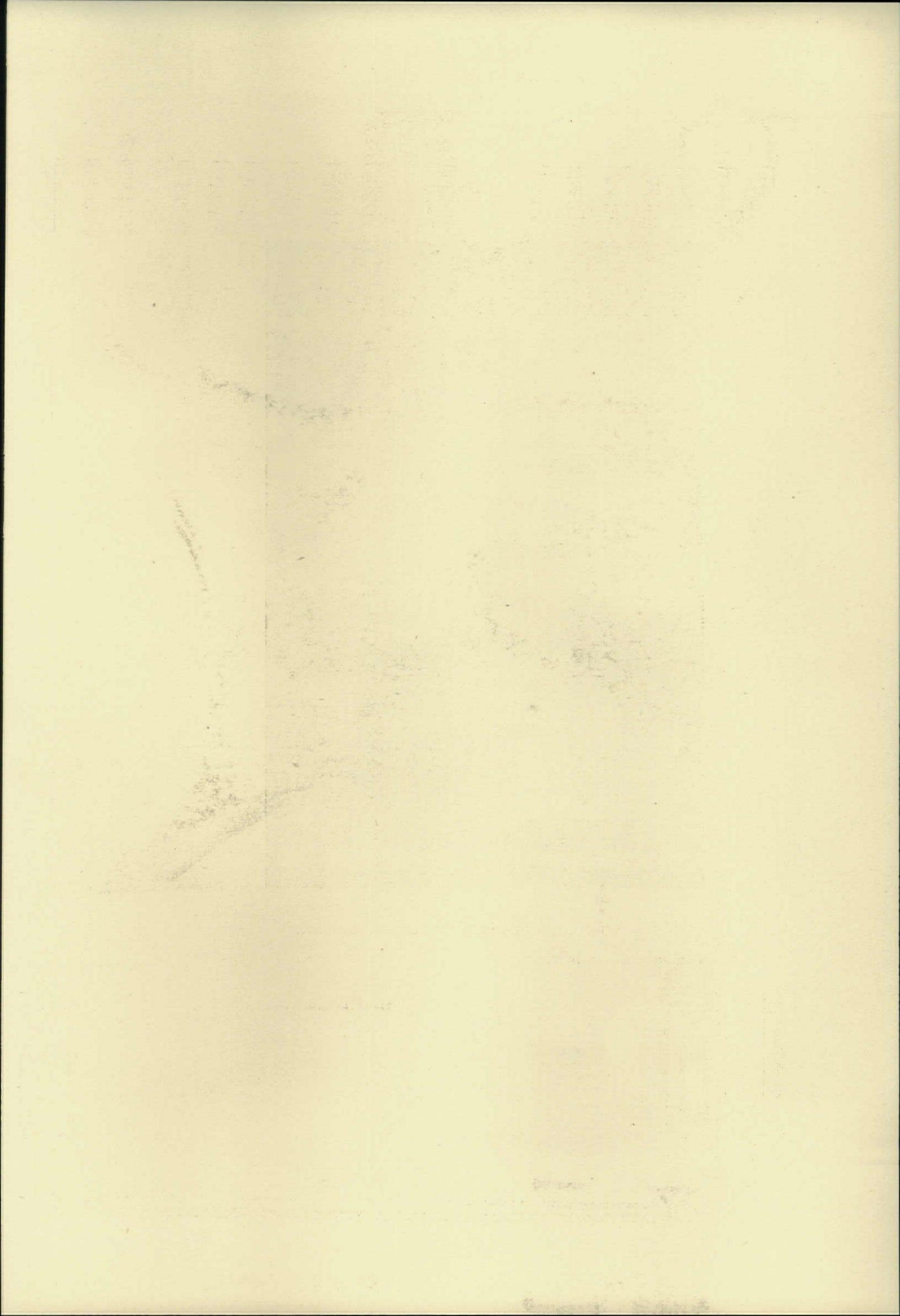




Photo. P. A. Nyholm

THE NEW YORK LIFE INSURANCE COMPANY BUILDING
CASS GILBERT, ARCHITECT

The Architectural Forum

THE
ARCHITECTURAL
FORUM

VOLUME L

NUMBER ONE

JANUARY 1929



USING SCALE MODELS ADVANTAGEOUSLY

BY

LE ROY GRUMBINE

WITH MODELS BY THE AUTHOR

THE first difficult problem that an architect encounters is that of salesmanship. He has to secure the coöperation of a client before he can produce. He has to sell something that does not yet exist,—something that probably requires the largest investment of anything the client buys.

The architect is an artist. Other types of artists,—painters, sculptors, poets, musicians, dramatists,—work more or less independently. They create by themselves. They usually produce first and sell afterwards. Their works sell themselves by direct appeal. The artist gets most of all of the money expended. The architect, on the other hand, usually gets only 6 per cent of the money expended. The artist creates art for art's sake. The buyer seeks art for art's sake. The architect applies art to a necessity. The buyer is seeking a necessity. So the architect, in addition to having to sell something that does not yet exist, has to sell his art in combination with a necessity, and in competition with those offering the same necessity without the art, at a lower price. And he has to sell 16 times as much per dollar earned! The qualities that make an artist and the qualities for successful salesmanship, are seldom found in the same individual. It seems as though they are the antitheses of each other. Witness the many instances where architects who are capable designers struggle all their lives with small practices, while the incompetent enjoy large and lucrative practices in spite of the many eyesores they are continually erecting.

How can an architect best demonstrate his value? Prestige is long and tedious in building,—never more so than in the case of an architect, because of the magnitude and rarity of the units he deals with; a doctor or lawyer has a hundred cases to one commission of the architect. Besides, prestige, no longer has the value it once had. Things move too fast in this age. What was good a short while ago, may no longer be good now. New things are coming thick and fast. What is best for the case in hand, is all-important. Emerson's little "mousetrap" theory no longer applies. Competition is ever increasing, making it easier for the

buyer, and since the human animal is so likely to take the easiest way, the successful seller must display his goods and take them to the buyer.

How can an architect do this? In no way so well as by means of a scale model. Not many years ago a nationally known shoe manufacturer of many years' reputation, lost two million dollars' worth of business in one year, simply because he continued to make a good thing in the same way. People of this age demand *new* things. The architect who presents his designs in model form, appeals to this demand. What is more enduring than building? What is more required by the people? What else absorbs as much capital? Even the sight of a modest residence has to be endured, or is enjoyed (as the case may be) by thousands of passers-by, daily. It continually irritates or pleases the owner and his family and guests as long as the owner lives there, which is the greater part of each day for a large part of his life. One is constantly in contact with buildings, either outside or inside, at home, at work, or traveling. Why should not buildings, of all things, be beautiful, and be made to give visual pleasure as well as to render efficient service?

To help make buildings more beautiful, to eradicate irritating ugliness, to further the cause of good architecture, is the mission of the scale model. Most people cannot or will not take the trouble to visualize. Sales experts tell us that few people can be "sold" on reason. Most people must be appealed to through their appetites or senses. A model does this. It diverts the attention from dollars to be expended and focuses it on something to be desired. It gives the prospective buyer something tangible, something definite. It dispels doubt. It creates enthusiasm. The client is interested in what the architect is going to do for him, not in what he has done for others. The model removes the buying of architecture from what is akin to a mail-order-from-catalog description, cash-in-advance matter, to a see-it-before-you-buy proposition. A model gives the architect the advantages other artists have,—of expressing himself independently of commissions; of creating first and



One-sixteenth Inch Scale Model of Longue Vue Golf Club, Pittsburgh

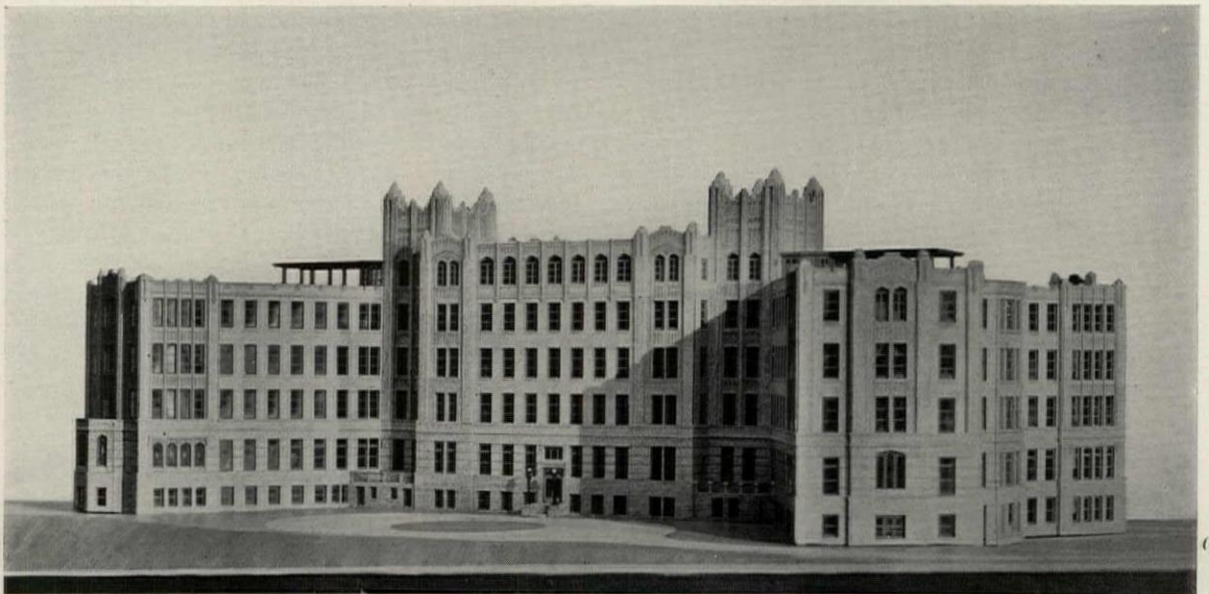
Bruno Janssen, Architect

A. D. Taylor, Landscape Architect

letting the result sell itself. It gives him a chance to display his wares immediately, without having to rely on prestige or to wait for a client.

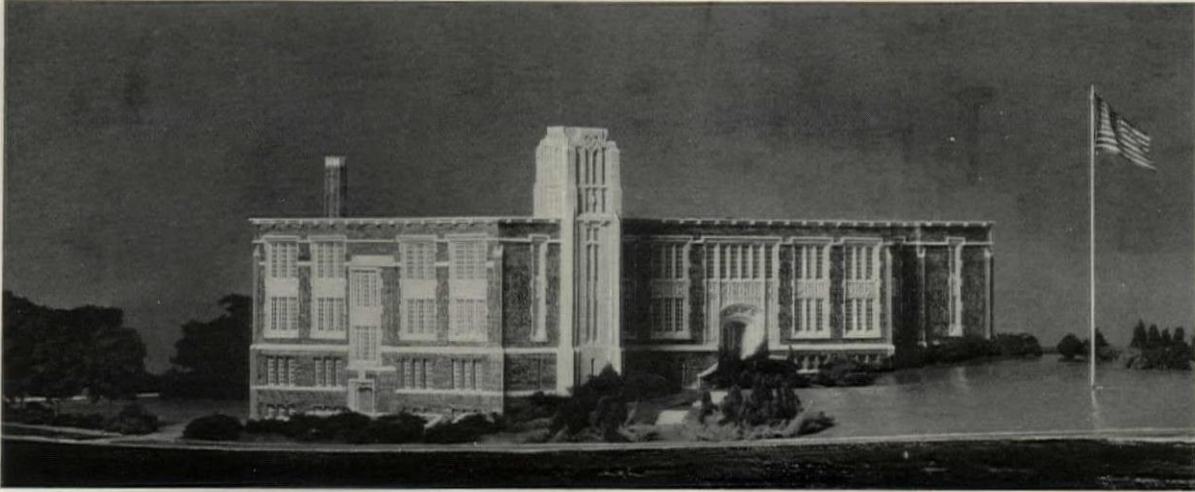
All the elements that enter into the artistic side of architecture (and they are the same in all the various arts),—namely, form, color, harmony, contrast, composition or grouping, and central feature or climax,—can be as well portrayed in a scale model as in the building itself. To what extent a building approaches an architectural ideal, or is merely a constantly irritating eyesore, is determined by the preliminary studies (or lack of them). It is a mistake to put off making the model until various points have been decided and the preliminary scheme accepted by the owner, on the theory that it is useless to have a model if

it's not going to be like the finished building. It is to help decide how the building shall look that a model is most useful, so obviously the model must be made before the decisions are made. It is not at all necessary that the model conform to the completed building in all details. The model should be the architect's presentation to the client of his design. Appropriate floor plans and section drawings, to show the interior arrangement, should accompany the model, but no rendered elevations or perspectives are needed. It is possible to use models effectively in this way, and the cost is not prohibitive. Models should be treated in the same manner as perspectives. They should of course be truthful, but photographic exactitude should not be attempted in one case any more



Model of Children's Hospital, Cincinnati, with Future Additions

Stanley Matthews—Elzner & Anderson, Associated Architects



One-sixteenth Inch Scale Model of Coventry School Building, Cleveland Heights
Franz C. Warner, Architect

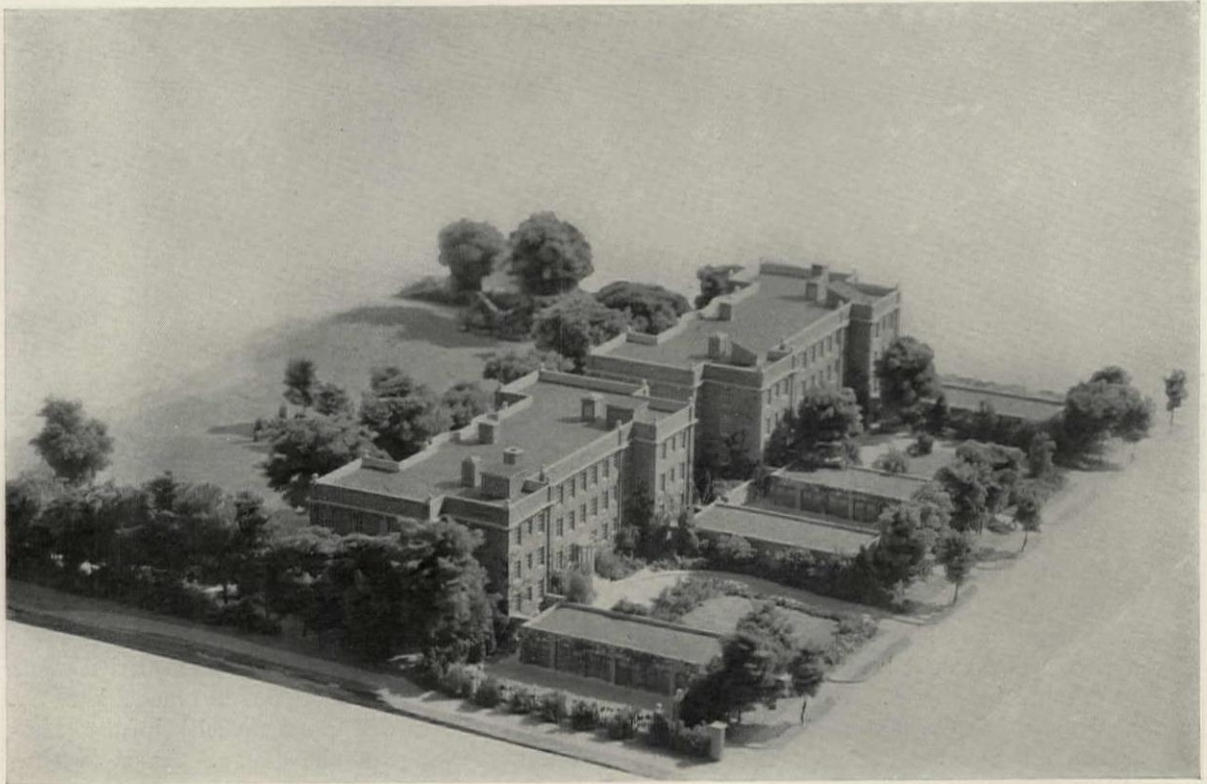
than in the other. Models should not be too elaborate. They should be "sketched" in the same way a perspective would be. Only the essential features should be shown. For this kind of a model, cardboard is the best material to use. It can be laid out and cut out with T-square and triangle on the drafting board. It takes various color mediums well and admits of "rendering" textures of materials and minor details. For the best effects and because of the exigencies of the materials used, a scale should be selected that will make the model 1 to 2 feet long. One such model usually can be made for what two or three perspectives would cost. As a model makes rendered perspectives and elevations unnecessary, it really costs little if any more to present a study in model

form than by the customary perspectives and rendered drawings. Sketch models of two or more schemes, by which to compare relative merits, are of more value than one more detailed model later on.

The architect will find a model helpful to himself, in working out the design. As an illustration, take a tower with an octagon top on a square base. The writer's experience has been that invariably, although the drawings show ideal proportions, the model reveals that the top has been designed too narrow for the base. This was true even in a case where a carefully laid out perspective, taken at the 45 degree angle as a check, failed to reveal what the model showed. Where two or more architects, or architect and landscape architect, are associated on the same project, and one



Model of the Hardesty Residence, Daytona, Fla.
Martin L. Hampton, Architect; E. H. Ehmann, Associated
A. D. Taylor, Landscape Architect



Model of Garden Apartments, Cleveland

George B. Post & Sons, Architects

A. D. Taylor, Landscape Architect

contends, for example, that a certain wall should be constructed with a batter while the other maintains that it should be perpendicular, by having a model to refer to, they may readily agree as to which is the better scheme.

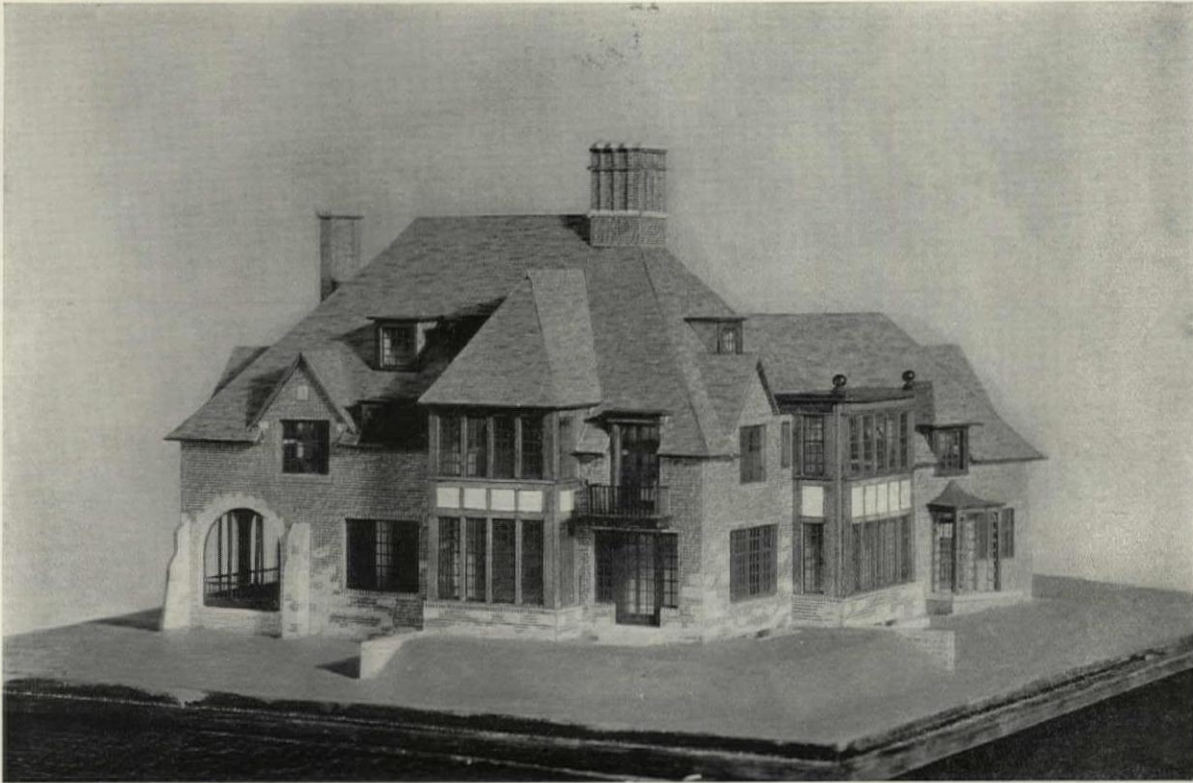
It is, however, in discussions between architect and client that the model is most helpful. It offers a real means of communication between the two. The conventional portrayal of architectural designs is artificial and often ambiguous, and sometimes even deceitful, to the lay mind. Anyone can understand a model. If the building is for an individual and of a private nature, the personal tastes of the client are important, and a sketch model helps the architect and client to understand each other; it helps the architect to discover the client's preferences and personal prejudices, and it aids the client in appreciating the architect's creations. Erroneous conceptions are avoided. A model often more than saves its cost by making unnecessary costly alterations.

If the building is more or less of a public nature, where decisions had best be left to the architect, and the architect has committees or trustees to deal with, a more detailed and carefully finished model of what the architect deems the best solution will help to convince the various members and to get action. If some member of the building committee argues for an impractical or inferior

scheme, a model readily demonstrates his error. How often, after working out a good design, the architect meets with delay and postponement! The writer knows of many instances where the architect gives the model full credit for getting the order to go ahead,—for "selling" the client.

Incidentally, in this connection, a model often serves another very valuable function in helping to arouse public interest in a project,—by being conspicuously exhibited, as, for example, in a case involving bond issues or a drive for funds. Subscribers like to see just how their money is going to be used. A few years ago in Cleveland, within a short space of time, four prominent public money-raising drives took place. Of these four, two were for hospitals and two for colleges. In each of these pairs, one got the quota on schedule and one did not; but the two that did had scale models of the proposed buildings publicly exhibited, and the two that failed had no models. While this does not necessarily prove that the models were responsible for the outcome, these facts would indicate that a model has influence. In this way alone a model may earn its cost many times over.

When an elaborate project is being contemplated and planned, only a small portion of which is to be built in the immediate future, a model helps psychologically to fix the scheme and to insure its



One-eighth Inch Scale Model of a Residence at Madison, Wis.

Law, Law & Potter, Architects

completion by keeping it in mind, making it less easy for something inferior to be substituted by a cheaper or less competent architect, or for a future administration to graft on. When it is planned to build only part of a group or building, leaving the rest to be completed at some future time, the model can be made with the future addition detachable, showing both the part to be immediately built and the finally completed project. To show two or more different designs for some particular feature, as a tower, the model can be made with interchangeable parts. Special features, such as an ornamental doorway, a cornice, or other like details, are best shown in detail on separate models, rather than by enlarging the scale of the model of the whole building sufficiently to portray them, which would result in needless duplication.

The interiors of auditoriums, churches, theaters, lobbies, and similar buildings, are effectively portrayed by models. The model should be constructed in sections, usually six, to correspond with the floor, four walls and ceiling, each section removable while leaving the other five intact, for the purpose of viewing. In this way the model can be viewed from all angles, and it affords a complete check on the seating arrangements. The interior and exterior can be shown in the same model, but it is usually more satisfactory and less expensive to make separate models. In buildings of a monumental nature, where time and

expense are not important considerations, an additional model at a larger scale, showing more detail, made in conjunction with the preparation of the working drawings and specifications, is valuable. Sometimes an exact model of the plat and topography in their original condition is helpful to the architect in developing a layout, especially for a group of buildings.

In some cases it is practical to "sketch model" the various buildings and units separately, and to move them about in various positions on the plat, in order to try out different schemes. In this way all possible combinations are easily and quickly tried out and effectively studied, and the time and labor of drawing up the various schemes are saved. In portraying group plans, it requires a great many drawings and perspectives to show even a small portion of the many interesting views and vistas. The cost of preparing a few such drawings soon equals the cost of a model that would show all from every angle, doing so definitely and without error. A group plan or landscape model should be at a scale to keep its maximum width less than 4 feet. However, a large group plan model can be made in sections or developed by installments, first modeling the buildings individually, and later adding the landscaping and connecting sections.

Photographs of models are excellent for publication purposes. If surroundings and setting are important features, these can be drawn in either di-



One-eighth Inch Scale Model of a Preliminary Study for the Euclid Avenue Baptist Church, Cleveland

Walker & Weeks, Architects

rectly on an enlarged photograph of the model or on a tracing from it with much less labor than it would take to lay out a separate perspective. Cardboard models are light in weight, and are not nearly as fragile as those made of plaster or clay. They are easily carried about and are convenient to take to committee meetings. A collection of such models, having served as preliminary studies,

would form an interesting and useful exhibit in the architect's reception room,—or they can be easily stored and filed for reference. The use of models is steadily increasing. Those architects and landscape architects who use them are enthusiastic over them, and it seems certain that the time is coming when presentation will be made largely by models.

STEEL FRAMING FOR A THEATER

BY

MILTON TUCKER

DRAWINGS BY CHARLES J. MCGINLEY

IN the designing of steel framing for theaters, the most perplexing problems are usually found in the balconies, or more precisely, in the balcony trusses. For here it is that we have to deal with heavy loads, combined with long spans and limited depths. Intersecting trusses and cantilevering often add to the difficulties and require complicated connections seldom met with in other buildings.

The Mastbaum Theater, Philadelphia's newest and largest playhouse, is no exception to this rule. In fact, in very few theaters can trusses be found with the length and load, combined with the limited height, which confronted the engineers engaged on this work. The modern theater, of course, does not permit the use of any intermediate columns under the balcony. In the Mastbaum Theater, the two main balcony trusses were required to span 131 feet, center to center of the supporting wall columns. Although main balcony truss MT2 (Fig. 1) was allowed a depth of 23 feet, main balcony truss MT1 was limited to a depth of 15 feet, and at the same time it was required to carry a load of 1200 tons. As a result, the stresses developed in the various members ran very high. In addition, the three "vomitories," or passages from the balcony to the second promenade, pass through each truss. In the case of main truss MT1, the vomitories take up the entire panel opening; this precludes the use of any diagonal members in three panels, i.e., the center panel, and the second panel from each end. This difficulty

was overcome by designing the top chords as plate girders to take the shear in the panels. These girders occur not only over the open panels, but over each adjoining panel. In the adjoining panels, part of the shear is carried by the web plates of these girders, and part by the diagonals.

Main truss MT1 was designed with double top and bottom chords and with a single-web system between the double-chord members, as can be seen in Fig. 2 which shows the uncompleted truss. The web members consist of rolled sections and cover plates, while the chord sections are a combination of angles, flange plates, and cover plates. Both top and bottom chords were double-laced throughout their entire length. All connections were designed with the rivets in double shear in order to cut down the number of rivets. All rivets used were 1 inch in diameter. Field holes were punched 15/16 inch in diameter and then reamed for 1-inch rivets after the truss was completely assembled in the shop. Of course the truss was disassembled again for transportation. The top and bottom chords were each shipped in three sections. Very little difficulty was experienced in driving the rivets in the field, due to the accurate punching in the shops of the fabricators, and the efficient field organization of the erectors. Fig. 3 shows a few of the 25,000 rivets used in this one truss (MT1); of these, 21,000 were driven in the shop and 4,000 in the field. The completed truss, of 173 tons, is shown in Figs. 3, 4 and 5, in which

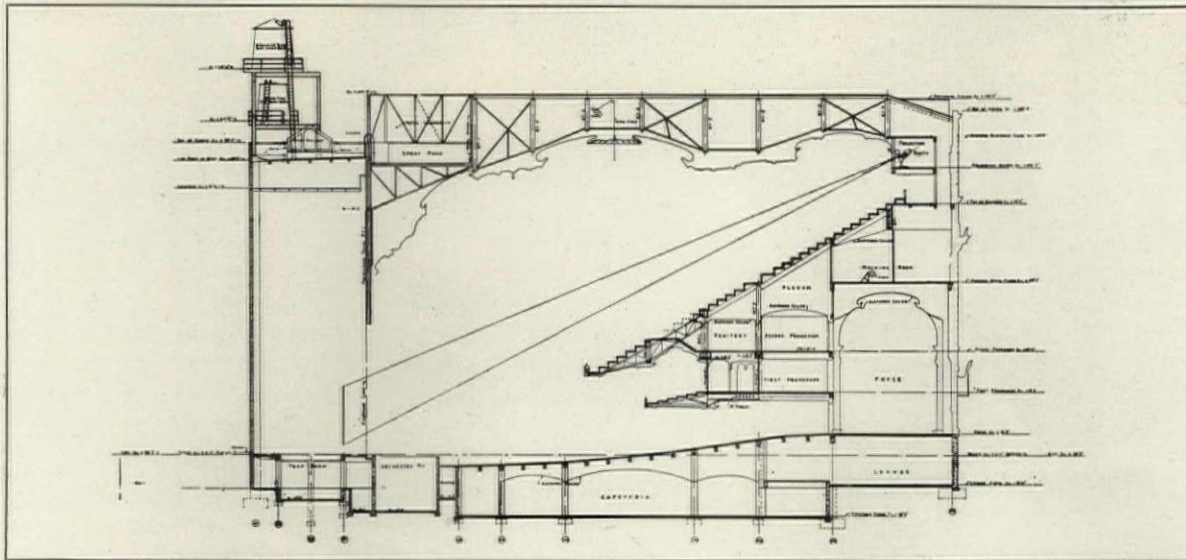


Fig. 1. Longitudinal Section, Mastbaum Theater, Philadelphia
Hoffman-Henon Company, Architects and Engineers

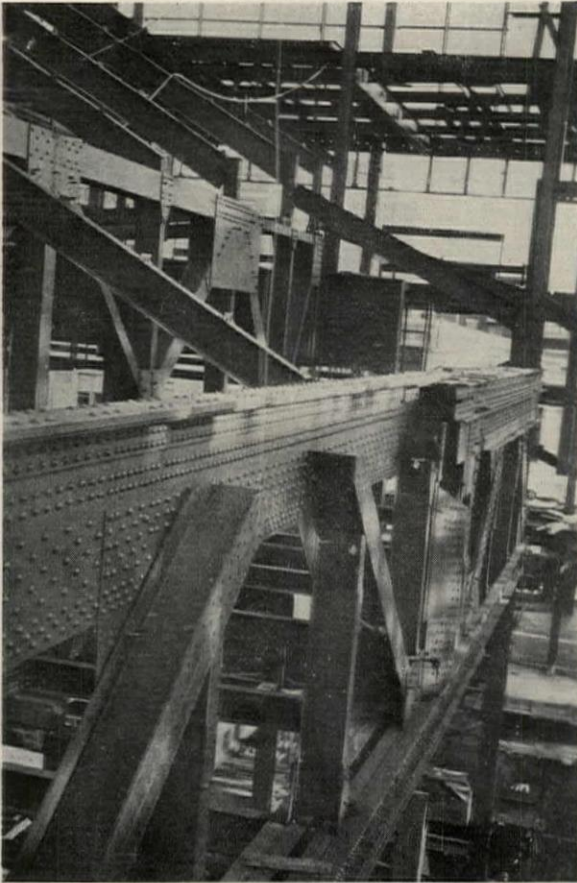


Fig. 2. Main Truss MT2, Twenty-three Feet Deep
are also shown the open panels for the vomitories.
In Figs. 6 and 7 is shown the layout of all
the balcony trusses. In Fig. 7, the truss with

the heavy top chord running to the wall column is main truss MT1. Back of it is main truss MT2, which offered very few obstacles owing to the greater depth available (23 feet); the resulting truss weighs 65 tons. Main truss MT2 is made up entirely of rolled sections and cover plates. A good idea of the comparative sizes and weights of the two main trusses can be obtained from Fig. 8. To support the front of the balcony required an additional truss, but due to the slope of the balcony, the available depth between the floor and the ceiling below becomes less and less as the front was approached. The design of MT1 presented difficulties enough, but the design of fulcrum truss FT1 offered even more. To make possible the use of a rational design it was necessary to cut down the length of truss FT1 to a practical figure. This was accomplished by introducing the diagonal girders DT1 and DT2 to cut off the corners and carry FT1. This at once simplified the designing of FT1.

The diagonal girders are supported at one end by the main balcony truss MT1 and at the other end by wall columns. Each girder weighs 30 tons. These diagonal girders were originally designed as trusses, but, due to the shallow depth obtainable and the high stresses in the web members, difficulty was experienced in developing the joints. This made necessary the plate girder design. As a matter of fact, many of the balcony trusses could have been designed as girders, i.e., with solid webs; but since the space between the balcony floor and the ceiling below is occupied by a plenum chamber in connection with the heating and venti-

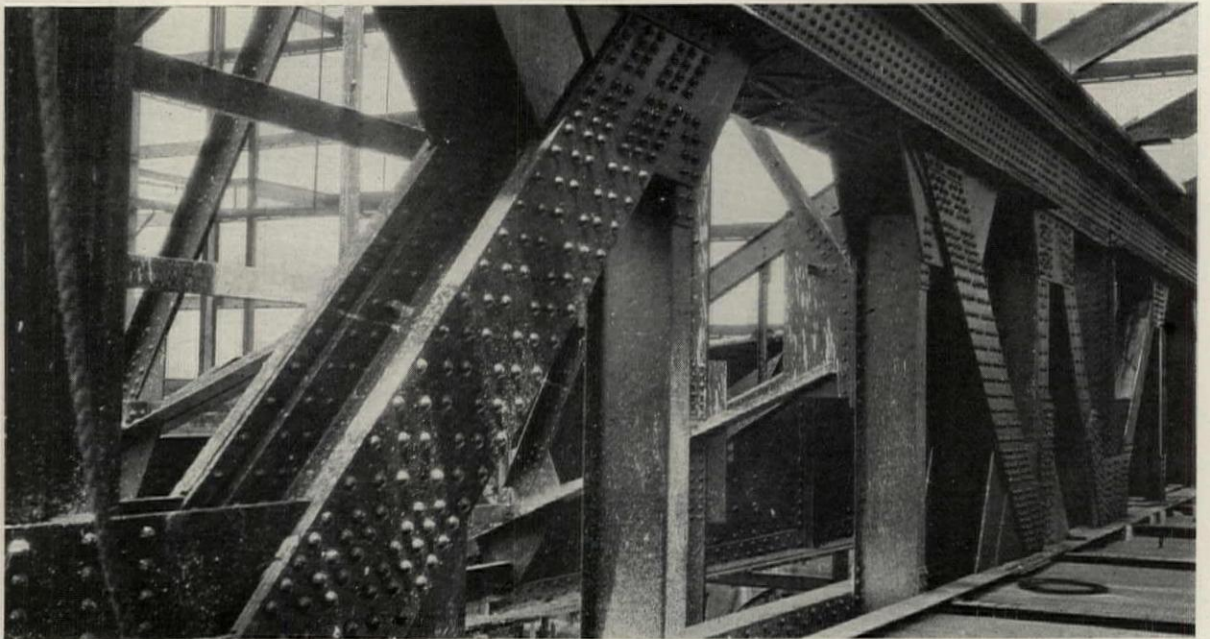


Fig. 3. Truss MT1, Fifteen Feet in Depth, Supporting 1,200 Tons

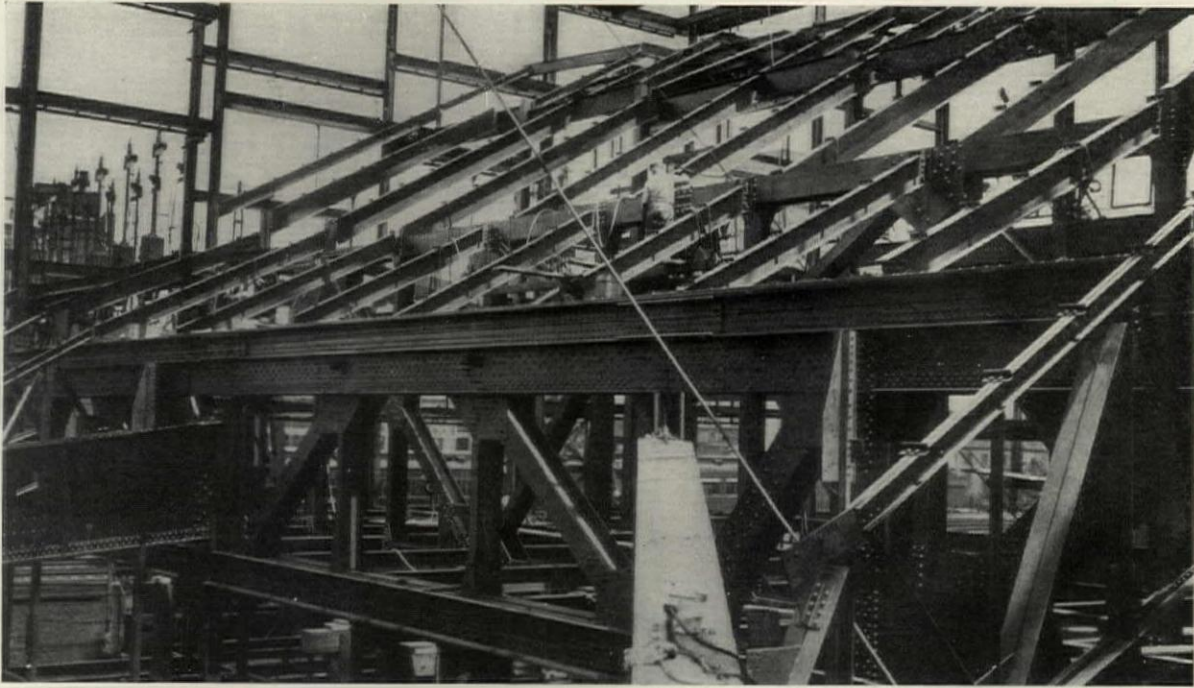


Fig. 4. Truss MT1, Showing Open Panels for "Vomitories"

lating, it was necessary to use trusses to permit the free passage of air to all portions of the plenum chamber. The fulcrum truss FT1 is 83 feet long, weighs 35 tons, and was brought to the site completely assembled. Figs. 6, 7 and 9 show the manner in which the diagonal girders carry the fulcrum truss.

The very front of the balcony is supported by ten cantilever trusses in the manner shown in Figs. 6, 7 and 9. These cantilever trusses are supported at the fulcrum point by the fulcrum truss FT1, and at the rear end they are anchored to the main balcony truss MT1. The balcony

seats rest on reinforced concrete slabs, or "steppings." From the balcony fascia back to the main truss MT1 these steppings are carried on the cantilever trusses. The portion between the two main trusses is carried on rolled steel sections framed between the trusses. In back of MT2 is a line of columns coming up from the auditorium floor to the under side of the balcony. The steppings between these columns and MT2 are carried on rolled steel sections. Figs. 1, 6 and 7 show the supports for the concrete steppings. The top of the balcony between the line of columns and the rear wall is carried on three trusses, BT1,

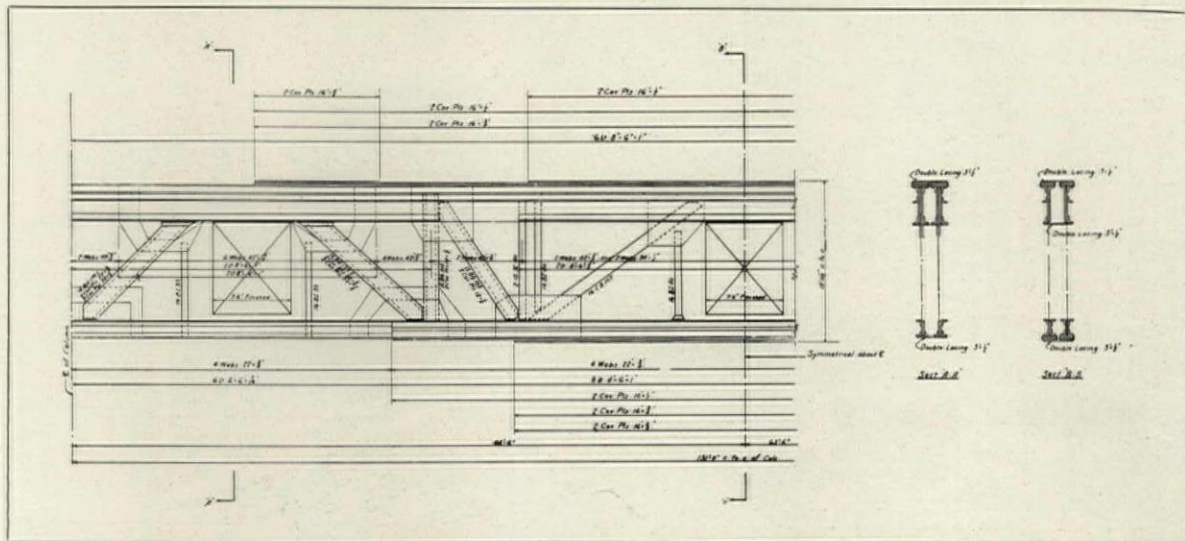


Fig. 5. Detail of Main Balcony Truss MT1

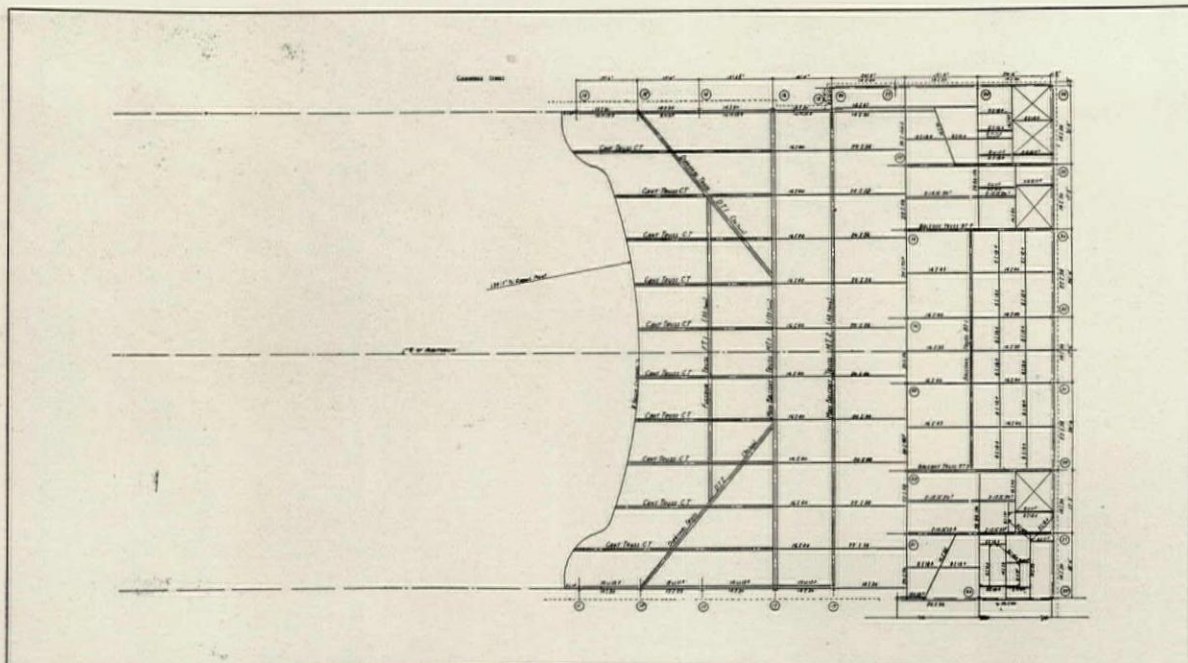


Fig. 6. Main Balcony Framing Plan, Mastbaum Theater, Philadelphia

2 and 3, and on rolled sections, as shown in Figs. 1 and 10.

As can be seen in Fig. 1, the lower or loggia balcony is slung under the upper balcony. The loggia balcony steppings are supported on cantilever trusses similar to the cantilever trusses in the upper balcony. These trusses are supported at the fulcrum point by hangers up to the main balcony truss MT1, each hanger consisting of two 6 x 4 x 1/2-inch angles. This accounts for some of the 1200-ton load figured for MT1. These hangers are concealed in imitation stone columns forming an ornamental arched colonnade. The

rear ends of these cantilever trusses are anchored by struts up to the main balcony truss MT2. The rears of these cantilever trusses were made up as girders with solid webs on account of the shallow depth. However, in order to pass fresh air ducts from one side of the balcony to the other, it was necessary to burn six 10-inch diameter holes in the web of each girder. These cantilever trusses, with the holes in the webs, can be seen in Fig 7, if carefully observed.

The main roof slab is a poured-in-place gypsum slab, 3 1/2 inches thick, of the suspension type. The slabs are carried on channel iron purlins which

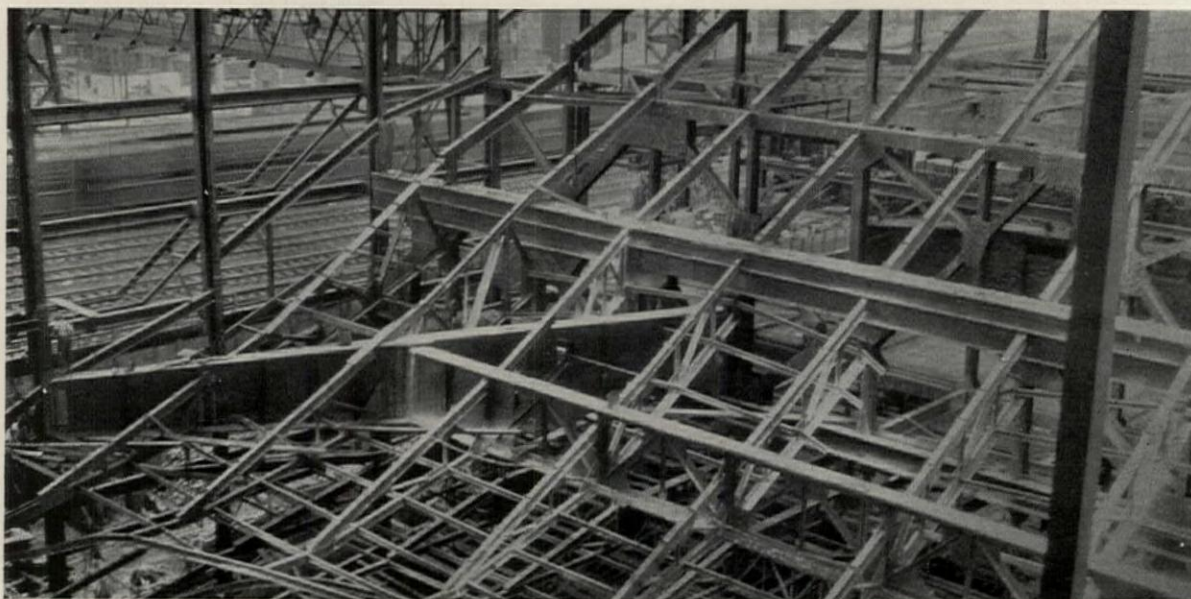


Fig. 7. Several of the Ten Cantilever Trusses Supporting the Front of the Balcony

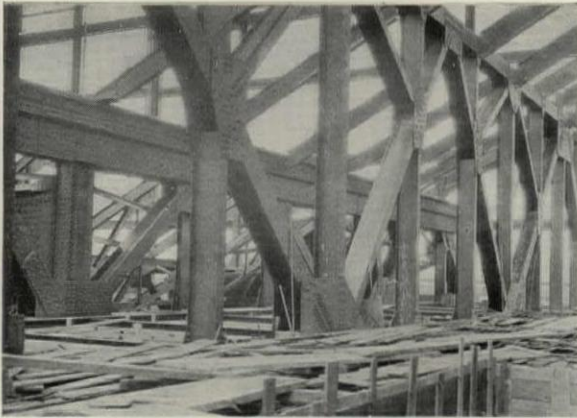


Fig. 8. Comparative Sizes, Trusses MT2 and MT1

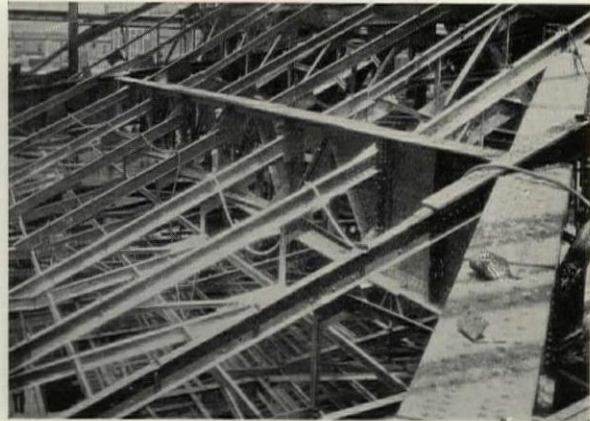


Fig. 9. Cantilever Trusses to Support Front Balcony

are supported by the roof trusses. The latter are of the Warren and Baltimore types, and vary in weight due to the varying loads carried. See Figs. 1 and 10. From the truss at the rear is hung one side of the projection booth and broadcasting room, with floor area of 138 feet by 21 feet, figured for a dead and live load of 225 pounds per square foot. The other side of the projection booth is supported on wall columns. This roof truss is 139 feet long, 13 feet deep, and weighs about 30 tons. The top of the truss is 113 feet above the auditorium floor. This truss was hoisted in two sections and shored up from the balcony as shown in Fig. 11. The other seven roof trusses

were hoisted from the auditorium floor, fully assembled. The trusses over the domed ceiling carry the main chandelier. The latter was figured at 2 tons, but this is only a "drop in the bucket" as compared with the total loads on the roof trusses. Roof truss RT1 (over the orchestra pit) carries the spray pond for the cooling system, 35 feet by 106 feet in area. The main ceiling and the walkways over the ceiling, which provide access to the cove lighting and to the chandelier winches, are all hung from the roof trusses and the purlins. All the trusses are adequately braced at the top and bottom chords. In addition, there are three rows of cross frames for further strengthening.

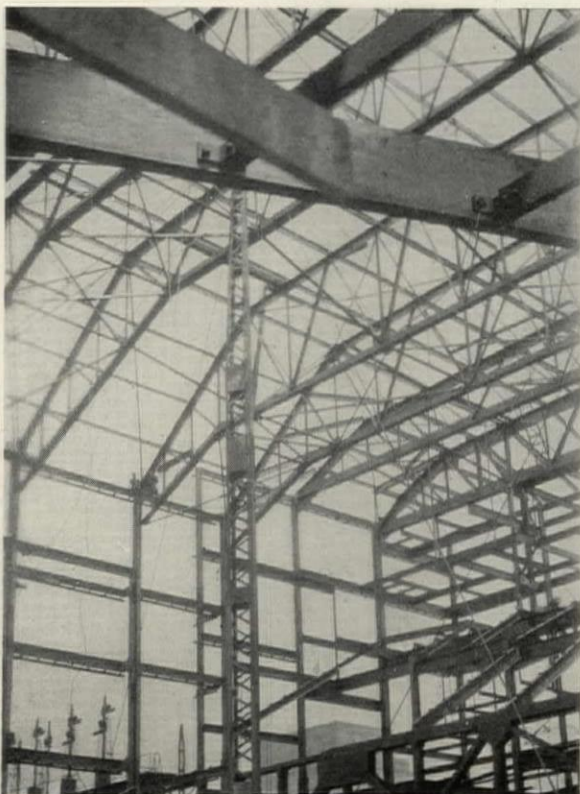


Fig. 10. View of Roof Trusses

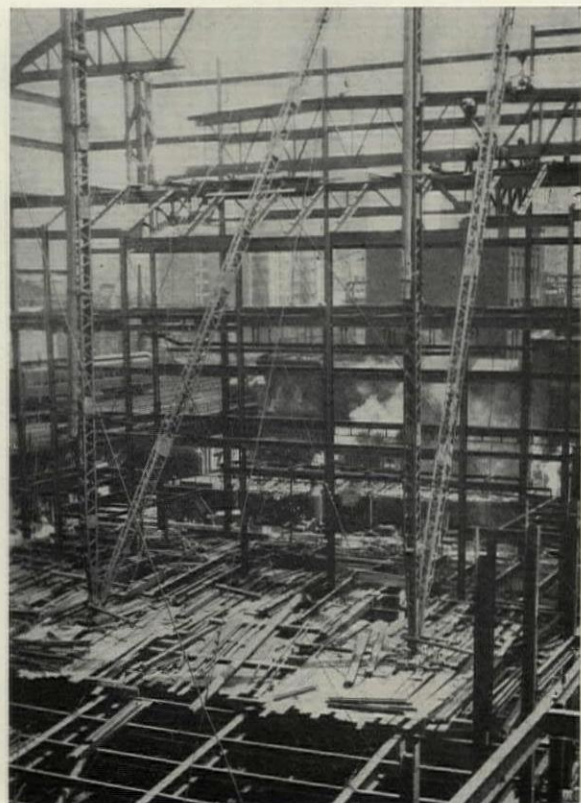


Fig. 11. Truss Being Placed

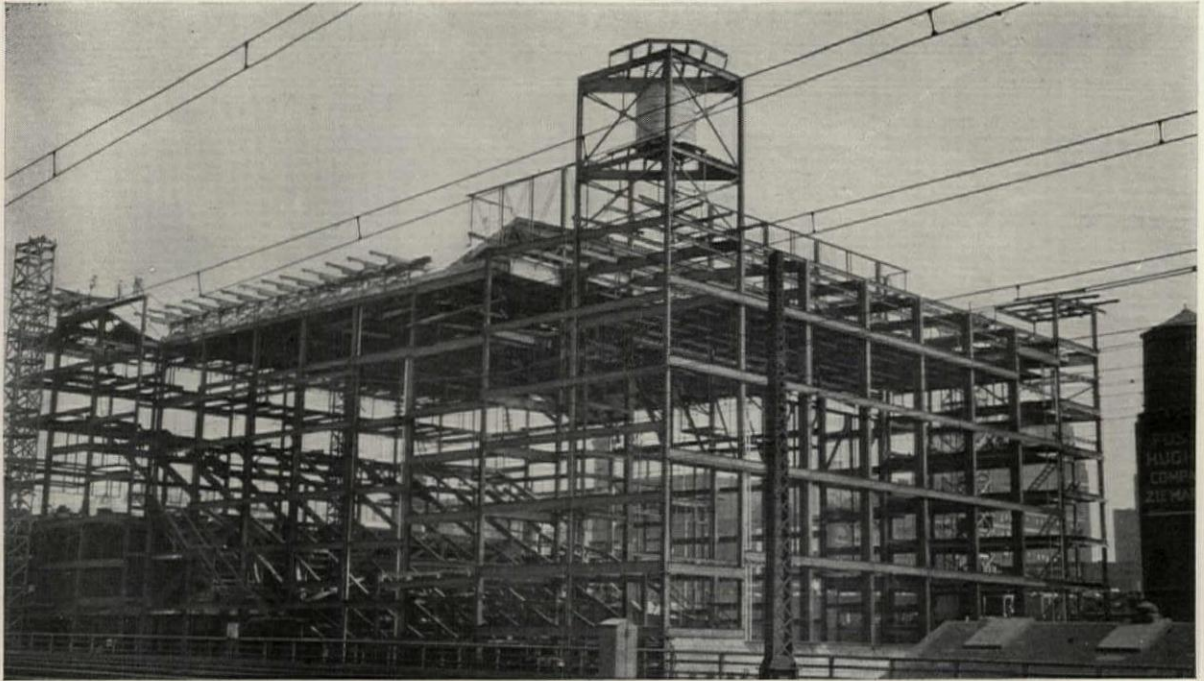


Fig. 12. General View of the Framing of the Mastbaum Theater, Philadelphia
Hoffman-Henon Company, Architects and Engineers

The proscenium wall over the proscenium arch, or stage opening, is carried on a truss made of angles. Due to the practically unlimited depth available, this truss is comparatively light, weighing only 30 tons. The width of the proscenium opening is 75 feet. In the back stage wall the columns are unsupported for a height of nearly 90 feet, due to the necessity of having a clear, open space to handle scenery. To take care of this condition and to keep the unsupported lengths of columns within the allowable stresses, as prescribed by the Philadelphia building code, these columns were made of 24-inch I-beams. In the other direction, the columns are tied into the spandrels, which occur at 14-foot intervals, by $\frac{3}{8}$ -inch plates. The masonry of the rear stage wall is 13 inches of brick, as required for a fire wall. Other walls above grade consist of 4 inches of brick and 8 inches of hollow tile. Walls below grade are reinforced concrete and are chiefly retaining walls.

The foundations are of reinforced concrete, of the spread type. Due to the head of water on the floor of the sub-basement, 28 feet below the sidewalk, a 12-inch thick hydrostatic slab was required. This, of course, was designed as an

inverted floor slab. In general, the theater frame is of reinforced concrete and steel. The completed steel framework, totaling about 1800 tons, is shown in Fig. 12. Here the house tank is seen in position, and, over it, the platform for the sprinkler tank. In back of the tank appears the light framework for the spray pond louvers. Directly beneath this can be seen the proscenium truss over the stage opening. At the extreme right is the framing for the pent house for the dressing room elevator machinery. The dressing room section is literally an eight-story building, isolated from the rest of the theater by fire walls and automatic fire doors. Two elevators serving the balconies will be located in the far left corner near the temporary service elevator shown. In Fig. 12, the balcony steel can be seen, as well as the 24-inch columns in the rear stage wall. The steel pole in the foreground supports the wires of the Pennsylvania Railroad.

When finished, the theater will seat 4709, of which number 2387 seats are on the main floor, 433 in the loggia balcony, and 1889 in the main balcony. The structural designing was done under the supervision of John E. Williams, the engineer of the Hoffman-Henon Company, Philadelphia.

PROVIDING FOR RADIO AND AMPLIFYING INSTALLATIONS IN LARGE BUILDINGS

BY

KARR PARKER
CONSULTING ENGINEER

THE tremendous growth of radio broadcasting during the past few years and the almost universal public demand for this service have brought a new problem to architects. What provision should be made in the construction of clubs, hotels, hospitals, apartment houses, schools, auditoriums, etc., for radio installations? Closely allied to the radio installation is the voice-amplifying or "public address" installation. Auditoriums and hotel dining rooms have been increased in size until the voice of a speaker cannot be heard distinctly throughout the rooms and must be amplified by means of microphones and suitable reproducers. If proper provision is not made for conduit and wiring when the building is built, it is difficult to make a satisfactory installation later and to get the microphone and reproducer outlets in the correct locations. Furthermore, it is expensive and unsatisfactory to channel finished surfaces for conduits and to patch and refinish walls and floors. Large public buildings should have provision made for radio and voice-amplifying systems, and the conduits and outlet boxes, etc., should be built in with the building.

Certain general rules will apply to a central radio installation for a large apartment building, club, hotel or hospital. In this type of installation one or more programs are received in the radio

control room and supplied to the guests or tenants over a wiring system. Usually the equipment operates from noon until midnight, and the guest can switch his loud speaker or head set off and on or select his program as desired. There is no receiving or amplifying apparatus in the guest room, and therefore no skill or attention on his part is required. The programs being received on a high class equipment by a skilled operator in the control room can be transmitted to 2,000 rooms and give radio reception that is far superior to that which the average user would get from his own radio set. In large, high buildings it is practically impossible to get satisfactory radio reception by individual sets in the rooms, due to the absorption of the ether waves by the steel frames of the buildings. There is an increasing tendency for the landlord to supply radio service to his guests by a central system in the same way that heat and light are supplied.

The design of a central radio system starts with the location of the radio control room. This should be on the roof or top floor of the structure unless there is also a broadcasting station on the building. In the latter case, it should be located as far from the antenna of the station as possible, but not lower than the third story of the building. If public address equipment is also to

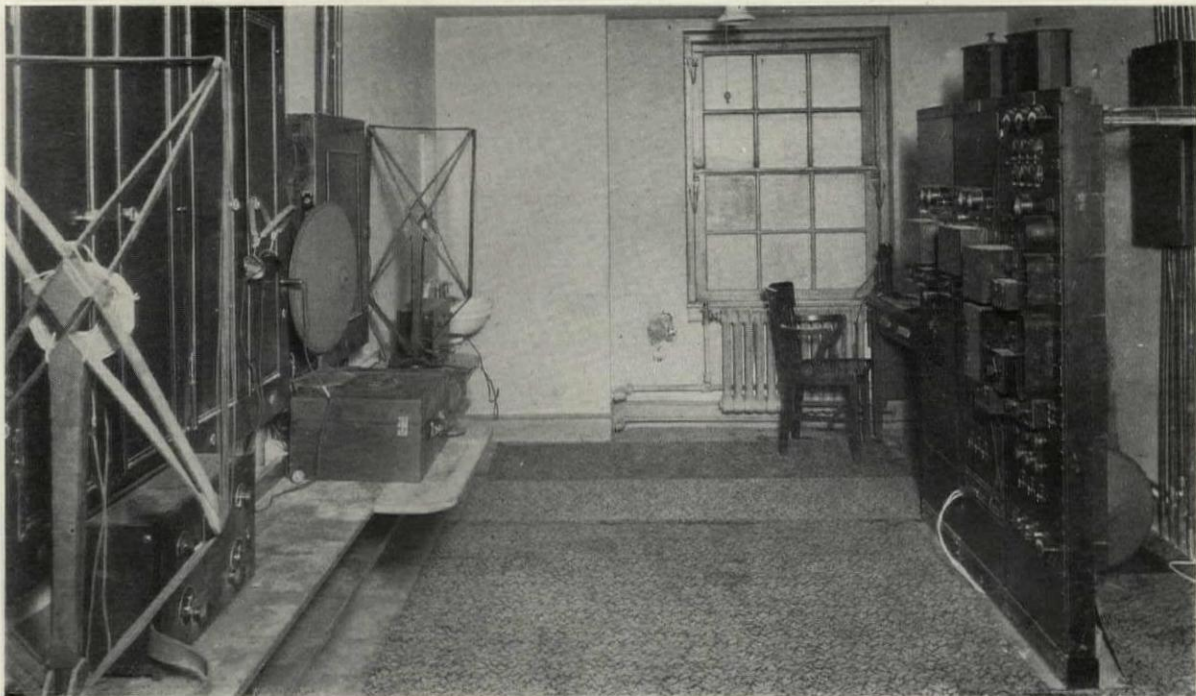


Fig. 1. Radio Control Room for a Large Installation



Fig. 2. A Lever Type Selector

be used, the room should be approximately 15 by 20 feet in size; if radio equipment only, it may be reduced in size to 10 by 10 feet. It is advisable to provide sufficient room for the equipment and operator. Figs. 1 and 5 show well arranged radio control rooms for a large radio and public address system. The architect should consult with the owner and determine whether the system shall carry one program only or shall distribute two or more programs. A pair of wires are required to every outlet in the building for each channel,—i.e., a three-channel service would require six wires to each outlet. The cost of instal-

lation increases greatly with additional channels, and also it is much more difficult to install the wiring for multiple systems because of inductive interference between the circuits which causes "cross talk" and a poor quality of reception.

The next thing to be determined is whether loud speakers or head sets or a combination of the two are to be used in the various rooms throughout the building. If it is a hospital, head sets located at the heads of the patients' beds are recommended because of the necessity for quiet. In an expensive apartment building, however, loud speakers with proper volume control will probably be desired. However, caution must be exercised in installing loud speakers in a large hotel or apartment building, especially around inside courts, as the collective noise of a large number operating at one time is objectionable. A study of each particular case and its acoustics should be made to avoid such a difficulty. A good general rule is to use loud speakers on large outside rooms and suites and to install head sets in the smaller inside rooms. Fig. 6 shows a radio head set installation suitable for hospitals or hotels.

From the terminal cabinet in the radio control room a complete conduit system must be run to the various outlets. Not more than 50 head sets or 15 loud speakers should be placed on one branch circuit, and the wiring for head sets and loud speakers must be run in separate conduits, as the current level is different for the two. These branch circuits should terminate on individual switches in the control room cabinet so that in case of trouble on any branch it can be quickly cut off and repaired without shutting down the entire system. The conduits are run in the concrete slabs, ending in steel outlet boxes in a manner similar to that of the lighting instal-

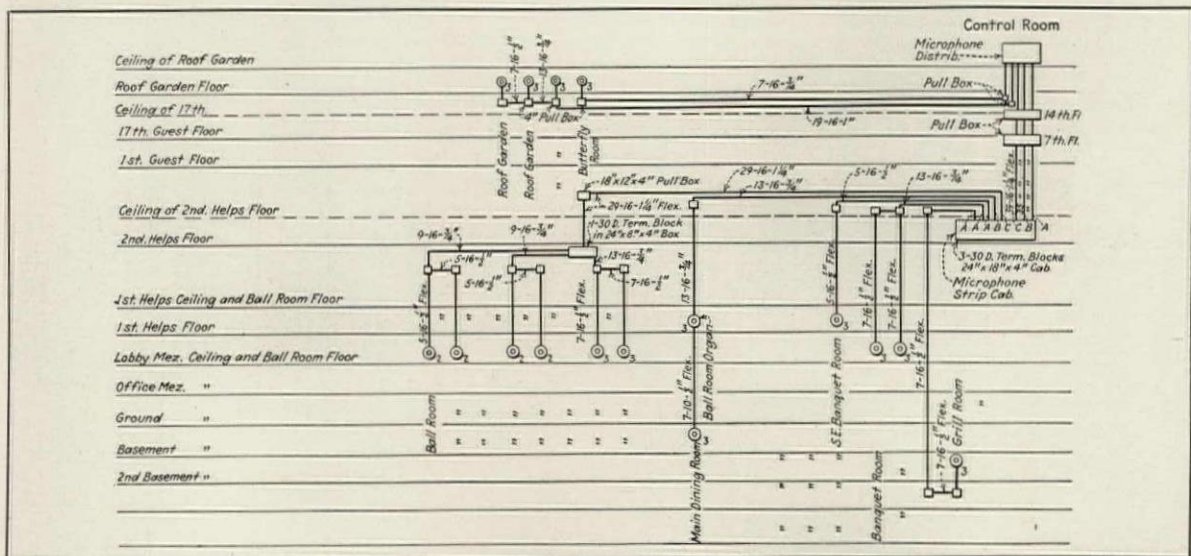


Fig. 3. Diagram of the Radio Wiring for a Large Hotel

lation. The wiring should be lead-sheathed in the control room; the entire system should be lead-sheathed, and each individual pair twisted on itself to minimize inductive interference if there is more than one channel. Special attention should be paid to the insulation of the cables. At the loud speaker outlets a plug-in receptacle (single or multiple type) with a small volume control dial may be provided with plate finished to match the hardware of the room. The guest selects different channels by simply plugging into the different holes in the receptacle. Special radio program selectors have been devised which may be built into the loud speakers or arranged for controlling head sets. Fig. 2 illustrates a lever type selector.

The receiving apparatus should be selective and made to "tune" sharply and should be of the heterodyne or radio frequency type with amplifiers of adequate capacity. The selection of the radio receiving apparatus, amplifiers and control room equipment calls for the technical advice of a radio engineer, and each installation should be worked out by a competent engineer. The head sets and loud speakers should be of the proper electrical characteristics to operate on the equipment selected. The arrangement of antenna and control room apparatus should be carefully planned in order to secure satisfactory operation. It is recommended that a magnetic reproducer be installed with a supply of phonograph records so that music can be supplied at all times independently of the radio reception.

The radio system may be combined with a voice-amplifying installation so that radio music, addresses and programs may be amplified and heard throughout large dining rooms, auditoriums and school rooms. Such an arrangement also permits of transmitting the voice of a speaker in

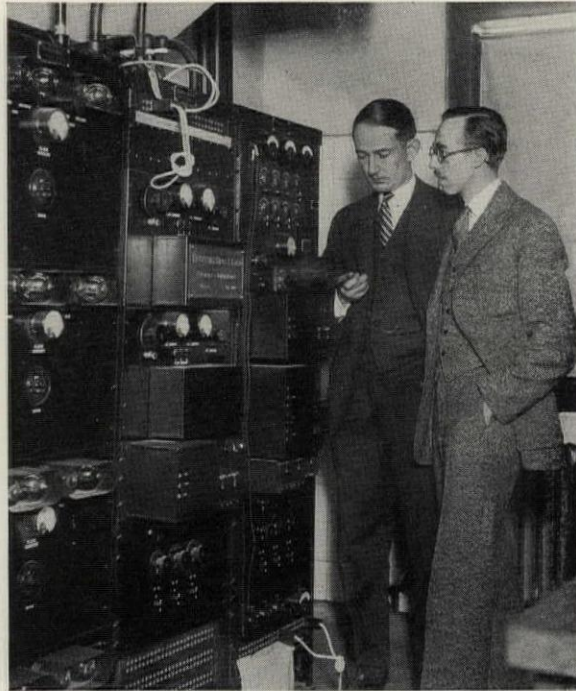


Fig. 4. A Panel Board of a Large Installation

the building over the central radio system simultaneously with the amplification of his voice in the auditorium. In a hotel, for example, an address by the President of the United States could be brought in over the radio from a distant city and amplified so that it could be heard at a banquet in the dining room at the time that it was transmitted throughout the hotel over the central radio system. Speeches at conventions and functions held in the hotel could be transmitted throughout the house so that guests in the rooms could listen to the speakers and to the orchestras playing in the hotel. This is also used in schools.

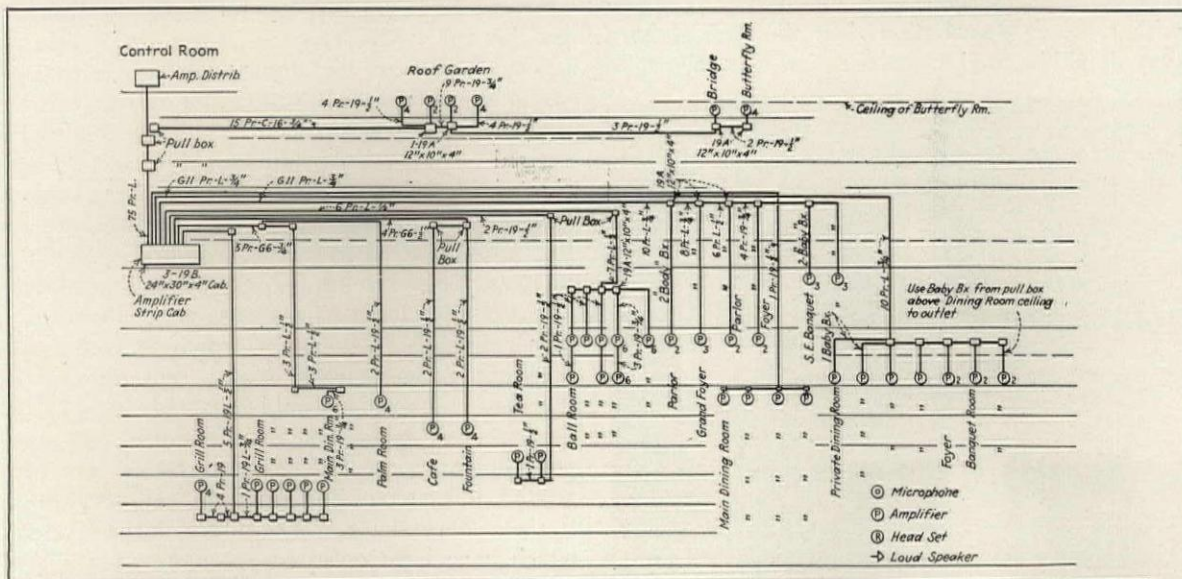


Fig. 3a. Continuation of Radio Wiring Diagram

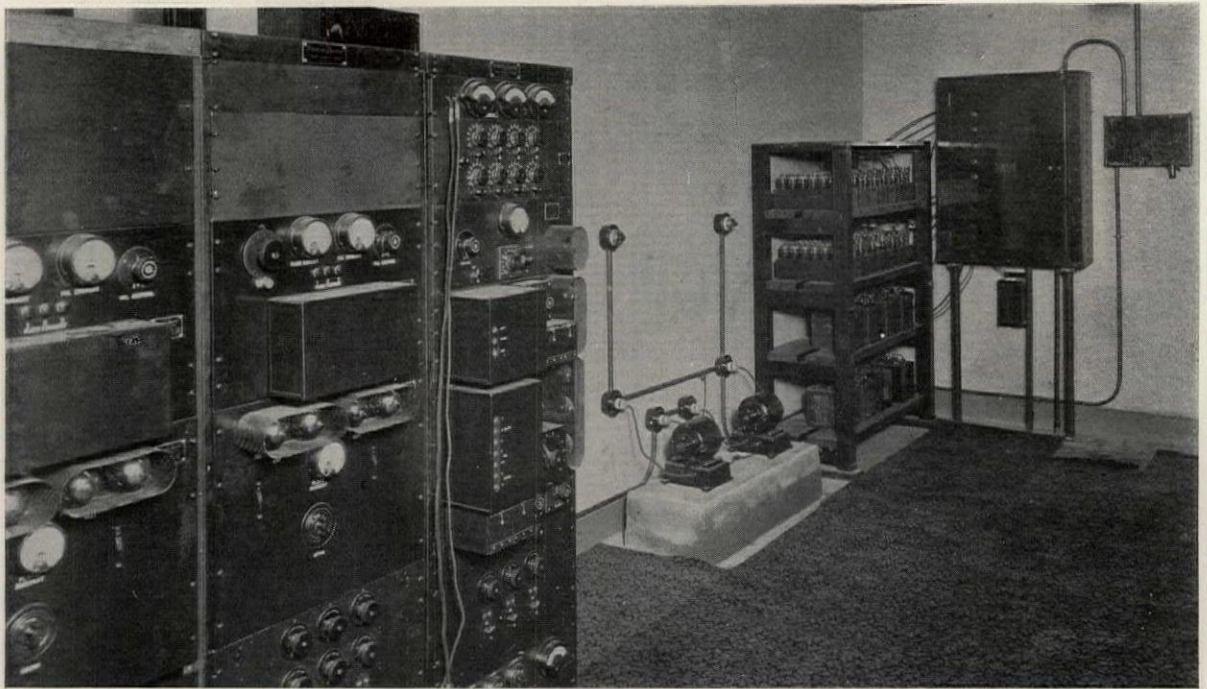


Fig. 5. Portion of a Radio Control Room Showing Panel Board

In designing the voice-amplifying system, microphone outlets should be provided in the dining rooms and auditoriums near the speakers' tables. For large rooms the horn type reproducer suspended above and in front of the table or stage should be used, grouping several horns if necessary so that the volume distribution is adequate. These reproducers should not be placed back of the microphone, or a "feed back" will result, with unsatisfactory operation. A large public address system control switchboard is shown in Fig. 4, and the wiring diagram of a large system is illustrated in Figs. 3 and 3a. In smaller rooms a cone type loud speaker or a horn type reproducer with a wider distribution than the conical horn type should be used. Conduit and wiring are run to

the reproducer locations and terminated in receptacles into which the horns may be plugged.

In the radio control room a monitor speaker enables the operator to hear the speaker, and he can regulate the volume of amplification by means of his rheostats on the switchboard. The systems operate on 60-cycle, alternating current; if direct current only is available, small rotary converters must be installed to provide the alternating current. The cost of current for operating this equipment is negligible. At a rate of 2 cents per kilowatt hour, a large central radio system combined with a voice-amplifying installation can be operated 12 hours per day for a cost of 15 cents per day for electricity.

The general considerations applying to an installation as outlined here will aid an architect in determining the type of a central radio system that is desired for a particular building. The electrical design of the wiring system, selection of the apparatus and preparation of plans and specifications for the installation require the technical skill of a radio engineer who must work out each installation in order to get the proper results. Obviously, a poorly planned installation which is continually breaking down, giving faulty reproduction of speeches and music, would be a liability. If the system is properly designed, installed and operated, however, the maintenance cost is very low, repairs and current cost nominal, and service extremely dependable. There are large systems which have been operated for more than a year with efficient and practically uninterrupted service.



Fig. 6. A Room Head Set in Use

WILL ARCHITECTS BE BUSY IN 1929?

BY
C. STANLEY TAYLOR

EIGHTH ANNUAL BUILDING SURVEY AND FORECAST

THE prediction of THE ARCHITECTURAL FORUM, based on its annual survey and forecast which has just been completed, is that architects will be as busy, if not busier, in 1929 than in any preceding year. If any belief still persists that the record building activity in 1926 and 1927 represented a "boom period," it must be dispelled by the fact that the year 1928 shows a record of even a greater amount of construction than ever.

The theory was advanced by THE ARCHITECTURAL FORUM in January, 1928 that we had been experiencing a boom period in building activity, but that we had arrived at a relatively stable demand of new construction to meet the present-day needs of our growing population and expanded industrial and commercial life. In other words, the theory was advanced that we had practically arrived at a new normal annual volume of new building construction, from which deviations might occur only in direct accordance with the variations in general prosperity and business activity. The building figures of the year 1928, as shown in the accompanying charts, and in the totals produced

by the various contract-reporting agencies, verify this theoretical conception. The reports of S. W. Straus & Company, covering permits issued and plans filed in 587 leading cities and towns throughout the country during the first eleven months of 1928, give a total value of \$3,548,668,073, which is within approximately one million dollars of the total for the corresponding period of 1927. For the same period of eleven months, the F. W. Dodge Corporation reports building contracts in 37 states amounting to \$6,195,529,800, which is slightly more than 6 per cent greater than the amount reported for the corresponding period of 1927 and that of the record-breaking year of 1926.

An additional and convincing proof of the theory of a new normal condition is presented in the accompanying forecast of THE ARCHITECTURAL FORUM for the year 1929. Architects throughout the country are familiar with the annual forecast which THE ARCHITECTURAL FORUM has presented for eight consecutive years, during which time it has arrived at a reasonably close approximation of the building activity which actu-

1929 PREDICTION BY DISTRICTS IN 19 BUILDING CLASSIFICATIONS

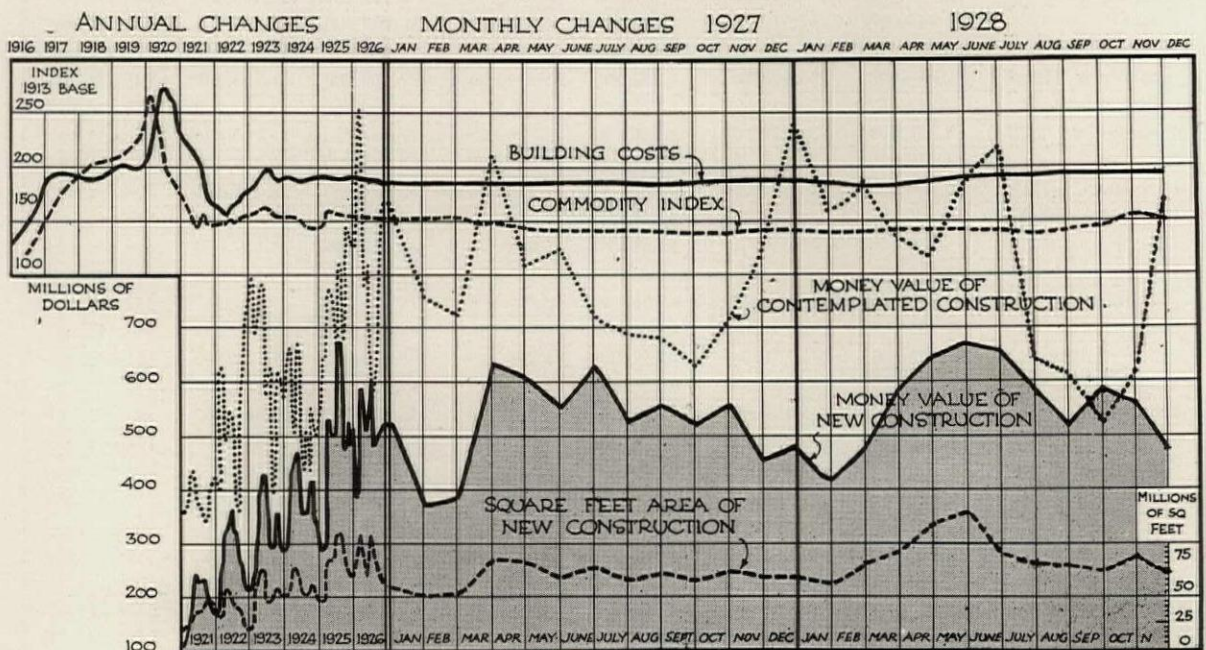
BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U. S. A.
Automotive	\$14,469,400	\$42,132,200	\$7,447,000	\$10,670,000	\$56,322,200	\$14,539,800	\$145,580,600
Banks	15,730,000	53,312,600	1,148,400	5,984,000	56,999,800	12,859,000	146,033,800
Apartments	16,801,400	366,163,600	10,469,800	20,882,400	171,941,000	84,992,600	671,250,800
Apartment Hotels	2,640,000	83,560,400	4,972,000	15,554,000	97,979,200	41,925,400	246,631,000
Club, Fraternal, etc.	7,231,400	70,010,600	1,515,800	13,191,200	66,704,000	15,987,400	174,640,400
Community and Memorial	3,421,000	21,232,200	1,529,000	5,711,200	17,047,800	11,710,600	60,651,800
Churches	21,142,000	55,105,600	22,770,000	23,859,000	69,885,200	20,409,400	213,171,200
Dwellings (Below \$20,000)	10,936,200	83,540,600	6,791,400	11,215,600	40,198,400	24,314,400	176,996,600
Dwellings (\$20,000 to \$50,000)	10,346,600	38,445,000	5,935,600	7,629,600	37,470,400	15,085,400	114,912,600
Dwellings (Over \$50,000)	6,749,600	43,443,400	5,555,000	5,662,800	25,348,400	12,837,000	99,596,200
Hotels	21,659,000	95,763,800	14,212,000	45,513,600	101,378,200	66,149,600	344,676,200
Hospitals	18,860,600	110,105,600	4,606,800	12,749,000	73,035,600	33,169,400	252,527,000
Industrial	20,295,000	130,191,600	15,661,800	35,846,800	154,671,000	28,789,200	385,455,400
Office Buildings	12,485,000	244,101,000	4,859,800	41,296,200	300,979,800	87,760,200	691,482,000
Public Buildings	15,518,800	185,924,200	6,226,000	18,499,800	87,353,200	27,689,200	341,211,200
Schools	44,811,800	165,499,400	13,010,800	60,152,400	256,326,400	57,981,000	597,781,800
Stores	6,366,800	78,876,600	4,477,000	7,926,600	55,497,200	23,324,400	176,468,600
Theaters (All Types)	6,303,000	62,891,400	3,746,600	7,812,200	74,032,200	8,773,600	163,559,000
Welfare Y. M. C. A., etc.	10,799,800	48,100,800	5,077,600	13,666,400	31,858,200	4,644,200	114,147,000
TOTAL VALUE OF							
NEW BUILDINGS	\$266,567,400	\$1,978,400,600	\$140,012,400	\$363,822,800	\$1,775,028,200	\$592,941,800	\$5,116,773,200
New Construction Under Architect's Supervision.....							\$5,116,773,200
Buildings of All Types—Excluding Public Works and Utilities—Not Designed by Architects.....							2,192,020,000
(Estimated from Averages of Previous Years)							
TOTAL ESTIMATED CONSTRUCTION FOR 1929.....							\$7,308,793,200
(Exclusive of Public Works and Utilities)							

ally occurred. The forecast is based on individual reports received from architects in every part of the country, and the figures are developed by the use of a series of weighting factors which have been established after very careful research and which have proved to be substantially correct, insofar as anyone can forecast trends of the future. The present forecast for the year 1929 is based primarily upon reports received from 2,057 architectural offices, indicating work actually on the boards or in definite contemplation for contract letting during this year. The figures have been correlated and established in exactly the same manner which has proved successful for the seven preceding years, and for this reason it is felt that the law of average functions in these figures to a point which, unless some extraordinary occurrence takes place, will show that the figures given here for the year 1929 will be closely approximated in actuality. We predict, therefore, that building activity during the year 1929 will be maintained on approximately the same general level which has been established during the last three years, with a definite possibility of the total's exceeding any previous year's. There are definite changes in the relative activity in different types of buildings and there are changes in territorial activity, all of which are indicated in the accompanying tables and relative percentages.

In considering probable building activity it is, of course, necessary to give serious consideration to the general economic condition of the country. It is believed that we are entering a period of at least eight years of unprecedented prosperity.

There are no threatening factors. There is no condition of over-expansion. There is a new administration in governmental affairs, which promises an even greater appreciation and understanding of the economic problems of the building industry than was ever before accorded. There has been established in the financial world a more direct relationship with the public, and consequently the sources from which money must be obtained for building projects are more powerful and more diversified than ever before. These coming years of prosperity will see another great development in the standards of housing for all types of commercial, industrial and domestic activity. Threads of transportation are drawing cities, suburbs and rural areas more closely together. There is a broader interchange of knowledge, and there is every reason to believe that higher standards and more rigid requirements will call for a volume of building which will maintain a new normal.

We are learning more about building activity in this country. The means for gathering figures are constantly being improved, and as a result, we are gradually realizing that our measuring of building activity has been inadequate in the past, and that in actuality we are building well over eight billion dollars' worth of new structures annually, to which may be added repair and replacement bills to bring the total closer to ten billion dollars, making the building industry by far the greatest of the basic industries of this country. This is the day of the architect in a manner never before known. He is constantly becoming more important in the economic structure, because he is



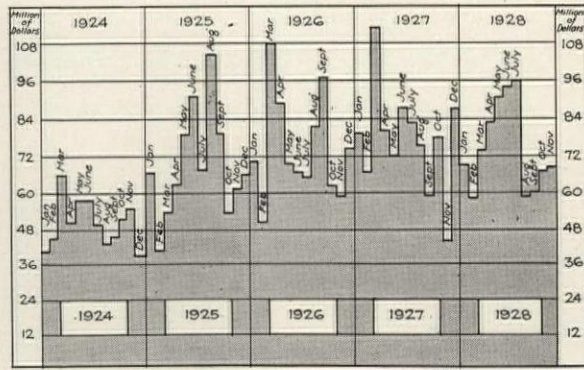
THE BUILDING SITUATION

The various index lines are designated on the chart, which is developed from reports of the United States Department of Commerce, the F. W. Dodge Corporation, and *The Engineering News-Record*

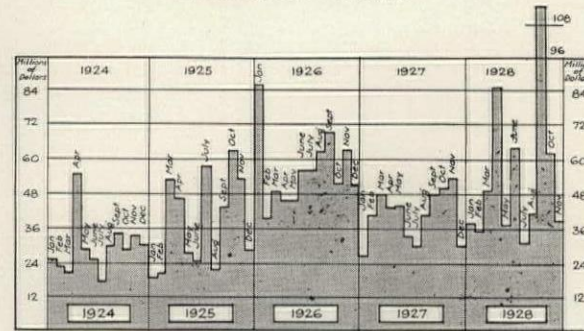
accepting the responsibilities of planning efficiently and of creating structures which are economically sound and successful as investment projects, as well as interpreting æsthetic features. The application of architectural precedents, as indicated by the work of contemporary American designers, comes closer to original conception than in any period known since these very precedents were established. Architects may, therefore, look forward with confidence to a busy year, a year which should be prosperous perhaps in a manner never known before by the architectural profession.

NATIONAL PERCENTAGES, U. S. A.

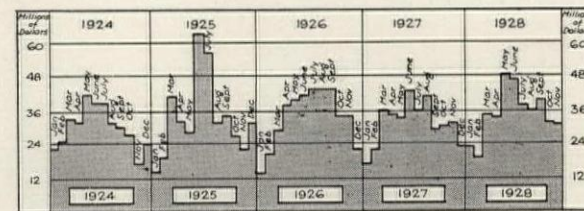
Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change
Automotive	3.9	2.8	-1.1
Banks	2.8	2.9	+ .1
Apartments	13.2	13.1	- .1
Apartment Hotels	4.4	4.8	+ .4
Clubs, Fraternal, etc.....	3.5	3.4	- .1
Community, Memorial	1.5	1.2	- .3
Churches	4.3	4.2	- .1
Dwellings (under \$20,000)....	4.0	3.6	- .4
Dwellings (\$20,000 to \$50,000)	3.3	2.3	-1.0
Dwellings (over \$50,000)....	2.4	1.9	- .5
Hotels	6.9	6.7	- .2
Hospitals	6.2	4.9	-1.3
Industrial	5.3	7.5	+2.2
Office Buildings	11.8	13.5	+1.7
Public Buildings.....	6.7	6.7	—
Schools	11.5	11.7	+ .2
Stores	2.9	3.4	+ .5
Theaters	3.3	3.2	- .1
Welfare, Y.M.C.A., etc.....	2.1	2.2	+ .1



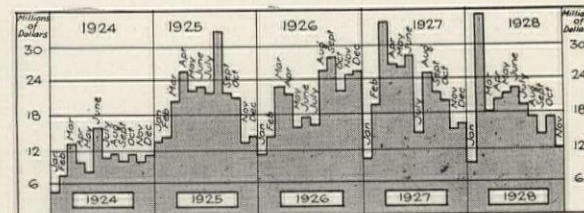
Commercial Buildings



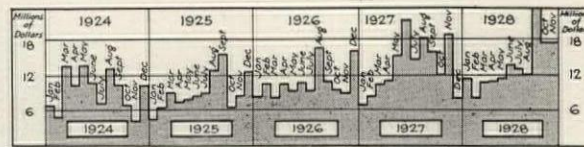
Industrial Buildings



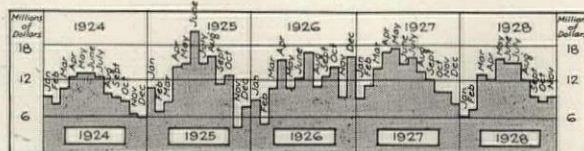
School and College Buildings



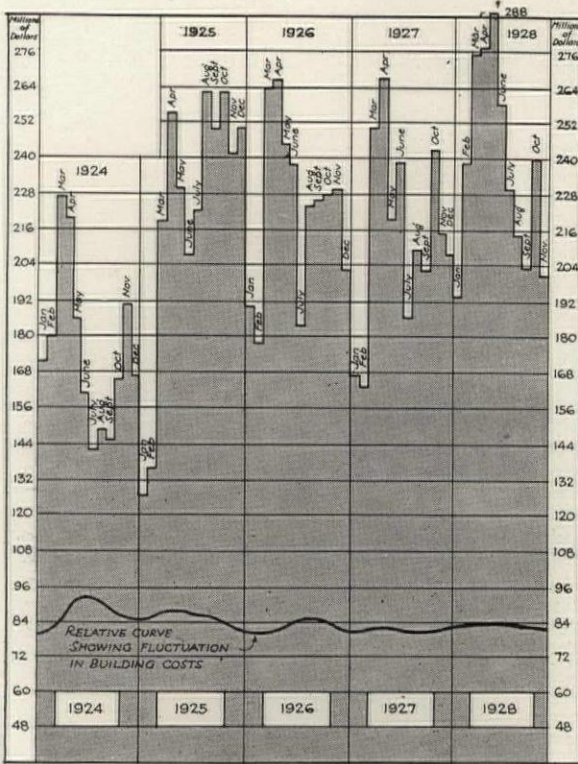
Club and Fraternal Buildings



Hospitals and Institutions



Church Buildings



Residential Buildings

CHARTS SHOWING VALUE OF NEW CONSTRUCTION FOR PAST FIVE YEARS

NORTH ATLANTIC STATES				SOUTHWESTERN STATES			
Type of Building	Requirements for New Buildings by Percentages			Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change		1928	1929	Change
Automotive	3.9	2.1	-1.8	Automotive	4.8	2.9	-1.9
Banks	4.2	2.7	-1.5	Banks	2.8	1.6	-1.2
Apartments	20.0	18.5	-1.5	Apartments	6.2	5.7	-.5
Apartment Hotels	.2	1.0	+.8	Apartment Hotels	3.6	4.3	+.7
Clubs, Fraternal, etc.	2.6	3.5	+.9	Clubs, Fraternal, etc.	4.1	3.6	-.5
Community, Memorial	.8	1.1	+.3	Community, Memorial	1.5	1.6	+.1
Churches	2.9	2.8	-.1	Churches	5.8	6.6	+.8
Dwelling (under \$20,000)	4.4	4.2	-.2	Dwellings (under \$20,000)	4.5	3.1	-1.4
Dwellings (\$20,000 to \$50,000)	4.0	2.0	+2.0	Dwellings (\$20,000 to \$50,000)	3.4	2.1	-1.3
Dwellings (over \$50,000)	2.6	2.2	-.4	Dwellings (over \$50,000)	3.1	1.6	-1.5
Hotels	6.2	4.8	-1.4	Hotels	12.5	12.5	—
Hospitals	6.0	5.6	-.4	Hospitals	5.9	3.5	-2.4
Industrial	4.6	6.6	+2.0	Industrial	3.4	9.8	+6.4
Office Buildings	8.0	12.3	+4.3	Office Buildings	15.9	11.4	-4.5
Public Buildings	7.1	9.4	+2.3	Public Buildings	4.9	5.1	+.2
Schools	11.4	8.4	-3.0	Schools	12.8	16.5	+3.7
Stores	3.1	4.0	+.9	Stores	2.2	2.2	—
Theaters	2.5	3.2	+.7	Theaters	1.0	2.1	+1.1
Welfare, Y.M.C.A., etc.	2.4	2.4	—	Welfare, Y.M.C.A., etc.	1.6	3.8	+2.2

NORTHEASTERN STATES				MIDDLE STATES			
Type of Building	Requirements for New Buildings by Percentages			Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change		1928	1929	Change
Automotive	5.4	5.4	—	Automotive	3.8	3.2	-.6
Banks	3.4	5.9	+2.5	Banks	1.9	3.2	+1.2
Apartments	3.3	6.3	+3.0	Apartments	10.6	9.7	-.9
Apartment Hotels	.2	1.0	+.8	Apartment Hotels	6.0	5.5	-.9
Clubs, Fraternal, etc.	3.4	2.7	-.7	Clubs, Fraternal, etc.	4.9	3.8	-1.1
Community, Memorial	1.0	1.3	+.3	Community, Memorial	2.4	1.0	-1.4
Churches	6.4	7.9	+1.5	Churches	4.1	3.9	-.2
Dwellings (under \$20,000)	6.4	4.1	-2.3	Dwellings (under \$20,000)	2.8	2.3	-.5
Dwellings (\$20,000 to \$50,000)	3.7	3.9	+.2	Dwellings (\$20,000 to \$50,000)	2.1	2.1	—
Dwellings (over \$50,000)	2.8	2.5	-.3	Dwellings (over \$50,000)	1.8	1.4	-.4
Hotels	6.9	8.1	+1.2	Hotels	6.0	5.7	-.3
Hospitals	7.3	7.1	-.2	Hospitals	6.3	4.1	-2.2
Industrial	5.8	7.6	+1.8	Industrial	6.9	8.7	+1.8
Office Buildings	8.5	4.7	-3.8	Office Buildings	15.0	17.0	+2.0
Public Buildings	7.8	5.8	-2.0	Public Buildings	7.5	4.9	-2.6
Schools	13.6	16.8	+3.2	Schools	9.3	14.4	+5.1
Stores	3.8	2.4	-1.4	Stores	2.3	3.1	+.8
Theaters	7.	2.4	-4.6	Theaters	4.1	4.2	+.1
Welfare, Y.M.C.A., etc.	3.3	4.1	+.8	Welfare, Y.M.C.A., etc.	2.2	1.8	-.4

SOUTHEASTERN STATES				WESTERN STATES			
Type of Building	Requirements for New Buildings by Percentages			Type of Building	Requirements for New Buildings by Percentages		
	1928	1929	Change		1928	1929	Change
Automotive	4.8	5.3	+.5	Automotive	3.0	2.4	-.6
Banks	1.3	.8	-.5	Banks	1.2	2.2	+1.0
Apartments	8.2	7.5	-.7	Apartments	11.7	14.3	+2.6
Apartment Hotels	2.9	3.6	+.7	Apartment Hotels	5.9	7.1	+1.2
Clubs, Fraternal, etc.	1.7	1.1	-.6	Clubs, Fraternal, etc.	2.3	2.7	+.4
Community, Memorial	.3	1.1	+.8	Community, Memorial	1.7	1.9	+.2
Churches	7.4	16.3	+8.9	Churches	6.1	3.4	-2.7
Dwellings (under \$20,000)	5.1	4.8	-.3	Dwellings (under \$20,000)	4.3	4.1	-.2
Dwellings (\$20,000 to \$50,000)	4.7	4.2	-.5	Dwellings (\$20,000 to \$50,000)	4.0	2.5	-1.5
Dwellings (over \$50,000)	4.0	4.0	—	Dwellings (over \$50,000)	2.7	2.2	-.5
Hotels	11.7	10.1	-1.6	Hotels	6.9	11.2	+4.3
Hospitals	5.1	3.3	-1.8	Hospitals	6.3	5.6	-.7
Industrial	4.2	11.2	+7.0	Industrial	3.7	4.9	+1.2
Office Buildings	5.8	3.5	-2.3	Office Buildings	14.2	14.8	+.6
Public Buildings	2.9	4.4	+1.5	Public Buildings	4.7	4.7	—
Schools	21.6	9.3	-12.3	Schools	13.3	9.8	-3.5
Stores	3.0	3.2	+.2	Stores	4.1	3.9	-.2
Theaters	2.5	2.7	+.2	Theaters	2.8	1.5	-1.3
Welfare, Y.M.C.A., etc.	2.8	3.6	+.8	Welfare, Y.M.C.A., etc.	1.0	.8	-.2

COMPARISON OF DEMANDS FOR NEW BUILDINGS IN 1928 AND 1929, BY DISTRICTS

CRAFTSMANSHIP

BY

WILLIAM O. LUDLOW

CHAIRMAN OF THE COMMITTEE ON RECOGNITION OF CRAFTSMANSHIP, NEW YORK BUILDING CONGRESS

THE Plasterer: "I have been at my trade for 40 years, and have been accustomed to the best work in New York. I do 100 per cent work if possible, and have monuments of my work throughout the city. I think the craftsmanship certificates help the spread of good craftsmanship. The buttons and certificates are the finest things in life."

Painter: "Everyone tries to get one. In the last few years I have had more time to do the work and do it right. Finest piece of plaster work in city done by Mr. Jones on the Seamen's Bank for Savings. It is a pleasure for a painter to work on that kind of work. The plasterers help the painters out."

Hoisting Engineer: "I feel highly honored by receiving the certificate, and the Missus feels that way also."

Architectural Carver and Sculptor: "One of the greatest things ever brought up; wonder it hasn't been taken up before. I am proud of my work."

Such are some of the comments made by workmen who have received from the New York Building Congress certificates and gold buttons for superior craftsmanship. Effort, time and money have been expended over a period of nearly four years, not merely to reward certain deserving

workmen, but in an endeavor to raise the whole standard of workmanship in the building industry. We well know that higher wages, stricter supervision, and driving the men will not bring better quality; we must move their desires, awaken their pride, instill ideals. This whole movement of the recognition of craftsmanship, therefore, is an attempt to preach far and wide the gospel of quality work, and the 950 certificates of honor that have been presented to mechanics in New York are one of the means. It is of more than passing interest to inquire, therefore, if substantial results have been accomplished. Is better work being done, and has the spirit of the men been stimulated?

The comments of the honored craftsmen, themselves, such as have been quoted, tell us something. The opinions of some of New York's most prominent builders are also enlightening. I quote a few.

J. R. Kilpatrick, Vice-president of George A. Fuller Co.: "It is impossible to measure the concrete results of the recognition of the craftsmanship movement, but they have been remarkable in rehabilitating pride in craftsmanship. Undoubtedly the results of this work show in better quality of workmanship. The attitude of the men is improved."



Presentation of Certificates of Craftsmanship, Uppercu Cadillac Building, New York



Craftsmen Receiving Certificates at the Bank of New York and Trust Company

William O. Ludlow presenting certificates; Edwin J. Merrill, President of the Board of the Bank; Benjamin Wistar Morris, Architect, and Robert Eidlitz, Builder, are present

D. T. Webster, of the firm of Marc Eidlitz & Sons: "It has created a spirit of emulation,—workers are talking about better craftsmanship,—they are thinking about it. They now have a target to shoot at,—something to strive for. The results cannot be measured, and if they could, it would not be advisable to do so."

John Lowry, of John Lowry, Inc.: "More enthusiasm is put into their work. The men have a desire to do better work and are stimulated by the awards. There is a better spirit created by the awards, and no doubt about it."

Christian G. Norman, Chairman of the Board of Governors of the New York Building Trades Employers' Association: "The building industry generally is looking forward in its line of progress to doing things better, and the incentive for the workman not only to draw a substantial wage but to be proud of what he is doing should be properly instilled. My reaction to the craftsmanship movement of the Building Congress is that it is being talked about to a considerable extent among the workmen, and anything that makes for better quality work should be encouraged."

And what has labor itself to say? John Halkett, President of the New York Building Trades Council, in speaking to a group of honor crafts-

men, remarked: "You are a credit and an honor to the Building Trades Council. You must encourage and inspire others who have thus far failed to obtain recognition. The New York Building Congress has exerted great influence in New York, and there has been harmony during this period between employer and employe."

John J. Collins, Secretary-Treasurer, International Union of Tunnel & Subway Constructors of North America, says: "Labor heartily joins in doing its share to encourage better workmanship. It sees a great value to all concerned, including the public. Public recognition, with its accompanying certificate and gold button is a reward that brings real satisfaction to the worker and an incentive to his fellow workers. I see an increasing eagerness on the part of the workers to measure up to the title of 'Craftsman.'"

Alexander Kelso, Secretary-Treasurer of the Carpenters' District Council says: "One of the achievements of the New York Building Congress is the recognition of the craftsman who has shown outstanding workmanship in his trade. It is something new for the mechanic to be so honored. We have all seen tablets at the entrances of buildings on which are inscribed the names of the engineer, architect, contractor and banker as men



The Chairman Presenting Craftsmanship Certificates, New York Life Insurance Building
Darwin P. Kingsley, President, New York Life Insurance Company, in center

who have erected the structures. We have to thank the New York Building Congress through its Committee on Recognition of Craftsmanship for giving the workman his delayed recognition."

Comments such as these seem to indicate that the program of the awarding of certificates is not only meeting with general approval but that it has had a far-reaching result. We know at least that the 950 men who have been honored have a new attitude toward their work, have received a new inspiration, and a new incentive. Perhaps it is safe to say also that a large proportion of the thousands of workmen who have witnessed the presentation of the certificates to these 950 men have had their ambition stirred, pride in craftsmanship awakened, and now realize that "someone cares." Moreover, the hundreds of articles, news items and editorials that have been carried by all of the leading papers, the radio broadcasting and the magazine articles that have a countrywide circulation have had influence, it is fair to presume,—perhaps intangible, but nevertheless real, definite and enduring.

For the stirring of the spirit of pride of crafts-

manship there never was a time more opportune than these years of prosperity, and perhaps there never has been a body of workmen who by reason of their general intelligence were more ready to be convinced that there is nothing more satisfying in life than work well done. We have started with our work of recognition of craftsmen in New York in the building trades, but suppose that this kind of recognition spreads further? Suppose it spreads to other industries and other occupations and to other cities? I believe it is possible that there may be awakened throughout our land a will to do good work, an appreciation of the spiritual value of craftsmanship and the happiness it brings, and that there may be stirred in many workers a new and mighty ambition. Then we shall have done our part in reviving the interest in superior craftsmanship that we so sorely need, and then we shall have done our part in bringing into the lives of some men a new usefulness and a new contentment. Perhaps then we shall have done our part, too, toward bringing to the American people a new and a worthier citizenship.

Editor's Note. Mr. Ludlow will explain in a second article the way in which the New York Building Congress has organized and conducted its activities in the recognition of craftsmanship.

WHAT IS A GOOD CRAFTSMAN?

The following definition was part of a talk given by William O. Ludlow, Chairman of the Committee on Recognition of Craftsmanship, to a meeting of Honorary Craftsmen members of The New York Building Congress in Carpenters' and Joiners' Hall, Madison Avenue, New York, December 7, 1927

A GOOD CRAFTSMAN first of all is a man who does first class work in his trade; he is known by his workmanship; nothing he does is shoddy, ugly or of poor quality.

"A good craftsman is loyal. He is loyal to his union, for he believes that no union man has any right to injure either his union or anyone in it, and he believes that any man who belongs to a club or a society or a union is bound to help that organization along in any way he can.

"A good craftsman is loyal to the men of other trades. He never intentionally or willfully injures the work of another workman. If he is a carpenter, he doesn't draw pictures on white plaster walls, and if he is a plasterer, he doesn't drop mortar on a newly laid floor.

"A good craftsman is loyal, also, to his employer and the owner, for he knows that he has sold to them his eight hours a day and his skill, and he would no more expect to loaf on the job or do poor quality work than he would expect his grocer to take his money for a barrel of potatoes and then give him the barrel half full, or the potatoes half rotten.

"A good craftsman realizes that buildings are produced by coöperation,—coöperation all the way down the line from the owner to the laborer,—and he rightly feels that his part in the construction of a building is just as necessary and just as important as the architect's or the contractor's part; he is proud to point out the buildings he has had a hand in building.

"A good craftsman, moreover, never forgets to give a word of advice or encouragement to the apprentice or show him how to do a job. He is quick to help his brother mechanic when he needs a hand, and he is the first man to pick up the fellow who meets with an accident. He is never a grouch, and when he is about, things seem to go better on the job.

"And then a good craftsman is a man with a happy look on his face. Why shouldn't he have a happy look? His day's work is no mere grinding out so many hours for so many dollars; he has given to his work the most precious things he has,—his interest, his skill, his best effort. Every day when he quits, he looks over his work with pride and satisfaction for he knows he has done a good job, and he brings home to his wife and 'kiddies' contentment and happiness. Because he is a good craftsman, he is a good fellow, a good husband and a good father, a worthwhile man in his community,—a good citizen.

"Now you and I do not know whether the years ahead of us are few or many, but some day perhaps we shall stand before the Great Craftsman Who made all things, and perhaps we shall be asked 'What have you done?' I think the good craftsman will answer: 'I did the best work I knew how.'"

THE CLIENT, THE ARCHITECT AND THE CONTRACTOR

PART II—THE ARCHITECT

BY

CLINTON H. BLAKE

IN referring in my preceding article, in the November issue of *THE ARCHITECTURAL FORUM*, to the attitude of the owner, I pointed out that in most cases the owner has either a very poor opinion of architects in general or an unreasonably exalted view of the profession. While the converse of this is not entirely true, it is true that the architect, as a rule, considers that the client is either wholly lacking in building and design sense and knowledge, or else that he has a very general and more or less complete knowledge of building customs and problems and understands all the essentials of architectural practice and the customs of the architectural profession. It would be perhaps a trifle more accurate to say that ordinarily the architect holds a point of view which is a composite of these two ideas. He is, I am afraid, rather scornful on the whole of the layman's knowledge of buildings and their construction and plan, but on the other hand, although it may be paradoxical so to do, he assumes too often that the layman has a rather full understanding of the practices and customs of architects. The architect is likely to prove wrong on each of these points. While many clients are wholly helpless in the face of a sketch or plan drawings, and are more or less paralyzed at the sight of specifications, there are many who have the ability intelligently to read sketches or plans, to visualize the finished work, and to analyze and constructively criticize the proposed specifications.

Where the owner is equipped with a fair amount of common sense and knows what he wants and can analyze and make clear his requirements, his cooperation may be of very great value. I have known repeated instances, however, where the architect, having to deal with an owner of this character, has nevertheless proceeded on the theory that the owner was a very minor element in the transaction; that his chief function was to pay bills and ultimately enjoy the fruits of the architect's and contractor's labor, and that it would be a waste of time to seek his cooperation in so far as any practical advice relating to the work was concerned. I know of many cases where a much better result would have been secured and a great deal of difficulty for all concerned avoided, if the architect had given the owner an opportunity to discuss some of the problems involved and had been content to heed some of the advice which the owner volunteered.

The fact that one is an able business man does not, it is true, necessarily qualify him as a critic in design or construction. On the other hand,

there is much of common sense in the practice of every profession, and the advice and help of an intelligent and common-sense client is not to be despised. No one can sympathize more heartily than I with the difficulties which architects encounter in dealing with clients who are not qualified to advise but who, apparently for that particular reason, consider themselves qualified to do so. I would emphasize merely the thought that, while there are clients of this character, there are others who can be of real help to their architectural advisers. Even if their advice is not taken, a little tactful discussion with them now and again, which gives to them the thought that their ideas are being considered and made use of, will yield good diplomatic results. On the other hand, the architect cannot, in justice either to himself or to his client, assume, as is so often assumed, that the client is acquainted with architectural customs and practices. In this connection, I have in mind especially the matter of the ownership of plans, the matter of extras and supervision, changes in the plans and the like. The architect owes it to both the client and to himself to make these points clear to the client, so that the latter may understand the basis on which they are proceeding, the possibilities of additional cost, the scope of and limitations upon the architect's services, and similar points entering into their relationship and into the operation.

I have had occasion many times to point out to the profession the prevalent misconception on the part of architects of the law with respect to the ownership of plans. As I have indicated time and again, the ownership of the plans, as a legal proposition, in the absence of a contract to the contrary, is vested in the client who has ordered and paid for them. This is far better understood by architects than it was a few years ago. Nevertheless, in repeated instances, architects are still proceeding under the comfortable delusion that, because it is the custom of the profession that the plans as instruments of service belong to the architect, the client must recognize the fact that this is so. A client is not necessarily presumed to be acquainted with the customs of the architectural profession. He is not necessarily bound by any such customs, where he has no knowledge of them and they have not been brought to his attention or been impliedly made a part of his understanding with the architect. A special custom, as a matter of fact, is one of the weakest reeds upon which legal rights can be predicated.

If it can be shown that the client was acquainted

with the custom and made no objections to it, proof might be admitted and the custom sustained. For example, if the client had dealt with the architect previously and knew that it was the architect's custom to assert ownership to the plans or to charge, in the absence of agreement, a certain rate, the client would be held, in further dealings with the architect, to be in effect placed on notice and, in the absence of a definite agreement, to be willing impliedly to go ahead on the same basis as that on which they had formerly dealt. It is such a simple matter, however, to cover such a question as to the ownership of the plans by specific agreement, that any architect is foolish to trust to proof of custom or to an implied understanding with the client on this point. The chances are decidedly against his being successful, unless he can show a specific agreement, and it has become clearly manifest that the tendency of the courts is opposed to sustaining the architect's ownership of the plans on the basis of custom rather than specific agreement. To protect his right to the ownership of plans, therefore, the only common-sense and safe course for the architect to follow is to have a definite agreement with the client on this point by which the ownership by the architect of the plans is clearly covered and recognized.

The architect is somewhat likely, also, to assume that the client realizes the expense involved in the preparation of plans and specifications and especially in the carrying out of successive changes in the drawings. The client has a very limited understanding of these things. As I said in discussing his point of view, he has no conception, ordinarily, of the time involved in producing drawings and details. He is more impressed by the specifications, because they appeal to him as a business contract and he can see from examining them that they involve considerable care and effort. The drawings do not produce in him any such reaction. It seems to him a simple matter to make changes and to make still further changes. He looks upon these as more or less routine matters which can be easily carried into effect by the architect and which do not involve real time or expense. He realizes in a very limited way, if at all, the amount of time that must be given to a study of the whole problem as it is affected by the changes which he requests or of the expense for draftsmen and for service which these changes will mean to the architect. He has little conception, also, of the expense which changes will mean to him personally, in additional extra charges by the contractor. When these charges come in, he will be both astonished and angry in many cases, and often the nearest target at which his displeasure can be aimed under these conditions is obviously the architect.

One of the chief problems connected with this

question of changes in the plans is how fairly to recompense the architect for his extra work. The Institute form of contract properly provides for extra payments to the architect for changes in the scheme originally adopted. The practice of architects in the application of this principle varies widely. Generally speaking, in practices of a more commercial character the architect is inclined to stress the point very little and to make any changes within reason without any material increase in compensation. Other architects, especially in residential work, stand strictly on their rights and expect and collect additional compensation for any material changes.

The handling of this matter with the client requires considerable tact and diplomacy. It is necessary that each client be approached in a particular way and each case handled on its own merits. The important fundamental fact, however, is that the architect, if he intends to seek additional compensation for changes ordered by the client, can in large measure prevent misunderstandings and ill feeling, if not more serious complications, by making clear to the client in the first instance the fact that the architect will expect and is to receive extra payment, if changes in the plans as prepared and at first approved are made. In some cases, this compensation will amount to a modest sum; in others, it may involve the re-drafting virtually of all the plans and a re-study of the whole problem. In this case, the architect will legally and morally be entitled to substantially a new fee in addition to that already earned. From my talks with clients as well as with architects, I know that the client ordinarily does not understand a request for additional payments by the architect for changes in the plans. He resents such a request and feels that it is unfair, unless he has been prepared for it in the first instance and unless the circumstances which make it proper and equitable have been explained to him. It is not a difficult matter for the architect to bring home to the owner tactfully and without over-emphasizing it, but nevertheless clearly, a true understanding of these points. He can make clear to him something of the work and expense which changes in the plans involve from the point of view of the architect, and he can warn him against extras and against making changes which will inevitably result in extras. By putting the owner on notice in these respects, he will be doing him a real favor, and he will be doing himself a great service at the same time.

One of the most dangerous and yet most common points of misapprehension on the part of the architect has to do with his position as agent for the client. He assumes all too often that his appointment as architect carries with it a general agency and authority to do whatever he thinks

necessary within rather wide limits in connection with the building operation. If he has an agreement with the client which gives him power to make changes and act in general in the client's behalf, he is protected in doing so. It is a very exceptional case, however, where any such general agency is granted. The standard form of contract and the contracts ordinarily in use throughout the profession give to the architect very limited agency powers and discretion. The recent amendment to the Institute's form of contract, providing that the architect may make minor changes in the work, not involving extra cost and not inconsistent with the purpose of the building, is a step in the right direction. I am afraid that most architects, however, feel that they have the right, irrespective of any contract, not only to make such minor changes, but also to make, without the authority of the owner, changes in many particulars which involve various extra charges.

The architect will do well to disabuse himself of any such delusion. The only safe course for him to follow is to adhere strictly to the specific authority given to him and, where he wishes to depart from it, to secure the approval and clear authorization of the client. Any other course will inevitably result, not only in misunderstandings between the client and himself and between the client and the contractor, but will lead in many instances to his being held liable for the additional cost to the client of alterations and changes put into effect without the latter's approval.

The agency of the architect may be what is known in the law as an "express" agency, or it may be an "implied" agency. An express agency is one granted in express terms. If the owner in so many words gives the architect the right to make specified changes in the plans or specifications or to deal in certain specified ways with the contractor or others, this constitutes such an express agency. On the other hand, an implied agency is one which has not been expressly granted, but which is legally assumed to result from certain acts of the principal or the surrounding circumstances. Obviously, an implied agency is a rather dangerous proposition. No agent can safely proceed on the basis of an implied agency only. An architect, especially, cannot do this. If he limits his acts to authority which has been given expressly, and if he secures this authority in writing, he cannot well go wrong.

Many architects assume that they have authority to act when, in fact, in the eyes of the law they have no such authority. In some cases they assume that they have the authority, simply because they are acting as architects. In some instances they assume they have it as the result of something which has been said or done by the owner. If the owner should say to the architect,

for example: "I cannot be bothered with changes in the work,—please attend to them," many an architect would, with considerable show of reason, construe this as giving him full power to handle any changes which may be involved. The owner, on the other hand, by this remark, may have in mind simply routine changes, involving no substantial additional outlay, if any, and not changes involving substantial extras or varying in any material respect from the plans or specifications. The architect should not, in his own interests and in the interests of a proper understanding with his client, indulge in any assumptions when this matter of agency is involved. It is a simple matter for him to secure the specific approval and authority of the client where this is required, and he will be far wiser to assume too little rather than too much authority.

There is another phase of the architect's activities, however, in which he can assume responsibility without the danger of laying himself open to criticism or claims for damages. This phase has to do, not with his agency powers, but with his general advisory powers. One of the most common criticisms of architects which I have heard from clients is that the architect considers that he has done his full duty when he prepares the plans and specifications and supervises construction. There are many ways in which he can render much appreciated service to the client beyond the strict limits of his employment. In advising the client, in giving him a somewhat broader service than usual, in general advice and attention, in suggesting to him certain danger points which he should have in mind, in making clear to him the status of the contractor and the like,—in all these ways, he can both aid the client and build up with the client good will which will be of real value in the future as well as in the present. The client, as a business man, appreciates his architect's making suggestions which safeguard the client on the business phases of the operation. What I have in mind can perhaps best be summed up in the word "service." The service given the client by the architect may go far beyond the limits of the legal duties of the architect strictly construed. It will cost the architect something more to give this service, but the increased good will of his clients which will result from it will be substantial dividends.

When it comes to making estimates and dealing with cost figures, many architects are inclined to proceed far too casually. This is perhaps one of the most serious points of controversy in many cases between the architect and the client. It holds, also, probably, more of real danger for the architect than any other phase of his activities. The architect assumes too often that, when he gives to the client a cost estimate, the client ac-

cepts it with the understanding that the architect is merely making his best guess and that the figure is wholly tentative. The client, as I have pointed out in the preceding paper of this series, does not, however, accept an estimate in this spirit or upon this understanding. He is far more likely to accept it as an estimate given by an expert who by training and knowledge is in a position to give accurate figures. When it develops that the cost of the work far exceeds the amount of the estimate, he will in some cases feel that he has been "led on" by the architect, and in other cases he will feel that the architect is incompetent. Either feeling may be and probably will be under these conditions unjust to the architect. The client's point of view as to this, however, results usually from the fact that the architect has not made clear to him his limitations as a prophet of cost.

It is not a difficult matter for the architect to make clear to the client who is at all reasonable the fact that cost figures are today so variable that no one, however expert he may be in the profession or in the building game, can prophesy with accuracy. He can point out to the client that he is giving his estimates for what they are worth, and for nothing more. If the client insists on a more definite commitment, the architect can refuse to give the estimate or, if he feels that he must give it in order to hold the client's favor, he can at least discount increases in building costs with sufficient liberality so that the figure which he gives will be high rather than low. The client is naturally interested in the cost of the work. It is natural, also, that he should feel that the architect is in a position to give him that cost with substantial accuracy. The architect should see to it that he is set straight as to this and that any estimates given are so framed that they do not by any chance amount to definite cost representations or guarantees.

Differences and misunderstandings between the architect and the client are being materially lessened in number by the increased use of written contracts between them. Much missionary work in this field remains to be done, however. There are still many architects who feel that the use of a written contract with a client is impractical, and there are even those who maintain that it is in some way unethical. I had quite a spirited argument with one of the latter group not long ago. His position was that he would cheapen in some way his professional status if he requested his client to sign a written contract, and that by so doing he would become in effect a business man rather than a professional man. I do not think that there are many architects who hold this view. There are, however, a great many who feel that to ask the client to enter into a contract will create a bad impression and may result in the

architect's losing the commission. This feeling is based, I am convinced, on a misconception of the attitude of the ordinary client. The latter does not object to the architect's desire that the dealings between them be reduced to a concrete and written understanding. On the contrary, he welcomes such a suggestion, both because it is in line with sound business and the methods which he himself would adopt in business dealings, and because, also, it confirms him in his feeling that he has secured the services of an architect who is practical and businesslike. The client wishes to feel that he has secured the services of one who has real artistic ability. He is just as keenly interested, however, in feeling that he has secured the services of one who is practical and in touch with business methods and needs. Now and again it is quite possible that a client will be encountered who is not willing to sign a contract and who may resent being asked to do so. Any unpleasantness resulting from these isolated cases, however, will be more than compensated for by the favorable impression created in the minds of other clients by the evident desire and determination of the architect to deal with matters on a business basis.

So far as the attitude of the architect and contractor is concerned, it is my experience that it is on the whole one of understanding, coöperation and fairness. Some architects undoubtedly view the contractor as one to whom they have no obligation, and consider that they are justified in acting as the advocate of the owner alone. The great majority, however, realize that they owe an obligation to the contractor, as well as to the owner; that while they are employed by the owner and must act primarily in his interest, they are not expected to take any action which is unjust or unfair to the contractor; that where they are called upon in effect to arbitrate between the two parties especially, and to make more or less judicial decisions as between them, they must act with fairness to both and with impartiality.

The contractor has just as much right to expect fair treatment at the hands of the architect as the client has to expect it. Confidence on the part of the contractor that he will receive fair treatment is a mighty valuable asset in any building operation. If the contractor is assured of this fact, he will very readily place himself on many points in the hands of the architect, where otherwise he would refuse to do so; he will defer to the decisions of the architect, without complaint, and will in general coöperate in securing the prompt and satisfactory completion of the work, where he would fail to do this if he felt that the architect would not stand behind him on any issue where right is on his side. The existence of such cordial understanding and confidence between architect and contractor is to the owner's interest.

BETTER STUCCO HOUSES

PART III

BY

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ON September 16, 1928 a hurricane, the maximum velocity of which was conservatively estimated at more than 100 miles per hour, again swept over parts of Florida, teaching to builders by the types of its devastation precisely the same lessons about building construction that were taught by a similar hurricane just two years previously. The lessons of the disaster in 1926 were well taught, but they were not heeded, either because of willful disregard by unscrupulous builders or because of the well known American inclination to take a long chance. In either case the result was the same; preventable damage running into many millions of dollars occurred.

It will be very instructive to review a typical sequence of events during such a gale and suggest, as the narrative proceeds, feasible remedies for certain weaknesses which experience has revealed in the construction of this type of building. The problems involved in the foundation and in the framing up to the roof line were discussed by the writer in articles which appeared in the August and November issues of *THE ARCHITECTURAL FORUM*. The present article deals with the subjects of roof framing and coverings for hurricane regions, and with chimney design for localities that are visited by severe earthquakes.

Roof Coverings. This is a very difficult problem when the roof is of the gable type. Practically every kind of covering has been ripped off by strong hurricanes,—the various kinds of tile, slate, sheet metal, sheet composition, composition shingles, metal shingles, asbestos-cement shingles, and wooden shingles. The wooden shingle seems to have the best record for staying on, but wooden shingles should not always be used because of the great fire hazard they present. However, a valuable conclusion may be drawn from the superior behavior of the wooden shingle. The writer believes that this superiority is due to the fact that only about 30 per cent of its surface is exposed to the wind; this permits the nails to be placed low, which, in conjunction with the stiffness of the wood, renders the shingle very resistant to uplift. On the other hand, nearly all the types of metal shingles on the market,—they are made in aluminum, copper and zinc,—and also the asbestos-cement shingles, have very little overlap compared to their exposed surface area, with the result that when a strong wind gets under these metal shingles, they may be uplifted like hinged trap doors. In addition, some manufactured shingles are brittle and tend to crack at the nail holes. This is particularly true of those laid in

hexagonal fashion, where the overlap is very small.

The writer believes that both the non-ferrous metal and the asbestos-cement shingles would prove satisfactory in hurricanes if the overlap from above were arranged by the manufacturer to be about 65 per cent. The exposed surface should not exceed about 8 inches in width by 6 inches. While such a large overlap would practically double the cost of the covering, its hurricane resistance would insure permanence that would mean much greater ultimate economy, because the damage by water to the interior of a house is likely to be very great after a storm has destroyed the roof. Furthermore, the metal shingles could be stiffened by pressed longitudinal ribs and edge flanges so shaped that the exposed edges would lie flat against the shingles below, and thus prevent the wind from wedging in between. Asbestos-cement shingles might be made thicker to strengthen them for the abnormal strains. They could be moulded wedge-shaped like wooden shingles so that, when nailed, they would lie flat, because the wind must not be allowed to get under any part of the roof covering. Asbestos-cement shingles would then be preferable along ocean shores where the atmosphere is very corrosive on metal shingles because of its high content of wind-blown salt water globules. In other regions, in order to reduce corrosion to a minimum, copper nails could always be used with copper shingles, and heavily galvanized steel nails with either zinc or aluminum shingles. If, for example, copper nails are used with either zinc or aluminum shingles, the electrolytic action that produces corrosion is intensified; this will greatly reduce the otherwise long life of these shingles. Composition shingles and composition sheet roofing both lack stiffness, are readily torn in high winds, and cannot be so securely attached. If it is easy for the wind to get underneath, the covering is then doomed. This is true of sheet metal coverings.

The experience with burned clay roofing tiles in hurricanes has not been very satisfactory. Not only have the roof coverings been destroyed, but the flying fragments cause immense damage by breaking windows in nearby houses. The breaking of the windows frequently constitutes the first step in the destruction of a house by hurricane. The wind must be kept out of a building. This means that special precautions must be taken to protect openings. The use of large single panes of glass should be avoided. Where hinged wooden shutters or rolling steel shutters, as described in the previous article, are not feasible, very heavy

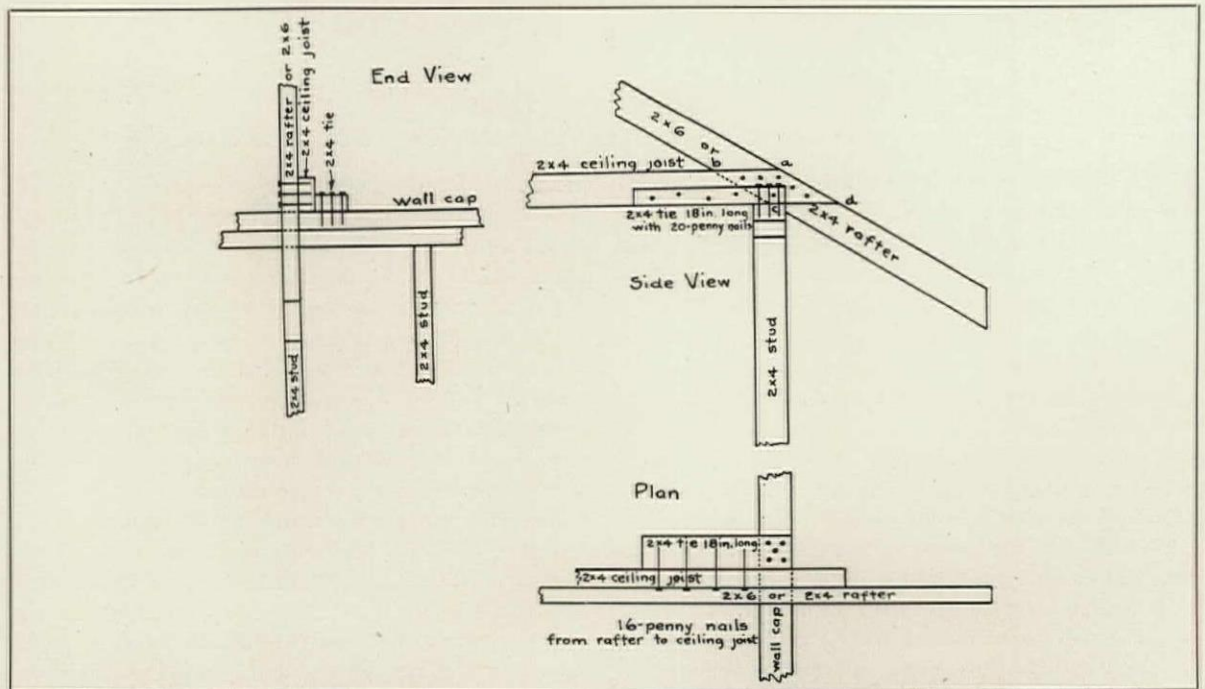


Fig. 9. A Method of Anchoring the Roof to the Exterior Walls

glass in subdivided all-steel frames designed to withstand a wind pressure of 40 pounds per square foot of window surface will prove adequate. Since flying pieces of roofing tiles have been known to penetrate even stucco walls during a hurricane, unprotected windows, even in steel frames, however heavy the glass, would surely be broken in regions where there are tile roofs. The writer is aware of the immense difference in architectural charm between a roof of hand-made mission tiles laid irregularly and one of machine-made tiles attached with monotonous regularity. But irregular laying does not permit the upper tiles to be nailed, and hence they are merely wired to keep them from sliding down the slope of the roof. In consequence, during a heavy gale they are uplifted, dangle at the ends of the wires, and are soon dashed to pieces. The folly of laying tiles without even wiring, when the slope of the roof is very gentle, is too apparent to even require comment.

Both the hazard and the menace of the loose or wired tile roof would be considerably reduced if proper precautions were taken in laying the roof. Of course, a substantial weatherproof roofing felt should first be laid on solid, smooth roof sheathing; then on top of the felt, at spacings varying from 10 to 14½ inches, depending on the type of tiles to be used, there should be placed 2 by 3- or 2 by 4-inch wooden roof strips to which the upper tiles are to be nailed. At the spacings, these wooden strips will assist materially in holding down the felt, and, provided the felt is well cemented along its horizontal edges, they will thus

keep the roof rain-tight, should some of the tiles be blown off. Machine-moulded tiles are usually much stronger than the hand-made. Manufacturers should provide two nail holes spaced about 4 inches apart along the center line of each tile, instead of only one, as is the present practice. The top tiles should be attached with two 10-penny nails in conjunction with lead washers, so that the nails can be driven just tight without breaking the tiles; the bottom tiles should be attached with two 8-penny nails and lead washers. While the inherent weakness in nearly all patterns of tiles lies in the fact that they must be so laid that the wind may gain access underneath the tiles, the writer nevertheless believes that two-nail, machine-made tiles regularly and carefully nailed, as described here, should weather any storm, if they are not exposed to a bombardment of debris.

When the roof is of the flat type, surrounded by a parapet wall, another type of construction will give not only a hurricane-proof covering but also a permanent wearing surface capable of withstanding all the hard usage that ordinarily comes on floors, thus adding another, though open, story to the useful floor area of the building. Referring to Fig. 8 (page 746) of the article in the issue of November, 1928, it will be seen that the parapet wall should be made low, preferably not more than 20 inches high. This is to minimize the overturning moment of the wind against the wall. The diagonal sheathing of the top story should extend without break clear up to the coping of the parapet. This will prevent the overturning of the parapet wall, a frequent type of failure,

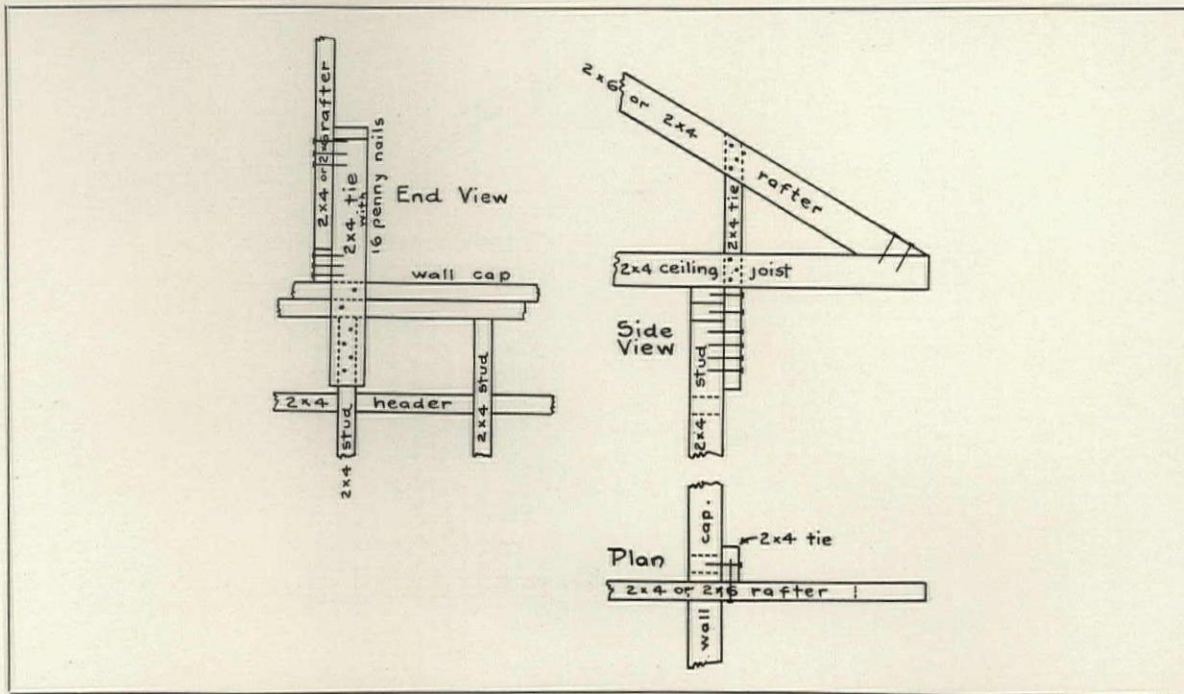


Fig. 10. Another Method of Anchoring the Roof to the Exterior Walls

which permits the wind to get under and raise the roof. The roof boards should be of 1-inch dressed material laid solid and diagonally on 2 by 6- or 2 by 8-inch ceiling joists spaced from 12 to 16 inches, center to center, depending on their span. The entire roof area should then be covered with a layer of sheet lead 1/16 inch thick, lapped and soldered at all joints and brought up 4 inches as flashing at all sides and at chimneys and vents. On top of the lead a continuous slab of concrete should be poured to a uniform thickness of at least 1½ inches; 2 inches would be better. In order to resist shrinkage and thermal stresses, the slab should be reinforced by electrically-welded steel fabric placed at its half depth. A rectangular mesh composed of No. 11 gauge wires, spaced 6 inches in each direction, would be satisfactory. The concrete should consist of a 1 cement: 1½ sand: 2½ crushed rock or gravel mixture to which is added the least quantity of water that will produce a dense and workable mass. The sand should range in size from fine to ¼-inch; the coarse aggregate, from ¼-inch to a maximum of ½-inch. Particular care should be taken to keep the slab constantly moist by spraying it for a period of ten days after pouring so that this thorough seasoning will insure high abrasive resistance in the wearing surface. The lead lining is necessary to insure a water-tight roof. The roof boards are necessary to support the lead lining. Wherever such a concrete-slab flat roof or a tile-covered gable roof is used, the exterior walls and underpinning must be particularly well braced in localities where earthquake resistance is a fac-

tor to be considered, because such coverings make a building top-heavy; their inertia subjects the walls to very severe horizontal thrusts.

The Framing of Gabled Roofs. Whatever the type of covering, the foundation of a roof should always consist of 1-inch dressed boards laid solid. For coverings of the lightest weight, 2 by 4-inch rafters should never be spaced more than 24 inches apart, while for tiling, 2 by 6-inch rafters may require a 16-inch spacing. Where a roof is without hips or valleys, the rafters must be diagonally braced in the plane of the roof in the same manner as described previously for outside walls. The anchorage of the rafters or framing of the roof to the walls is a critical feature in designing against hurricanes. Figs. 9, 10, 11 and 12 give full details of some satisfactory types of anchorage at outside walls. To avoid splitting wherever large nails are shown concentrated in small clusters in short splices or tie pieces, these timbers should be drilled to receive the nails. In Fig. 12, 1 by 8-inch ties and truss members are advocated where shown so as to provide ample nailing areas, a b c d, for many 8-penny nails. Fig. 10 shows the strongest anchorage. The smaller the overhang of the roof at the eaves, the less will be the wind pressure in this pocket.

In conclusion, from the standpoint of resistance to hurricanes, the best type of roof covering is a 2-inch flat reinforced concrete slab surrounded by a parapet wall not higher than 20 inches and continuous in construction with the wall of the story below. Such a roof is also fireproof. Being lined with sheet lead, it should remain leak-proof.

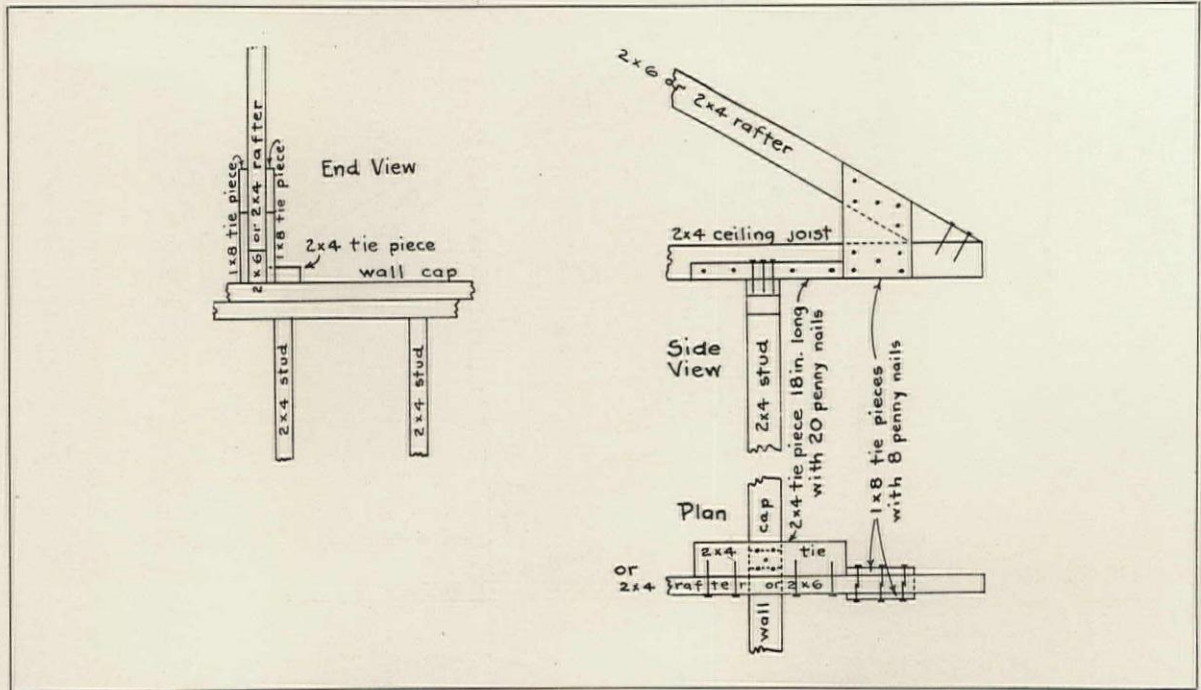


Fig. 11. A Third Method of Anchoring the Roof to the Exterior Walls

Chimneys and Fireplaces. Until comparatively recently, brick masonry in conjunction with fire-clay flue linings has been used almost exclusively for this purpose. As a precaution against fire, insurance underwriters require a clear space of at least 2 inches between all wooden framing and the outside of a brick chimney. This means that structurally the chimney stands completely isolated from the frame of the building; they are not in contact; the chimney is not anchored to the frame. When the building sways during a severe earthquake, so does the chimney, but they do not sway in unison; they cannot, because of the dissimilarity in the distribution of their masses. Consequently, there is impact between chimney and building, because the 2-inch clearance is insufficient to allow the chimney to sway freely within its enclosure, either within or at the side of the swaying building. Such impact is very injurious to the chimney, because brick masonry is not only inflexible but also very weak in tension perpendicular to joint. The chief break occurs usually at the roof line; serious cracks probably occur also at other places concealed within the wooden walls, and constitute a great fire hazard, frequently not suspected. If the mortar is weak, the top disintegrates into separate bricks as it falls; if the mortar is strong, the entire top falls in one mass, sometimes through the roof. If an attempt is made to anchor the chimney to the roof by running metal stays from the roof to a metal collar surrounding the chimney, such stays will probably operate to push over the chimney top. Isolated brick chimneys, already built and standing apart

from other structures, as they occasionally do at factories, may be protected against earthquake damage by enclosing them throughout their entire height in a steel cage composed of vertical and horizontal structural shapes welded together, but such a method is not practicable for residential brick chimneys.

After severe earthquakes the writer has seen brick chimney tops thrown down by the hundreds, outside brick chimneys in complete ruins, and some inside brick chimneys dropped down through houses into the basements, as the result of structural collapses of brick fireplaces. The behavior of brick and other block masonry chimneys in the past amply justifies the conclusion that they cannot withstand severe earthquakes without being seriously damaged. Therefore the writer strongly advocates the use of reinforced concrete in place of brick for residential chimneys where earthquakes occur. Reinforced concrete is flexible; it can stand tension and bending without being seriously fractured. When correctly designed and properly constructed, it possesses great tenacity. These are the qualities that make reinforced concrete structurally so superior to brick masonry for chimneys in earthquakes. If the architectural design demands a brick chimney, it is very easy to use a brick facing on a reinforced concrete structural core, but there must be a sufficient number of wire anchorages from concrete to brick at definite intervals, vertically and horizontally, as otherwise the bricks will be shaken off.

In constructing a reinforced concrete chimney, the fire-clay flue lining is used as the inside form.

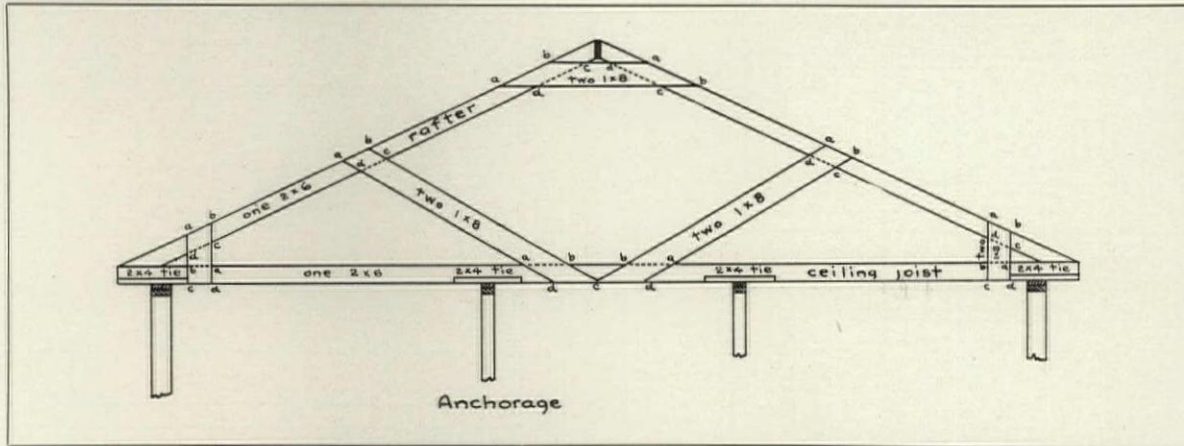


Fig. 12. Anchorage of Roof Framing Against Hurricanes

Reinforced concrete is superior to brick also in that it lends itself more easily to producing solid construction where flues from lower stories must be curved around fireplaces. Furthermore, at no increase in cost, reinforced concrete permits the use of circular flues, which are much more efficient for unit area of opening than square or rectangular flues.

For a single-flue chimney of average size in a one-story building, the minimum thickness of reinforced concrete wall, exclusive of flue lining or outside brick facing, if such there be, should be 6 inches, if the flue is square or rectangular. If the flue is circular, it may be 4 inches, but the walls of the fireplace should be of at least 6 inches in addition to the lining of brick. Since it is difficult to line the inside surface of the sloping walls of the smoke chamber above the fireplace, this lining may be omitted if the thickness of the concrete there is increased 1 inch. In the basement and lower story of a two-story house this minimum should be increased 1 inch; it should be 7 inches for circular flues also, if the chimney contains a fireplace at the second story. In the basement and lower story of a three-story building, the minimum thickness, irrespective of the shape of the flue should be 8 inches. The thickness of the fireplace walls should never be less than the thickness of the chimney walls immediately above the fireplace. These minimum thicknesses are merely suggestions for average cases. If a chimney contains a large number of flues, or very large flues, they should be increased by 1 or 2 inches. The minimum thickness of concrete between adjacent flues in a multiple-flue chimney should be 3 inches for circular flues, but 4 inches for square or rectangular flues.

The concrete mixture should not be leaner than 1 cement: 2 sand: 4 gravel or crushed rock; preferably it should be about 1: 1½: 2½, because it is very necessary that the chimney walls be strong, and particularly that they be non-porous.

The sand should be graded in size from fine to ¼-inch; the gravel or crushed rock should vary from ¼-inch to a maximum of 1-inch. The minimum amount of water should be used that will produce a workable mixture which will settle readily in the form when slightly rammed with an iron rod. In constructing the form, one side should be left open; this side should then be closed from the bottom up,—only about 3 feet in elevation at a time, so that there may be easy access for thorough tamping as the concrete is being poured. The entire form should be kept moist by sprinkling for 7 days after the pouring.

The reinforcement should consist of corrugated round or square steel bars placed vertically, together with square or rectangular intermittent horizontal loops at regular vertical intervals. These loops act as lateral ties for the vertical reinforcement; they are wired to the verticals and should inclose them completely. In multiple-flue chimneys they should have cross ties of the same size, as shown by AB and CD in Fig. 13. The ends of the loops must be securely anchored, as at E, rather than be merely overlapped; this applies also to such joints as at A, B, C and D. The dotted lines in Fig. 14 show how these horizontal ties should be arranged between the hearth and the top of the fireplace opening. They should be anchored as shown around verticals marked N and P. The hearth should consist of a flat slab of reinforced concrete 4 inches thick, reinforced with an electrically-welded 6 by 6-inch square mesh consisting of No. 10 gauge galvanized wires. The total cross-sectional area of vertical steel at any horizontal section of the chimney or fireplace should not be less than 0.004 times the cross-sectional area of concrete; it should be placed 2 inches from the outside surface. Bars should always be placed at the corners; intermediates should not be more than 12 or 15 inches apart. The minimum diameter of the bar should be ⅝ inch; lengths of overlaps at splices should not be less than 24

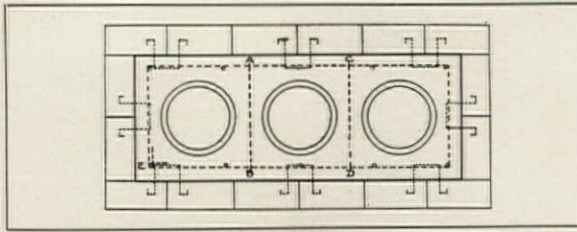


Fig. 13. Anchorage of Brick to Concrete Chimney

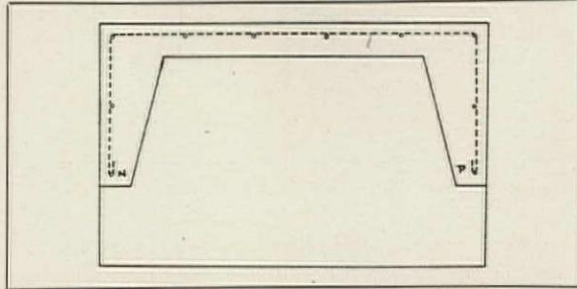


Fig. 14. Horizontal Ties in Reinforced Concrete Chimney

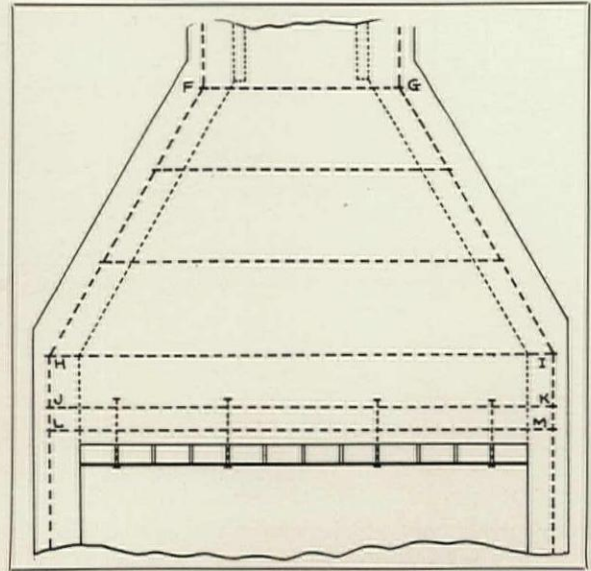


Fig. 15. Reinforcing of Chimney Throat Above the Fireplace

bar-diameters. The loops should be spaced 12 inches apart, vertically. Where the walls of the chimney are all vertical, the bars should be at least $\frac{1}{4}$ -inch in diameter in one-story, $\frac{5}{16}$ -inch in two-story, and $\frac{3}{8}$ -inch in three-story chimneys. Where there is a contraction in the width of the chimney, as just above fireplaces and also between the hearth and the top of the fireplace opening, the loops should be of the same diameter as the vertical steel bars, and should be placed also just at the bends in the verticals. See loops FG and HI in Fig. 15. Two loops should be placed just above the soffit of the fireplace opening, as shown by JK and LM in Fig. 15. They will then serve also to reinforce the top of the opening. For openings of up to 5 feet in width, these should be $\frac{3}{4}$ -inch square corrugated bars. In Fig. 15, the concrete soffit of the opening is protected against excessive heat by one course of brick, held in place by a steel plate extending the full width of the opening, and held as a shelf support for the brick by anchor bolts embedded at intervals in the concrete above the soffit.

Brick facings on reinforced concrete chimneys should always be anchored to the concrete by metal bonds, as otherwise the bricks will be shaken off in a severe earthquake. A device of wire is usually superior to one of sheet metal, because the latter will be destroyed more quickly if rusting occurs. Fig. 13 illustrates a method where soft steel wire of No. 12 gauge is employed. Approximately every seventh course of brick facing should be so anchored by embedding the wire in the mortar of the joint. Wherever feasible, these wire bonds should engage the horizontal or vertical reinforcement of the chimney. In any case they should have a hooked anchorage in the con-

crete of at least 2 inches. The ends of the bond wires should not be left straight, for then their hold in the brick mortar will be slight, but, after removal of the chimney form, they should be hooked as shown, and not merely given a right-angle bend. When, for architectural reasons, only the top of a chimney need be faced with brick, as in the case of an interior chimney, in order to avoid the earthquake stresses that are accentuated by top-heaviness, below the brick facing the concrete section should be increased to the dimensions of the composite section of concrete and facing in the top. This increased section should be maintained at various lower levels until it merges into a larger section, such as that demanded at a fireplace, for example. Special care should be taken to make the foundation area of the chimney of such dimensions that the unit pressure on the subsoil will equal that of the foundation of the rest of the house, as otherwise differential settlement will cause serious cracking in fireplaces, in interior plaster at the chimney, and injury to flashing at the roof.

In regions where earthquakes are severe, reinforced concrete chimneys should be securely anchored to wooden building frames; interior chimneys, by having the joists at each floor level framed snugly against all four sides of the chimney; outside chimneys, by strong steel enclosing bands bolted to the frame. A reinforced concrete chimney, designed and built as described here, will neither crack nor shatter in a strong shake, if it is anchored to a properly braced building on a good foundation. This contact of chimney and frame would therefore produce no appreciable increase in fire hazard, but there would be much structural benefit by preventing impacts.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 1. INTRODUCTORY

PART of the duties of the master craftsman in connection with a building operation has always been the direction of the activities of his co-workers and passing upon their work. As time rolled by and the duties of the master craftsman evolved into the more diverse functions of the modern architect, the supervision of the construction of a building developed into one of the main departments of his endeavors. Since he has elected to confine his efforts to the production of his building by means of the hands of others, it devolves upon him to see that those proxies of his are both capable and honest in the work of carrying out his true intent. He must safeguard the interests of the owner until the finished building is delivered, and must do it as well as if he were actually laboring, as of old, with his journeymen and apprentices at the site. This implies on the part of the architect, in the capacity of building superintendent, an intimate knowledge of all materials entering into the construction of a present-day building and, as well, of the correct manner of their placement. When Vitruvius presumed to set before his august emperor his famous inventory of the attributes of the well rounded architect, he could hardly have been expected to include more than a small fraction of those comprised in the attainments of the twentieth-century practitioner;—and yet the list compiled by that ancient architect was somewhat formidable.

It is, of course, humanly impossible for a single individual to know all there is to know about a building operation, from the clearing of the site to the installation of the last piece of equipment,—and yet the degree of possession of such knowledge and the amount of practical experience in its application are the gauges by which the work of the modern superintendent is measured. The owner expects and demands perfection in this office, and will be satisfied with little less. When he, with his admitted inexperience, notices defects that have escaped the keen eye of the man paid to find them, his faith in that keenness is materially lessened. Or, if later "wear and tear" bring out weaknesses that a close adherence to specification requirements would have prevented, the owner, put to serious inconvenience, perhaps to damage claims of tenants, is likely to blame the architect's superintendent more than the contractor. The latter was supposed to look to his own interests, but the architect and his representative were "well paid" to see that nothing was slighted. True, the architect has made it plain, in undertaking to supervise the work, that he is acting only in capacity of assistant

to the owner in seeing that the terms of the contract are complied with and that he, most emphatically, is not taking upon himself any of the contractor's liabilities. This relieves the superintendent of legal responsibility,—but he must still shoulder the moral blame for his shortcomings, and his punishment for remissness, large or small, will be found in the attitude of the owner toward the influencing of future business in which the architect is interested. In this, whether the work be the owner's or that of others, the degree of satisfaction of the client in the way a job is supervised may be of as much as or more importance in weighing his support than that of any other item of the service rendered.

With full realization, therefore, of the importance of the responsibilities devolving upon him, a wide-awake superintendent will prepare himself to the best of his ability to meet the various emergencies that may be expected to confront him on a given work, as well as many of those that are not to be counted upon in advance.

While it is true that the dependable building superintendent is a man of experience, it is no less true that he has much to learn from the experience of others,—and at a considerable saving in cost to himself and to those by whom he is employed. Unfortunately, the booksellers offer a dearth of books on the subject, and of those in the libraries the majority are now out of print. Some of the best of these are English or continental and apply but inadequately to American conditions. Again, in all works on building superintendence, there is a tendency to combine construction design or specification writing, or both, with field supervision, thus producing a volume or volumes of more bulk than is actually needed by an outside man.

In this series of articles, the author will endeavor to confine himself to matters of most direct interest to superintendents, clerks-of-the-works, and inspectors, leaving matters of design to those in the office to whom such duties properly belong. Not that the field man is in any way independent of his indoor confreres; on the contrary, their inter-dependence is akin to that of the voussoirs of an arch, upon which the whole structure is supported. Coöperation and esprit de corps mean much in the success of a construction undertaking. The kind of superintendent who delights in picking flaws in the drawings and specifications, even calling the attention of contractors to them unnecessarily, will find himself cordially hated at the home office and should be promptly replaced, no

matter how able he may otherwise be. He will eventually produce the impression, if permitted to remain, that the work of the office is untrustworthy. But that superintendent who can correct errors and iron out discrepancies with the greatest smoothness will find excellent backing from his co-workers. If his tact and diplomacy are logically extended to his dealings with contractors, his value to his employers will be limited only by his general building knowledge, experience and attention to his duties.

Of particular importance is the close relationship between the superintendent and the specification writer. The latter, if his time is entirely occupied with that work, lacks the direct touch with actual construction which is essential if he is to approximate the ideal documents which he should be striving to produce. Through the constructive criticism of the superintendent, he gets the needed practical touch, finds out wherein his clauses are weak, inappropriate or over-exacting, and can thus steadily improve his output.

The author is treating of the superintendent as of one whose entire time is devoted to such work, and will continue to speak of him in the abstract, striving to make his effort of value both to the old timer and to the beginner, and also to the architect himself who, because of choice or necessity, is looking after his outside work personally. The architect, if a young practitioner, may be as much in need of guidance in interpreting his specifications and in seeing that their stipulations are carried out as would be the case with his employe.

The thing most needing correction in many offices is slipshod, unbusinesslike procedure. As a rule, more and better records should be kept. Applied to field work, this means the inauguration of a set of rules for conducting a construction job and insistence upon close adherence to those rules. All carelessness should be eliminated, from the head of the concern down to the office boy. The modern architect may be a very fine artist,—should be if he is to arrive at the top of his profession,—but, if he is to be successful, he should, first of all, make himself a good executive. The first evidence of the lack of proper care in the administration of a job is frequently encountered in his initial dealings with his client. Either he has no contract at all or his memorandum of agreement is too vague, especially as to the amount of supervision the construction is to receive.

The form of "Articles of Agreement between Architect and Owner," published by the Illinois Society of Architects (Form No. 26, Revised March, 1923 and June, 1924) says in paragraph (e) of Article II that "General Supervision of the Work" consists of "such inspection by the architect or his deputy of work in studios and shops or at the building or other work in process of erec-

tion, completion or alteration, as he finds necessary to ascertain whether it is being executed in general conformity with his drawings, specifications and directions. In acting in this capacity his authority and status will be as defined in the 'General Conditions of the Contract' of the 'Illinois Building Contract Documents', which 'Illinois Building Contract Documents' are by reference made an express part of this agreement. He has authority to reject any part of the work which does not conform with the spirit and intent of the plans and specifications and to order its removal and reconstruction. He has authority to act in emergencies that may arise in the course of construction, to order necessary changes, and to define the meaning and intent of the drawings and specifications. He is not obliged to give continuous personal superintendence, but should the Owner require this service, the Architect will employ a clerk-of-the-works or inspector to render such assistance under his direction at the Owner's expense."

In the "Conditions of Agreement between Owner and Architect" published by the American Institute of Architects, Article 9, "Supervision of Work," reads: "The Architect will endeavor to guard the Owner against defects and deficiencies in the work of contractors, but he does not guarantee the performance of their contracts. The supervision of an architect is to be distinguished from the continuous personal superintendence to be obtained by the employment of a clerk-of-the-works. When authorized by the Owner, a clerk-of-the-works acceptable to both Owner and Architect shall be engaged by the Architect at a salary satisfactory to the Owner and paid by the Owner, upon presentation of the Architect's monthly certificates."

Clinton H. Blake in "The Architect's Law Manual" has to say on this general subject: "With respect to this whole question of the contract between the client and the architect, whether the form preferred is the Institute form or another form, it must be remembered always that the practice of every architect has certain special characteristics which distinguish it from the practice of other architects. To secure the best results, each architect should have prepared for him the form of contract which meets the special requirements and conditions of his own practice. The best use which the architect can make of these forms is not to adopt one of them bodily, but to use them as a guide in evolving the form of contract best suited to his own practice and specially prepared to meet his own problems."

This custom has been followed by the author, whose paragraph on supervision is some near variant of the following: "For the purpose of supervising the work of contractors, the Architect or his Representative will make visits to the site (or

to places where material is being prepared for use in the structure) of such frequency and duration as the nature of the work in progress may necessitate and will, during such visits and by means of correspondence and interviews between visits, use his best endeavors in properly instructing contractors in the work to be done and seeing that they correctly fulfill the terms of their contracts and maintain an effective going organization of all engaged upon the work. The Architect will pass upon the merits of materials and workmanship, audit contractors' accounts, prepare estimates of cost of original work and proposed alterations, issue orders for changes sanctioned by the Owner, give certificates for payments to contractors, and generally assist the Owner in enforcing the terms of the contracts; but the Architect's supervision shall not include liability for any breach of contract by a contractor, nor is the architectural service, under this contract, to include any of the duties ordinarily considered as belonging to a builder or contractor, nor shall such supervision be construed to mean the continuous oversight of a superintendent or clerk-of-the-works. The Architect reserves the privilege of recommending the continuous employment of a clerk-of-the-works for such period of the construction as he deems advisable and at such remuneration as may be approved by the Owner; such employe to be on the Architect's payroll and his pay billed to the Owner and paid for by the Owner in addition to other sums due the Architect. But the employment of such clerk-of-the-works will not relieve the Architect from the performance of his duties as above set forth nor tend to lessen his responsibilities in supervision."

In the last analysis, the Owner will, of course, get whatever supervision from the Architect the latter considers the job is entitled to receive and that he is in position to afford. The point is that he and the owner shall understand each other on the subject, and that the latter shall not expect too much. The suggestion of the employment of a clerk-of-the-works contained in the form given above has been found to take care of this point quite efficaciously. In this, as in all other matters touched upon, we assume that the architect is of the ethical type who has always at heart the best

interests of the work upon which he is engaged.

Inasmuch as there is a wide divergence in the method and personnel used in handling supervision in the offices of architects, it is advisable that we adopt certain arbitrary designations and expressions which are readily understood, though they may not be current in some localities or in all offices in any locality. In a general way, we shall treat of the supervision of all operations incidental to the construction and equipment of a million-dollar high school, situated in an ordinary town or small city, and in the customary somewhat isolated location. This is a comparatively simple engineering and construction problem, fairly typical, and will bring out some phase of each of a superintendent's duties and many of his worries.

The architect is assumed to be living in another city and making fortnightly visits to the work. His duties are thus supervisory, the actual superintendence being performed by a clerk-of-the-works whom, for convenience, we shall call the superintendent. He gives his entire time to the work and is paid by the architect who, in turn, assesses the wages and other expenses of supervision against the owner, to be added to the architect's fee, as is the best approved practice.

For clarity, we shall from time to time use diagrams and excerpts from the specifications, but all building drawings are purposely omitted in order that we may not become too specific on various subjects. For the same reason, we shall take occasion to digress from the particular building we have under consideration, as may appear advisable.

Of prime importance to a superintendent who finds himself at a distance from the home office is an intimate, definite knowledge of the methods in vogue with his employer. He must know, as nearly as may be, just what is expected of him day by day during the entire progress of the work. To this end, nothing is more helpful than a carefully prepared set of instructions. It is invaluable to a novice and scarcely less so to the older head, even if the work under construction is not remote. It will save a lot of conversation, correspondence and other lost motion;—it will also deprive the superintendent, perchance, of some otherwise convenient "alibi"!

CHAPTER 2. THE DUTIES OF SUPERINTENDENTS

THE instructions in this chapter are a composite of those prepared for four different architects' offices. They contain the gist of the rules of procedure needed by a new man going to his first job or by an older man under a new employer. Much that is contained in these instructions is obvious, but its reiteration will serve to

emphasize its importance. No such rules can be sufficiently comprehensive to meet all conditions that may arise. Perhaps in no other field, therefore, is the training of an experienced man of more immediate value. He must not only be possessed of proper initiative, but must have sufficient confidence in himself and his judgment to

take a positive stand when occasion requires. A man who changes his mind frequently, reversing his rulings under pressure, has no place in this important office. Of course, if he has made a mistake and is manifestly wrong, he should not be so "bull headed" as to refuse to back down; but too many such mistakes will pointedly demonstrate his unfitness for the work.

A talkative superintendent is less valuable than one who is aloof or taciturn. One who makes himself agreeable without being unduly sociable is ideal, other things being sufficiently to his credit. He is there to see and understand everything that goes on, but not necessarily to talk about it. Tact is his chief asset, next to his knowledge and experience. This means, among other things, that all criticisms and adjustments are to be taken up with the contractor himself or his chief representative on the job and not, except in case of emergency, with any subordinate. Nor should a contractor or foreman be censured to his men or in their presence. The superintendent is to promote a smooth-running job and must avoid creating disturbance or unrest. A novice in this position must guard against being either too timid or too eager to show his authority. For this reason, he should not have too much authority vested in him until he has outgrown his novitiate. It is easy to say: "Tear that down; it's all wrong," but nothing will disrupt an organization more quickly. If one sees masons laying a wall $12\frac{1}{2}$ inches thick with no mortar in the longitudinal joints when the drawings call for a 13-inch wall and the specifications say that "all joints shall be slushed full," it is easy to take the foreman to one side to discuss it with him and give him opportunity to move his men to another point until a decision has been made. The architect may take note of the fact that this particular piece of basement wall is merely a curtain wall and may not be particular about it; or he may decide that, because too much of it has been laid to make it a simple matter to have it razed, it is expedient to compromise with the contractor on the basis of a contract-price deduction. But the creation of an uproar on the job should be avoided by all means, if possible.

Every experienced architect and superintendent knows, however, that too much temporizing or compromising with contractors on a job is not good for it. Some superintendents are too accustomed to want to "trade" with a contractor here and there as the work progresses. It is easy to acquire this habit, and it is equally easy to allow the habit to grow into a serious evil. Particularly is this true when it comes to a matter of rectifying the architect's mistakes or those of his employes. He will find the contractor quite ready to curry favor by offering to make a correction at his own expense in exchange for some privilege, the which

actually causes the innocent owner, in the final analysis, to pay for the shortcomings of the architect. That architect who is as prompt to admit his own errors, and to pay for them if need be, as he is to call attention to those of the other fellow, cannot fail to win respect thereby.

All these pertinent facts, and many more are in the back of the brain of the older head,—learned, he might say, in the "school of hard knocks," and ready to be applied as opportunity offers. Definite instructions can only be general, but a superintendent is entitled to something of the kind that will serve to acquaint him with the custom of the particular office in charge of the job. Architects just starting independent careers might advantageously copy the following instructions, condensed or augmented as deemed advisable. Something of the sort should also be adopted in offices where definite rules have hitherto been lacking.

INSTRUCTIONS TO SUPERINTENDENTS

1. *Classifications of Construction Superintendents.* This office employs three types of Superintendents, each of whom shall report directly or indirectly to the Chief Construction Engineer:—

A. "Superintendents-in-charge" shall be the only men supervising construction who are entitled to be called "Superintendents." They will be in complete charge of major work under their jurisdiction, empowered to interpret drawings and specifications, issue orders and to make use of the firm's signature (with certain restrictions), but are not authorized to order other than minor changes, nor any changes involving additions to or deductions from the contract price. Superintendents report directly to the Chief Construction Engineer, will be in charge of one or more jobs and will, in each case, have one or more inspectors assigned to assist them.

B. A "Clerk-of-the-works" is employed to supervise certain operations as an observer only, is not authorized to issue orders or to make use of the firm's signature, except when particularly authorized to do so by the Chief Construction Engineer, to whom he reports direct.

C. The duties of an "Inspector" are similar to those of a Clerk-of-the-works, except that an Inspector receives orders and reports to the Superintendent-in-charge and not directly to the Chief Construction Engineer. The use of the firm's signature cannot be delegated to an Inspector.

The following instructions are intended primarily for the guidance of Superintendents and Clerks-of-the-works. Inspectors shall also familiarize themselves with these instructions and shall follow such as are applicable to their duties.

2. *Job Classification.* The operations out of this office are classified as "Major" and "Minor"; "New Work" and "Alterations"; and as "Local" and "Out-of-Town." Supervisory duties vary accordingly.

A. A Major Operation is one on which the Superintendent has one or more Inspectors assisting in the supervision.

B. All other operations are deemed "Minor."

The Chief Construction Engineer will determine the status of each job and make his assignments accordingly. He will also advise Appointees of any special duties or exceptions not in accordance with these instructions, which latter will otherwise apply in full force, without exception.

3. *Preliminary.* Immediately upon being assigned to a job, the Appointee must ascertain its classification, exact location and the time set for his first visit. He will, if feasible, be allowed from a day to a week in the Home Office, before going to the job, in which to familiarize himself with all phases of the work. When such time allowance is impracticable, he must take the first available time to accomplish this. He has no limiting working hours, but must use whatever time is needed for the performance of his duties, keeping always at least "one jump ahead" of the work on the job. He will be supplied with complete specifications and working drawings (including details and shop drawings) and a copy of the contract; also all addenda and special orders and correspondence affecting them. He will be provided with a suitable container in which he shall keep all prints and other documents pertaining to the work, including a complete file of job correspondence, for all of which he will be held individually responsible. If warranted, he will be permitted to requisition an office desk, chair and typewriter; also additional necessary equipment when a stenographer or other clerk is assigned to him.

4. *Working Drawings and Specifications.* The Appointee must make sure that his set of drawings and specifications is of latest issue and complete for all contracts. He must give both a thorough check, one against the other, as the best method of familiarizing himself with all documents. This will necessitate reading the contract and specifications,—every word, including the general conditions, printed or typed.

Notes must be made of apparent discrepancies, errors or other features not perfectly clear and each point be carefully set forth in a letter to the Home Office, except that matters of lesser import may be checked over with the Chief Construction Engineer as opportunity offers. But no such matters should be allowed to drag. They should be settled promptly, orally or by letter, and record made accordingly, corrections pertaining to drawings being noted thereon in ink or colored pencil.

5. *Contracts.* The Appointee must make careful note of all provisions of all contracts and the general conditions directly affecting the initiation of the work, such as:

- A. Securing permits.
- B. Soil tests. Boring or other records, if any.
- C. Time limits. Schedule and Penalties.
- D. Insurance, all kinds.
- E. Bonds, if required.
- F. Provisions for extras and overtime work.
- G. Provisions for "force-account" or "cost-plus" work.
- H. Provisions for union labor, if any.
- I. Contractors' statements and methods of payments.
- J. List of Subcontractors and how approved.
- K. Provisions for shop drawings, samples and models and their approval.
- L. Progress photographs, how many; when.
- M. Provisions for laying out of the building.
- N. Provisions for protecting property adjoining, if needed.

6. *Survey.* The Appointee must secure a copy of the survey, if one has been used, and see that the plans are in conformity therewith. He must definitely ascertain the relation between existing grades and datum and get the location of bench mark, if any has been established; if it has not, find out how it is to be established and see to it.

7. *Shop Drawings, etc.* He must secure copies of all approved shop drawings and make arrangement for future issues to reach the job promptly, both for the use of contractors and himself. He should not hesitate to keep the Home Office reminded that certain shop drawings are due or overdue. Such insistence may prevent avoidable delays. The same is true of approval of samples and models, as well as catalogs and manufacturers' specifications, to which reference has been made in the job specifications. Copies of all such must be on file in the job office while work is under way.

8. *Building Codes.* He must secure, or have access to, a copy of the city or state Building Codes (or both, if there be such) governing local conditions and give himself a working knowledge of them, as far as applicable.

9. *Office Blanks.* He must requisition such of the following stationery as will meet his job requirements:—

- A. Office letterheads.
- B. Envelopes; large, small and self-addressed.
- C. Departmental correspondence sheets.
- D. Carbon sheets.
- E. File copy sheets.
- F. Report blanks; daily, weekly and monthly.
- G. Telephone record blanks.
- H. Box files.
- I. Scratch pads.

Note that the scratch pads are intended to save wasting other stationery and marking on blue-prints, both of which are to be avoided.

10. *Job Duties.* It is assumed that the Appointee arrives at the site either before or shortly after the excavating has commenced. If not, he will take up his duties at the stage of progress at which he finds the work and make such inspections as are necessary to place himself in command of the situation, thereafter devoting such time to it as is required or allotted. His general duties are to see that the job goes forward according to schedule (or better), that contractors understand the drawings and specifications, and that they honestly carry out the terms of their contracts. Specific duties are such as may be directly assigned by the Chief Construction Engineer. Both duties shall receive the best attention of the Appointee.

11. *Reports.* Report blanks shall be filled out fully and clearly, daily, weekly and monthly, as directed, always regularly and promptly, so that the Home Office can "see and hear" exactly what is going on. The Superintendent is the eyes and ears of the Office. He must be especially forehanded in anticipating potential causes of delay and doing what he can to remove them; being particularly alert in citing all such in his daily reports and "jacking up" the Home Office if it appears probable that the negligence of someone there may later serve a contractor as an alibi,—alleging lack of coöperation in that quarter. Percentage progress reports shall be made at such intervals as decided by the Chief Construction Engineer and in such form as he may direct.

12. *Mail, Telephone and Telegraph.* Upon arrival (if possible, within the first 24 hours) the Appointee must call at local telegraph and long distance telephone offices and arrange for messages to reach him. For local calls, he will use the job telephone, unless otherwise directed by his Chief. He must secure a permanent mail address, preferably a P. O. box or at his hotel or rooming house, if the latter is not too distant for two daily deliveries. Provision should also be made for receiving special delivery mail at the job office, but it is not good practice to have other mail sent there. Too many have access to it, and it is too easily lost or misplaced. Mail must never be addressed or received in care of a contractor.

13. *Signs.* It is customary for the firm's sign to be located on the premises along with that of the contractors. The Chief Construction Engineer will confer with the general contractor as to how this is to be done. No sign or advertisement may

be erected without the Chief's special consent.

14. *Expense Accounts.* Each employe is entitled to an expense account when away from the office on the firm's business. Such account shall be kept carefully, day by day, and may include these items, actually paid out:

- A. Traveling expenses, including night Pullman fares.
- B. Street car fare and, in emergencies, bus and taxi fares.
- C. Hotel and restaurant bills, including only the first day on jobs requiring residence of six days or more.
- D. Ordinary tips in connection with the foregoing, not in excess of 10 per cent on any item.
- E. Telegraph and long distance telephone calls, only where record of them is on file. Telegrams to the Home Office should be sent collect; all others prepaid.
- F. Local telephone calls.
- G. Only such other expenditures as are specifically authorized by the Chief Construction Engineer.

Expense memoranda must be sent to the Home Office at regular intervals, as arranged.

15. *Correspondence.* Carbon copies of all outgoing letters must be kept and filed, using separate files for Home Office correspondence and for outside correspondence. All letters received must be similarly filed. Confirmation by letter of all important telephone conversations must be made a habit, the Superintendent either writing them on the blanks provided or insisting upon the other parties' doing so. If an explanatory sketch is sent out with a letter, carbon copy of the sketch must be filed with the letter copy. Copies of orders issued to Contractors modifying contract terms must be attached to the job copy of specifications. In case such orders affect the contract price, a notation to that effect must be attached to the job copy of contract.

16. *Revised Drawings.* Preliminary prints sometimes are issued for the purpose of starting excavating or foundations before all working drawings are finished or revised. When these or later issues are superseded by revised prints, the Superintendent must take careful note of all changes and their effect upon the work already done, as well as that to be performed, and must see that the contractors also have a clear understanding of it. He must also exercise due caution to see that all superseded prints are marked "void" and not left where they might cause trouble.

Editor's Note. This is the first of a series of articles covering in detail the duties, procedure and problems of the architectural supervision of building operations. Realizing the present lack of a definite and adequate treatment of this subject, Mr. Beach has prepared this thorough and informative treatise, based on his many years of active experience and observation. In the February issue, Mr. Beach will continue the "Instructions to Superintendents," and will take up the matter of superintendents' reports, etc. The articles will treat authoritatively of every phase of the work of building supervision for architects and their representatives.

STANDARDIZATION

AS APPLIED TO THE COMPILATION OF WORKING DRAWINGS

BY

E. L. NORBERG

CHAIRMAN OF THE STANDARDIZATION COMMITTEE OF THE NORTHERN CALIFORNIA CHAPTER, A. I. A.

THE architectural profession has in the past been generally criticized, and sometimes justly, for being impractical and lacking in business ability to such an extent that so-called architectural construction companies with their advertised staffs of experts have been securing a large part of the architectural business. So, with the object of promoting the "scientific and practical efficiency of the architectural profession," the Standardization Committee has worked out a number of practical ways and means of standardizing, simplifying and assisting to make more accurate, complete and systematic the architect's office work and, through the use of standard symbols and scientific methods to eliminate wasted effort in the drafting room and to materially assist in the compilation of more accurate and complete working drawings, so that guessing by estimators and extras on the project will be eventually eliminated.

A tentative set of "Standard Symbol Sheets" have been drawn up and consist of:

A. A Standard Symbol Sheet of architectural notations, including abbreviations.

B. A Standard Sheet of Symbols for plumbing work (developed in connection with the Master Plumbers' Association).

C. A Standard Symbol Sheet for heating, ventilating and mechanical equipment.

D. Revisions of the present Standard Symbol Sheet for electrical wiring.

In addition to these symbol sheets, an "Architect's Office Sheet" showing the simplest and yet the most complete manner of indicating different items, schedules and other data not contained in the Standard Symbol Sheets, has been compiled. These sheets have been approved by the Northern California Chapter of the A. I. A., and they were presented at the last national convention of the A. I. A. with the idea that eventually they will be adopted throughout the entire country. In compiling the symbol sheets every effort was made to select symbols that were already in general use and are understood and would be least likely to lead to confusion or misinterpretation. After the final approval of the symbol sheets they will be distributed to all architects of the Institute and in turn to the various engineers, contractors,

estimators, etc., down to and including foremen.

Advantages of the Symbol Sheets are that:

A. All architects of the A. I. A. will use the same symbols and notations on their plans, which will be of great assistance to all estimators, contractors and foremen who work with many different architects' plans.

B. Draftsmen will learn the standard symbols and methods, and in moving from one architect's office to another will not be confused as at present, and as a consequence time will be conserved, errors eliminated, and better plans produced at less cost to the architect.

C. It will no longer be necessary to draw a set of symbols and abbreviations on each set of drawings as it is at present. A note will simply say that all symbols and abbreviations are according to A. I. A. Standard Sheets.

In connection with this, model plans embodying these features, will be obtained from the various architects and exhibited for educational purposes. The sheets as at present published are more or less tentative, and it is hoped that architects will study them carefully; any comment or constructive criticism is invited.

Sheet "A," on architectural notations and abbreviations, is simply a compilation of data as generally used. Sheet "B," on plumbing, was compiled in connection with the Master Plumbers' Association, and its coöperation and assistance were of great help. Sheet "C," like Sheet "A," is a compilation of generally used symbols, and suggestions from the engineering societies will be appreciated. Sheet "D," on electrical symbols, was compiled some time ago by the electricians and approved by the A. I. A. and has been generally adopted. Only some additions and changes are required. The chief change is in using the figures 2, 3, 4, 5, 6, 7 and 8, which are substituted for the characters that formerly were marked on tap circuits to indicate the number of No. 14 conductors in 1/2-inch circuits. The "Architect's Office Sheet" is tentative and requires considerable thought and additional data on structural work to make it practical. In addition, this Committee is working out a number of other matters pertaining to drafting room efficiency.













Editor's Note. Constructive criticism of the tentative standards reproduced herewith is cordially invited. It is hoped that not only will there be suggestions in regard to the Symbol Sheets here mentioned, but that other such sheets covering other subjects may be developed and submitted for consideration. All communications may be addressed to THE ARCHITECTURAL FORUM.

SYMBOLS FOR ARCHITECTURAL & STRUCTURAL DATA

MATERIALS IN SECTION.

NOTE:

Old materials Same only Shaded.

	BRICK		METAL		TILE
	CONCRETE		PLASTER		WOOD
	GLASS		STONE		WOOD (COL., POST, STUD)
	MARBLE		TERRA COTTA		

ABBREVIATIONS

Basement	Bsmt.	Mirror	Mir.
Blackboard	B.B.	Mullion	Mull.
Bulletin Board	Bull. B.	Muntin	Munt.
Cabinet	Cab.	Natural Grade (Pres.)	Nat. (Pres.) Gr.
Canvas Covered	Can. Cov.	Not in Contract	N.I.C.
Casement	Csmt.	On Centers	O.C.
Cast Iron	C.I.	Panel	Pan.
Ceiling	Clg.	Patent Hardware	Pat. Hwd.
Cement Plaster	Cem. Pl.	Picture Mould	P. Mld.
Center Line	⊕	Pine - Oregon	O.P.
Closet	Clos.	Sugar	S.P.
Concrete	Conc.	Plaster	Pl.
Cooler	Cool.	Redwood	Rwd.
Cornice	Corn.	Riser	R.
Door	Dr.	Sash Door	Sh. Dr.
Double Hung	D.H.	Screened	Scr.
Down Spout	D.S.	Sheet Metal	Sh. Met.
Drawer	Dwr.	Shelf and Rod	Sh. & Rd.
Finished Grade	Fin. Gr.	Side Light	S.L.
French Door	Fr. Dr.	Sliding Door	Sl. Dr.
Galvanized Iron	Galv. I.	Stationary	Stat.
Glass - Cathedral	Cath. Gl.	Steel	St.
Clear	Cl. Gl.	Studs	Stds.
Leaded	Ld. Gl.	Telephone	Phone
Obscure	Ob. Gl.	Terra Cotta	T.C.
Plate	Pl. Gl.	Thimble	Th
Wire (Polished, Rough)	W. Gl. (Pol., Rough).	Threshold	Thr.
Hardwood Floor	Hwd. Fl.	Tongue and Groove	T & G.
Ironing Board	I. B.	Transom	Trans.
Jamb	Jb.	Treads	Tr.
Keene Cement Wainscot	K. Cem. Wains.	Veneer	Ven.
Leader	Ldr.	Wainscot	Wains.
Linoleum	Lino.	Window	Wnd.
Magnesite	Mag.	Wood Base	Wd. B.
Medicine Cabinet	M. C.	Wood Stair	Wd. St.
Metal Covered	Met. Cov.	Wrought Iron	W.I.

SHEET A

TENTATIVE STANDARD SYMBOLS FOR ARCHITECTURAL NOTATIONS, INCLUDING ABBREVIATIONS

Compiled by the Standardization Committee of the Northern California Chapter, A. I. A.

SYMBOLS FOR PLUMBING FIXTURES						DRAIN SYMBOLS			
CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN	PLAN	
Corner Tub		R. & L. Drain Board Kitchen Sink		Water Closet		Pedestal Lavatory		Floor Drain	Dr.
Built in Tub		L. Hand Drain Board Kitchen Sink		Wall Urinal		Wall Lavatory		Shower Drain	Dr.
Roll Rim Tub		Plain Kitchen Sink		Pedestal Urinal		Corner Lavatory		Garage Drain	Dr.
Shower Stall		Wash Sink	W.S.	Stall Urinal		Manicure Lavatory		Floor Drain with Backwater Valve	Dr.
Sitz Bath	S.B.	Slap Sink	S.S.	Trough Urinal		Dental Lavatory	D. Lav.	Refrigerator Drain	Dr.
Foot Bath	F.B.	Laundry Trays		Hose Rack	H.R.	Pedestal Drinking Fountain	Dr. F.	Roof Sump	S.
Bidet	B.	Combination Sink and Tray	S. T.	Hose Bib	H.B.	Wall Hung Drinking Fountain	Dr. F.	Clean Out	C.O.
Hot Water Tank	HW T.	Combination Sink and Dish Washer		Gas Outlet	G.	Scale of Symbols 1/4" = 1'-0"			
Water Heater	WH.	Washing Machine	WM.	Vacuum Outlet	Vac.				Grease Separator

SHEET B

TENTATIVE STANDARD SYMBOLS FOR PLUMBING WORK

PROPOSED SYMBOLS FOR HEATING AND VENTILATING SYSTEMS.

			RISER SYMBOLS
HIGH PRESSURE STEAM	————— HS —————	○	(HS 2)
HIGH PRESSURE RETURN	- - - - - HR - - - - -	○	(HR 2)
MEDIUM PRESSURE STEAM	————— MS —————	○	(MS 2)
MEDIUM PRESSURE RETURN	- - - - - MR - - - - -	○	(MR 2)
LOW PRESSURE STEAM	————— LS —————	○	(LS 2)
LOW PRESSURE RETURN	- - - - - LR - - - - -	○	(LR 2)
HOT WATER HEATING SYSTEM	————— HH —————	○	(HH 2)
HOT WATER SERVICE	- - - - - HW - - - - -	○	(HW 2)
COLD WATER	————— C —————	○	(C 2)
DRAIN OR BLOW-OFF	- · - · - · D - · - · - ·	○	(D 2)
VENT OR RELIEF	× ———— × V ———— ×	○	(V 2)
ANY PIPE OBSCURED OR BEHIND ANOTHER OBJECT	- - - - - HS - - - - -		
INDICATION THAT A PIPE PITCHES DOWNWARD IN DIRECTION OF ARROW.			

	SYMBOLS	DESCRIPTION (USE OPTIONAL)
GATE OR GLOBE VALVE		G.V.
ANGLE VALVE		A.V.
CHECK VALVE		CH.V.
PRESSURE REDUCING VALVE		P.R.V.
DIAPHRAGM OR SYLPHON VALVE		SY.V
FLOAT TRAP		FLT
THERMOSTATIC TRAP		T.T.
EXPANSION LOOP, SCREWED OR BEND		EX.
PACKED EXPANSION JOINT		EX.J.
THERMOSTAT		TH.
STRAINER		STR.
ANCHOR UNION, FLANGE OR SCREWED		AN.
		UN.
ELBOW		
TEE		
RADIATOR, DIRECT	 PLAN ELEVATION 2C-26"-15S=40f	
RADIATOR, INDIRECT	 PLAN ELEVATION	
AIR SUPPLY DUCT		
AIR SUPPLY OUTLET		
AIR EXHAUST DUCT		
AIR EXHAUST OUTLET		

COMPILED BY
 STANDARDIZATION COMMITTEE
 A.I.A. S.F.
 F.L. NORBERG - CHAIRMAN.

NOTE: ALL SYMBOLS, UNLESS SPECIALLY MARKED AS APPLYING ON PLAN VIEWS OR ELEVATIONS, ARE USED INDISCRIMINATELY ON EITHER.

DRAWING REVISED 2-28-28.

SHEET C

TENTATIVE STANDARD SYMBOLS FOR HEATING, VENTILATING AND MECHANICAL EQUIPMENT

Compiled by the Standardization Committee of the Northern California Chapter, A. I. A.

EFFICIENT PROCEDURE IN BUILDING

BY

MORTON C. TUTTLE

PRESIDENT, MORTON C. TUTTLE CO.

IN any field of enterprise, new methods and procedures are usually looked upon as visionary and impracticable, and in a field so fiercely competitive as that of the building industry, this would certainly seem to be the case. In the present paper I propose, it is true, to advocate new methods and procedures, but I submit them on the basis of practical experience of their effectiveness. The building industry has been and in fact still is conducted on the basis of competitive, lump-sum bidding. Yet one firm, which has refused to conform to this accepted method,—that is, to compete on a price basis for any contract,—has been satisfyingly successful in convincing discriminating clients that the methods herein discussed assure them genuine economy and satisfaction in their building and engineering operations. The firm departed from the established procedures of the trade because it believed that the theories upon which the building business has been conducted,—and more especially the procedure of competitive bidding,—have resulted in conditions and practices which are undesirable; and further, that they tend toward waste and extravagance, rather than toward economy and satisfaction. Let us, for a moment, consider certain facts regarding the building industry.

That building is hazardous business is a matter of common knowledge. No bank, for example, wishes to carry a large number of building trade accounts because of the notoriously bad credit risk. The Secretary of the Associated General Contractors of America says that failures among general contractors average 10 per cent a year; that is, in every period of five years one-half the companies engaged in general contracting fail. We need not here consider the economic evils inherent in such a state of affairs; we wish rather to consider the effect upon the contractors themselves,—those left in the field,—of a continuing economic slaughter of this kind.

Theoretically,—and practically,—a field of business in which one-half the competitors sink from sight every five years offers to the struggling survivors the constant threat of financial failure. In the competing and harassed building trade, the subject of price is emphasized from daylight to dark, year in and year out, and with the necessity for low cost constantly reiterated by architects and engineers,—and grimly illustrated by the failure of those who cannot pare costs to the quick,—it is small wonder that the building field is obsessed by the idea that only in the making of low costs,—at any cost,—lies success.

The building industry in general is conducted

upon the theory that the architect or engineer shall design and specify in exact detail the building or engineering work which the owner has in mind. His plans and specifications are submitted to general contractors, who are prepared to bid,—lump sums,—for the complete contract. The contractor whose bid is accepted will then undertake to execute construction or engineering work of the exact sort which has been minutely described in the plans and specifications. It is assumed that the architect or engineer will then see to it that a building of exactly the quality and of exactly the kind specified shall be constructed. This necessity for safeguarding the owner's interests is based on the theory that a contractor who has been in snrewd competition on price for the contract may,—in case of adverse conditions,—be tempted to substitute less satisfactory material and workmanship than that which has been agreed upon. It is unnecessary to amplify the fact that any industry in which the chief emphasis is placed on price cannot offer great assurance for frankness of dealing.

The evils of this condition, furthermore, are becoming apparent to the contractors themselves. Many of the best men in the construction field now hesitate to accept the duties of superintending and managing work obtained on a fixed-price basis. They declare openly that in order to make a fair profit on work obtained in price competition they are forced to sharp practices. They realize, furthermore, that their abilities are confined to low-cost building, rather than to building in which they can take legitimate pride. They even admit that, carried to its extreme the competitive building business requires them to dissemble, to evade, to answer with partial truths, and to deal with their subcontractors on the basis of *caveat emptor*, rather than on any basis of equitable coöperation.

This state of affairs is, in our opinion, due solely to the pressure resulting from competitive bidding. The evils inherent in the old system are, as I have said, beginning to be recognized. In the desire to get away from the hazards and evasions of lump-sum bidding, many firms are developing new methods of obtaining work. A common device is combining a building company and an engineering department with the management of public utilities. Under such an arrangement, the consolidated company can turn over to its building department a considerable volume of business on any form of agency contract it pleases. Another means of avoiding the rigors of lump-sum bidding is the combination of financing and building business. With direct ownership in the property, a builder

can secure work without lump-sum competition.

There are, of course, certain companies which prefer the old method of competitive bidding. Investigation generally proves, however, that these are companies which, through special personal or business affiliations, are not subjected to the full force of price competition, and which can therefore obtain contracts at a good margin of profit. The only genuine enthusiasm for the competitive bid comes from individuals who, by chance or through some special advantage, have obtained contracts at abnormally high prices. When a contract is awarded on a high bid, the contractor is naturally free from all responsibility as to its actually representing a fair price,—fair, that is, to the owner. The extra profit is all the contractor's, and by that much he is in luck. But to fulfill a contract on a fixed bid always involves the element of risk. A friend of ours, who for years was insistent that lump-sum bidding offered the only satisfactory method of conducting a business, was wiped out by unforeseen conditions.

Our inquiry into the procedure of the competitive bid confirmed us in the belief that not only is lump-sum bidding to the disadvantage of the contractor, but that it is, furthermore, greatly to the disadvantage of the prospective owner. As a matter of fact, rarely are the actual desires and needs of the prospective owner in the proposed building fully ascertained. The average owner does not always desire or need the precise building described by a given set of plans and specifications. What he does desire is a building approximately like that specified and planned. He has explained what he thinks he wants,—as clearly as he is capable of doing,—to his architect or his engineer, and he accepts,—hopefully or not,—the plans or specifications presently submitted to him as the best compromise he can obtain. Yet any given set of plans rarely represents the crystallization of the prospective owner's needs and desires. On the contrary, they often represent the results of uncertain thinking, faultily explained to the technician, who in turn translates those somewhat hazy ideas into the foreign language of blue prints and specification, and thus embodied submits them to the bidders, who do not dare to criticize the work of the designer, and whose business it is simply to name the prices,—the lowest prices,—at which they dare to attempt to fulfill the contract.

In the satisfaction of his every-day needs and desires, the prospective owner is accustomed to determine his selection on the basis of value and quality, and in most matters he has some experience or some means of comparison. In building he has perhaps little experience and small means of comparison. He ardently wishes he knew enough about engineering or architecture to judge how much included in the plans is necessary or un-

necessary for his purpose. He wishes he knew the precise cost of this or that detail, and what the result of a change or omission would be. He wishes he knew, in terms of cost, what other details besides those shown on the plans are available, for he must consider not only the immediate cost of construction, but the cost of upkeep and necessary alterations: He would like to know if simpler and less expensive methods might not be equally satisfactory. He would like to be able to determine whether the architect and the engineer have added certain details from pure pride of craftsmanship, for, although he may believe his architect or engineer to be an ingenious technician, he is not quite sure that any technician thinks in terms of cost; and he is acutely aware that it is he himself who must produce the money, and later on pay for the upkeep of the building.

Upon such matters the owner can, of course, consult the architect or engineer, but these agents rarely possess a thorough knowledge of current costs, nor do they always base their judgments upon considerations of cost and utility.

Cost knowledge, however, is the stock in trade of the general contractor; an accurate and complete knowledge of costs is the basis of his reckoning. He must know the cost of details, he must know which method is the most economical, and he has shrewd ideas as to the earning value of this, that, or the other equipment. The best of the general contractors also maintain competent engineering departments. These departments are composed of men thoroughly expert in their lines of work, who of necessity have the idea of economy constantly in mind. If they cannot produce economical work, they have no value to the general contractor. But the general contractor, with his sound knowledge of cost and value, cannot go to the owner with suggestions as to changes in plan, even though those changes might save the owner a substantial sum. The contractor is frankly afraid that he may make enemies of the architect and the engineer,—and they are the sources of his business. An owner is infrequently in the building market; the architect and the engineer are continuously in it, and they are the last individuals the contractor wishes to antagonize.

This situation raises a barrier between the owner and the contractor,—the individual who is perhaps best equipped to give the owner the detailed information he desires as to cost and value. As a result of this state of affairs, the buying in the building trade is done almost wholly by the architect and the engineer, as agents for the owner, and like any agents they are likely to safeguard their stewardship by buying as cheaply as they dare and awarding their contracts at as low a price as they can.

One contracting firm instituted its business in the belief that if it were unhandicapped by the

rigidity of the competitive bid, its experts could study the owner's requirements and cooperate with him, and his architect or engineer, in the selection of the most suitable solution, by showing him the detailed cost of various methods of fulfilling those requirements. It believed that the translation of the details of the problem into terms of dollars and cents would result in producing more economical designs,—a premise which, again and again, has proved to be correct.

Present-day specialization in the many processes of building confirmed the belief that some form of cooperation is essential. It was observed, for example, that the general contractor is himself a buyer for a large part of his operation. In the old days he used to be a mechanic,—usually a carpenter or a bricklayer,—who with his own workers constructed the entire building. As building grew more complicated, subcontractors came into the field, until today there are some 30 subcontractors engaged in the construction of a modern office building. It was found that the general contractor sub-lets some 70 per cent of his work, and that half the remaining 30 per cent is accounted for by the cost of materials which the general contractor uses for his own operations. This means that the general contractor's payrolls on an ordinary office building amount to about 15 per cent of the cost;—that is, for 85 per cent he is buyer of materials and subcontracts.

The contractor can obviously only estimate on all these subcontracts in the total bid which he submits to the prospective owner or the architect. If he has over-estimated and still is awarded the contract, he gains and the owner loses. If he under-estimates, he will certainly be tempted to try to make up his loss by skimping somewhere. It seemed that some method could be devised whereby value rather than merely cost should be the basis of selection,—not only in the individual subcontract but in all purchase of material. It was felt that as the general contractor is the expert,—and probably the only expert,—on cost and values, rather than submitting to the owner and architect a hit-or-miss lump-sum bid, he could be of greater service as their agent and adviser in estimating the relative values of methods and materials. It is clear that if the maximum value in all materials and subcontracts is obtained, the owner will receive maximum value in a building completed without unnecessary delay. This has been proved in practice.

There is another factor of very great importance to the owner, which can be gained only through cooperation with the general contractor. As any large piece of construction progresses, improvements on the original plan may suggest themselves, and opportunities for economy arise. Seldom can an engineer or architect visualize a problem in its

entirety months before the details of the operation are actually under way. In constantly studying his problem, in obtaining the ideas of the person engaged upon it, and in the acquired experience of the owner, there arise opportunities for improvement and for economies over the plan which was originally considered.

In dealing with a lump-sum bidder, the architect or the engineer properly hesitates to make a change in his plans and specifications, even though such a change be an obvious improvement and economy. He dreads any change in the original plans because of the difficulty of securing a fair adjustment of cost. On an omission the general contractor allows as little as possible; on an addition he charges as much as he can, and there is seldom a possibility of assuring the owner that the adjustment is fair. The total cost of even a few minor changes usually rises to an amazing total. The architect, accordingly, prefers to allow even a crudity embodied in the plans to remain uncorrected rather than face the perils of adjusting its cost with the lump-sum contractor.

Such desirable changes, however, are easily adjusted by the general contractor who is acting in cooperation with the owner. It should be noted that opportunities for desirable alterations usually occur not in the work handled directly by the general contractor, but in that of the subcontractors. Now the subcontractor looks to the general contractor for his business, precisely as the general contractor looks to the architect or engineer. The subcontractor is, therefore, very ready to cooperate with the general contractor. As the general contractor is responsible to the owner for the final cost, he will see to it that only a fair charge is allowed for any changes. Under the system of competitive bidding, however, the general contractor is likely to be entirely complaisant if a hard driven subcontractor gets a chance to pick up more profit. He is quite likely to feel that the owner, through his architect, has driven a hard bargain with him, and that it is little concern of his to decrease the burden of the extras. Incidentally, the general contractor usually receives a percentage of extra costs. It is not a situation that inspires much hope of sympathetic handling. The owner has dealt through an architect dealing with a general contractor, who in turn is dealing with a subcontractor. So, the owner can pursue the sequence of events down to one certain answer,—which is, that he pays.

The firm therefore concluded that if, in addition to a reputation for frankness, honesty and ability as contractors, it could establish a reputation as buyers and managers, prospective owners would employ it because of that reputation, with the assurance that they would receive sound work at a fair price. Owners have been found very

sensible of these financial benefits, and, contrary to general belief, many architects and engineers not only do not resent this procedure, but eagerly welcome it and cooperate in it. This cooperation of prospective owner, designer, estimator and constructor obviously produces economy. In practice these economies are greater than would be at first imagined.

Once convinced that this procedure was logical and that the theory by test adapted itself to practice, the firm was faced with another consideration. It was evident that it would obtain a considerable volume of work on an agency basis. This would come from persons for whom it had previously handled contracts, and who had confidence in the firm. It would come also from other persons who were obliged to start work before their plans and specifications were completed. The question was whether the volume of work that could be obtained from these sources would be sufficient. It was known that under the usual method of competitive bid, the firm could secure a large volume of work by bidding low enough. It could even expect to secure some work at prices greater than those named by some of the bidders with whom it would compete. Experience has shown, however, that out of a large volume of work thus obtained, about one-third would prove unprofitable—that on a small amount the firm would break about even, and that on the remainder would be able to make enough to show some profit.

It was not desired however, to conduct the business,—or any part of it,—on the competitive bid basis. First, it would be difficult to train men who would be effective in handling agency contracts, where frankness and a sense of value would play the principal parts. In addition, a practical sales difficulty presented itself, namely that if part of the contracts were handled by the firm as agents for the owner and another part as lump-sum contractors, the question would promptly arise in the minds of the owners for whom the firm was acting as agents as to whether it were giving their operations the best men it possessed and attacking their problems with the utmost vigor. There would, at least, be a suspicion that the firm's best energies would be turned to the projects on which the firm's cash was at stake. Accordingly, it was determined to handle the business on but one basis,—that of agents for the owner,—in the belief that, if successful in showing a list of satisfied clients, the firm could reasonably hope to prove to others the soundness of the theories under which it was working. It seemed, that the evidence given by the man whose money had been spent would probably be more effective than any other testimony that could be brought to bear on the soundness of these principles.

The decision wholly to abandon the lump-sum bid and conduct the business on an agency basis necessitated certain minor adjustments. The fact that under the newer method it became easier to make changes in an agency contract necessitated the setting up of an accounting system which would make the firm responsible for the cost of the work carried out according to the original plan. Such a system was devised so that before making any changes, either additions or deductions, the owner is informed as to the probable saving or the probable extra cost of these changes, and so kept constantly informed of the total cost. This was done because many agency contracts proved expensive, not because they were badly handled, but because the owner himself authorized changes without realizing in how much expense he was involving himself.

One other thing, however, is essential to the success of such a business, namely that the firm have no financial interest in any material or any other subsidiary enterprise. This required that no member of the firm should hold a directorship in any liability insurance companies, nor should he involve himself in agencies for any building material. Further, it seemed doubly wise not to own any plant, for various reasons.

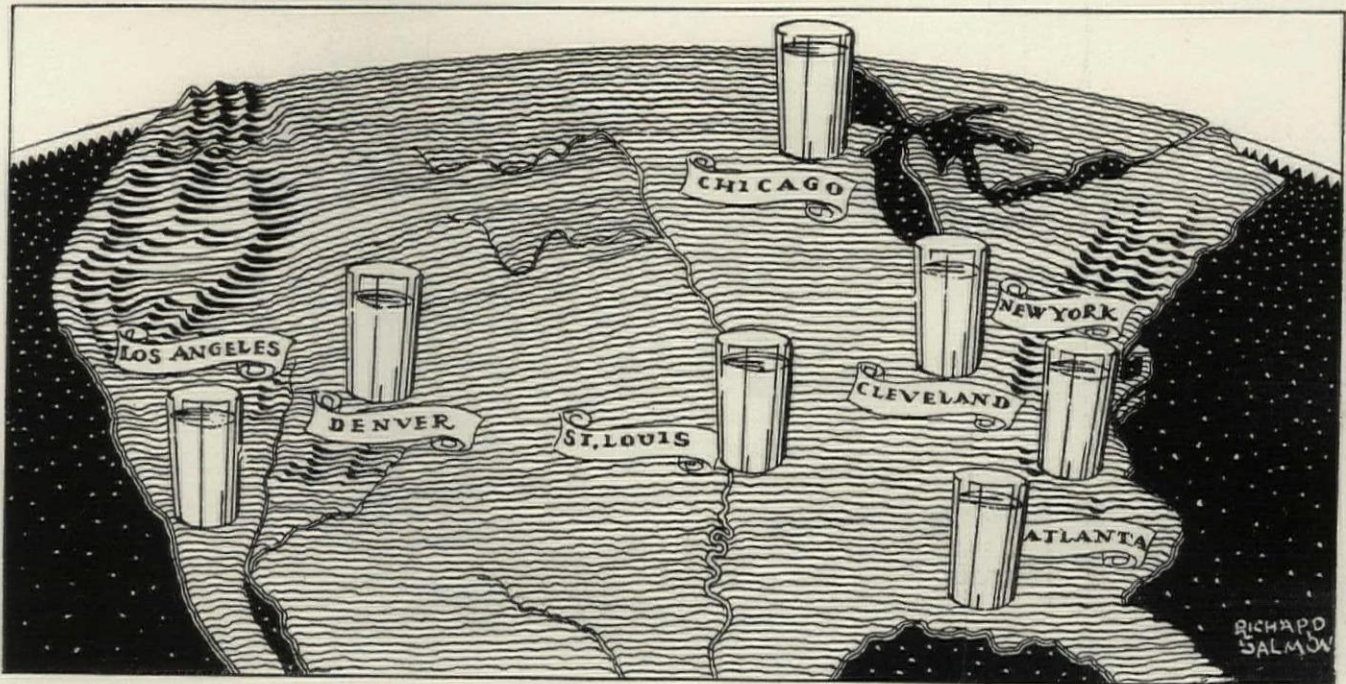
In recent years many equipment companies have been developed making a business of supplying contractor's plants. These equipment companies are scattered throughout the country. From them can be obtained a wide selection of good equipment, and, with their ability to furnish this equipment at reasonable rentals and with short freight hauls, it is far more economical for an owner to deal with them than it is to permit a general contractor to railroad his plant to far distant points. Accordingly, the firm determined not to become involved in the plant problem, and followed the theory of owning no plant.

The firm proceeded in its work upon the theory that by combining the knowledge of the estimator and the builder with that of the owner and the designer, greater economies can be effected and better value obtained than by neglecting such cooperation and relying for economy simply upon shrewd buying. The work has been based upon the attack of the preliminary problems involved in the making of the plans and specifications, then intelligently building that which has been determined upon as most effective. It is believed that there is at least 5 per cent to be saved on the cost of the average building by the intelligent carrying out of such a procedure. This statement is made deliberately, and with the knowledge that the operations in the American building trade run to three or more billions of dollars a year. This saving might pay for architects' services.

Water... Water

EVERYWHERE

and everywhere it's different...!



WATERS from different sources may look alike and taste alike. They may be equally pure for drinking. And yet they may be very different in their action on pipe.

Some waters are normally corrosive. Other waters—often those that are purest and most healthful—are highly corrosive.

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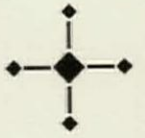
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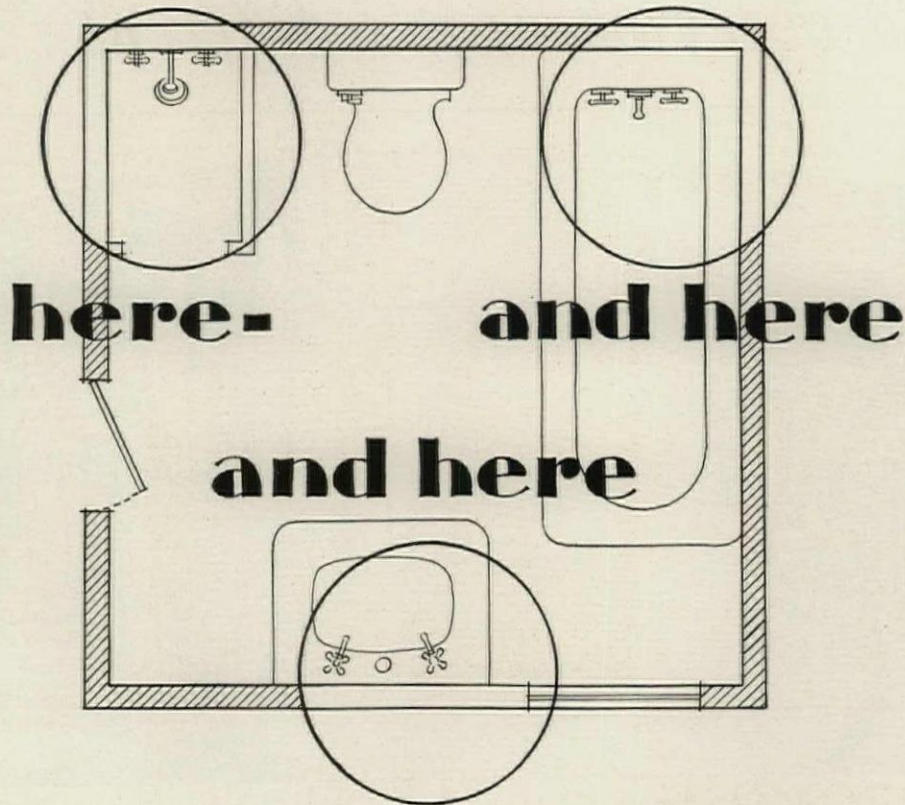
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inexpensive beauty



Must there be vivid bathtubs and Louis Quinze lavatories and gorgeous back-grounds to give the modern bathroom modern beauty? Not necessarily. Beauty is, after all, grounded on simplicity. Even a modest bathroom, equipped with Speakman



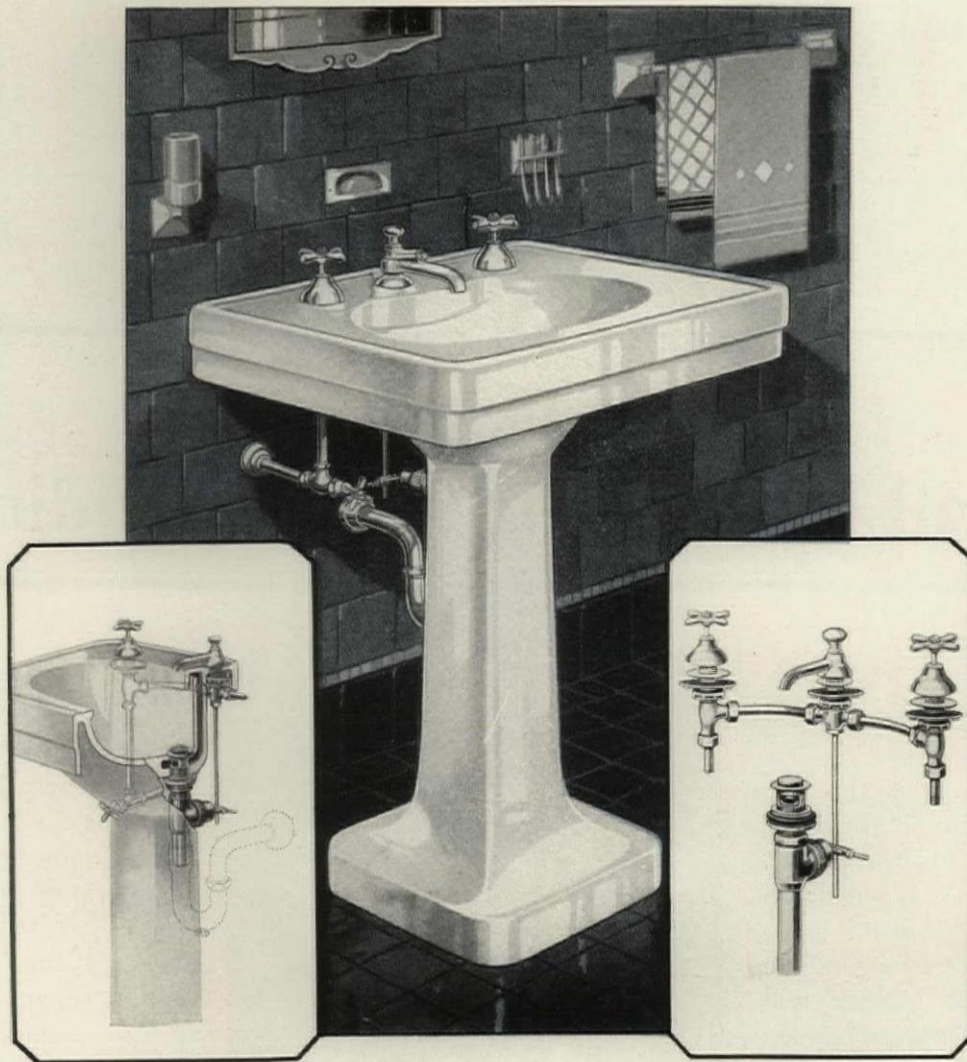
matched fixtures for showers, bathtubs and lavatories—chromium-plated, brilliantly styled—has glow and sparkle.

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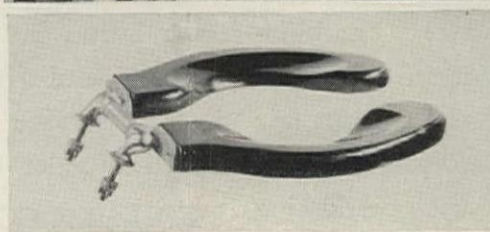


The toilet seats will last as long as the building

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This same hard composition covers the hinges on the all-black seats. They are completely sanitary. They cannot tarnish, rust nor become corroded. And they are held in place by screws, which are tapped through solid steel bars—molded into the seat core.

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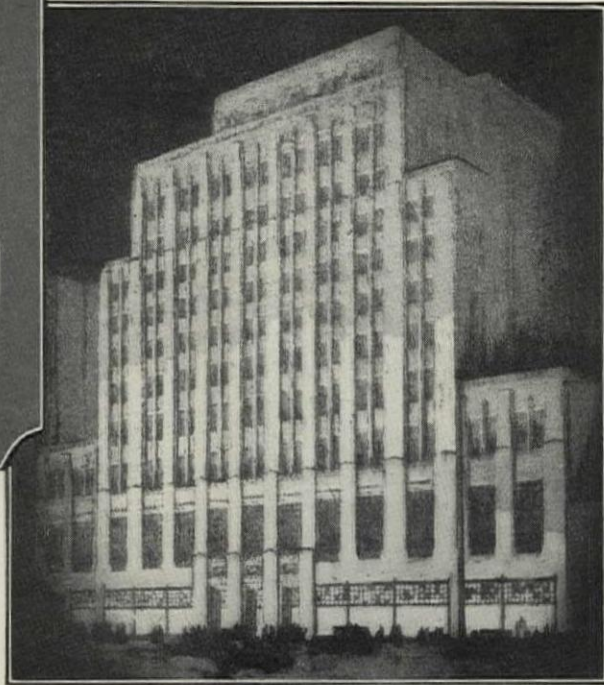
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EVEN 20 YEARS HENCE ...
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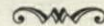
BECAUSE they are finished in CRODON, the chromium plate, 447 Jenkins Radiator Valves installed in the Title Insurance Building, Los Angeles, Cal., will permanently retain their initial lustre and attractive appearance. After years of constant use their CRODON surfaces will be mirror-bright—free from tarnish or corrosion.

To keep them bright and spotless, only an occasional wiping off is required. Polishing, the cause of rapid wear of other finishes is never necessary.

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Architects—John Parkinson & Donald B. Parkinson.



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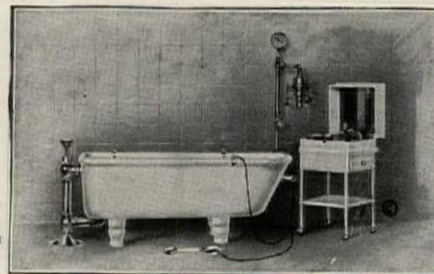
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WHEN the average hospital is built, only ten per cent of the total cost is spent for plumbing — *the most important part of all.*

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And Clow has been making a specialty of hospital plumbing since 1878. In those *fifty-one* years, Clow has designed and built many hydrotherapeutic and other fixtures, in addition to supplying plumbing for every hospital need.



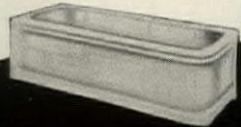
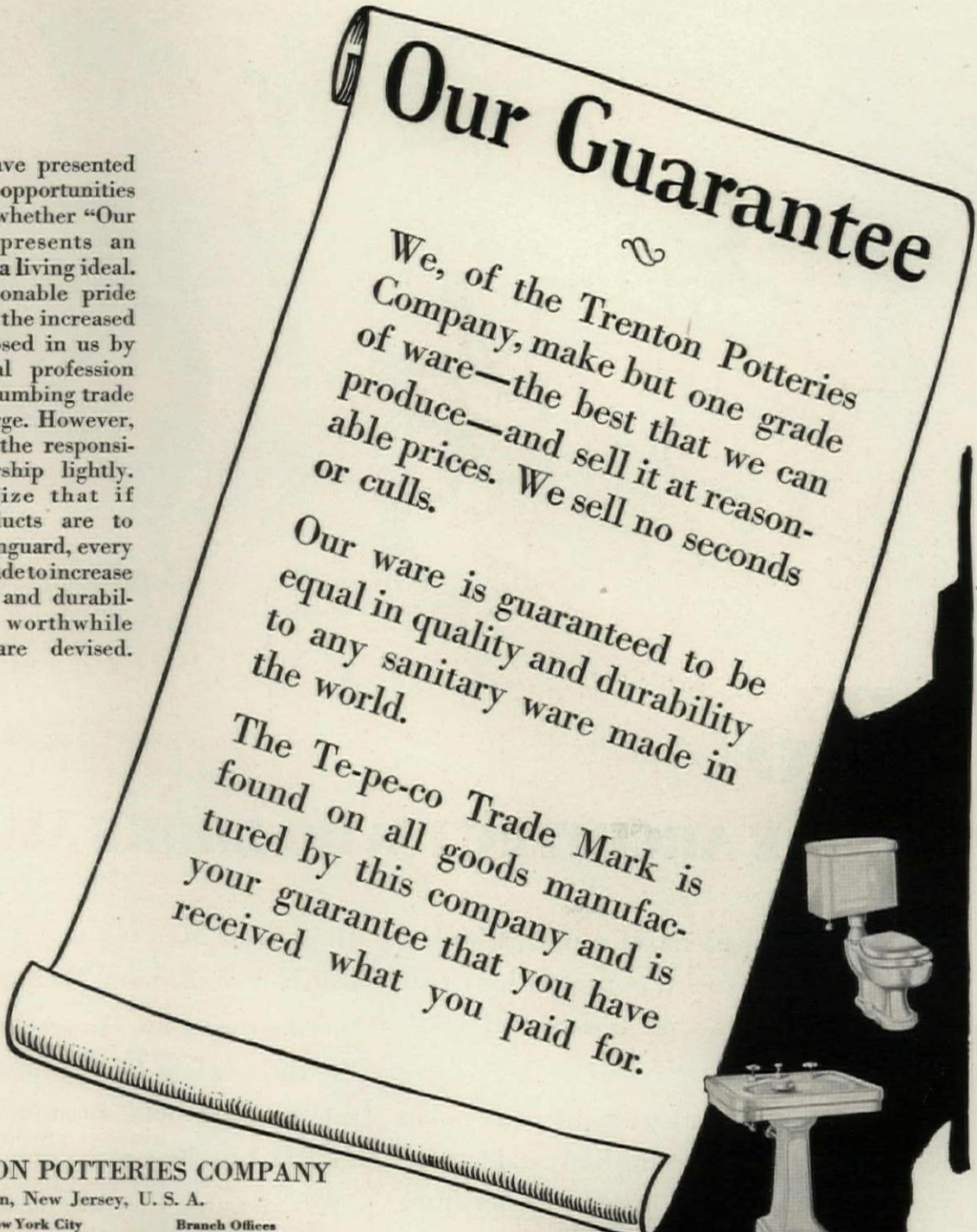
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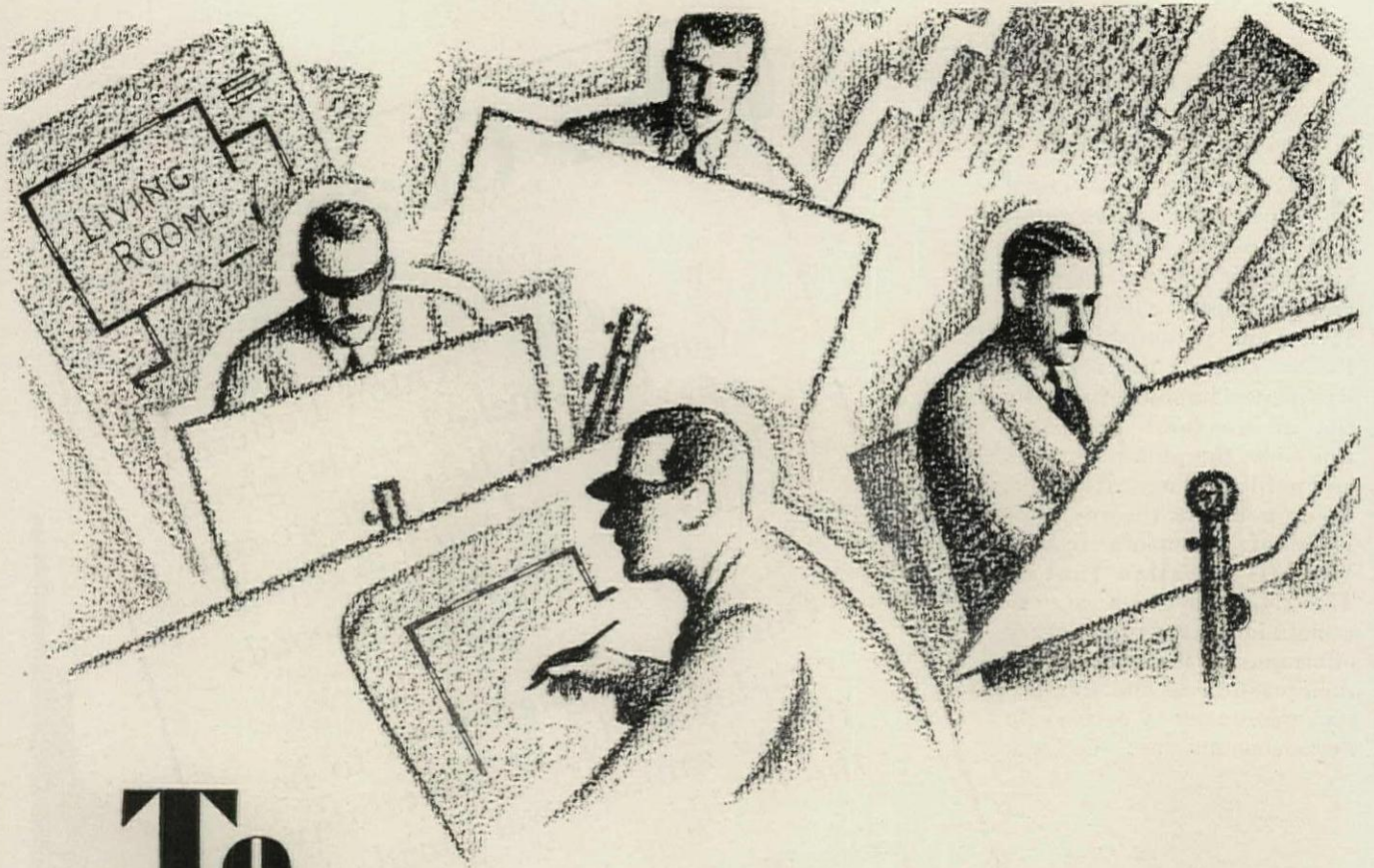
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THE TRENTON POTTERIES COMPANY



To

THE ARCHITECT WHO LOOKS AHEAD

We sympathize, of course, with the architect's wish to protect his client by avoiding unnecessary expenditures.

But is the bathroom the place to cut costs? Considering how vital to comfort and good health are its functions, are run-of-the-mine fixtures advisable or desirable? Are such fixtures, after all, an economy?

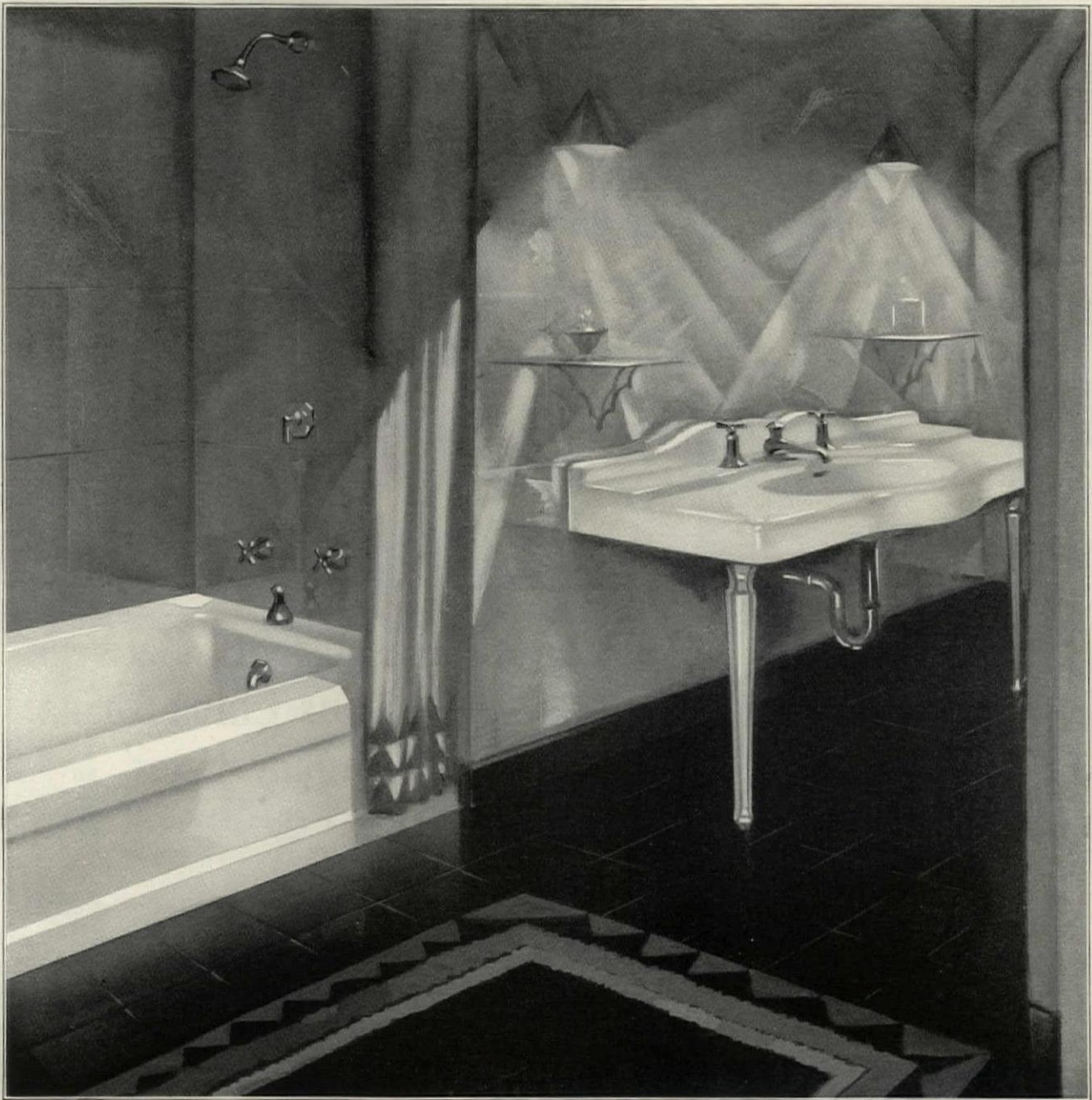
We ask your consideration for the

Improved Madera toilet and its matched companion Madbury lavatory because they are recognized as the last word in fine fixtures for the modern bathroom; because they are designed to the sanitary standards of 1929; because they are unsurpassed in beauty, durability and excellence of fittings; because they give lifelong satisfaction and permanent freedom from trouble.

MADDOCK

THOMAS MADDOCK'S SONS CO., TRENTON, N. J.

LOOK for the picture below in full color on the back cover of the January 12th issue of Liberty magazine. You will see a very beautiful bathroom, original in color scheme, with the new Kohler Mayfair tub and Bellaires vitreous china lavatory in the delicate "old ivory" tint. This advertisement in Liberty is a striking example of how Kohler of Kohler is cooperating with the architect in increasing public appreciation of the importance of color in bathroom design.

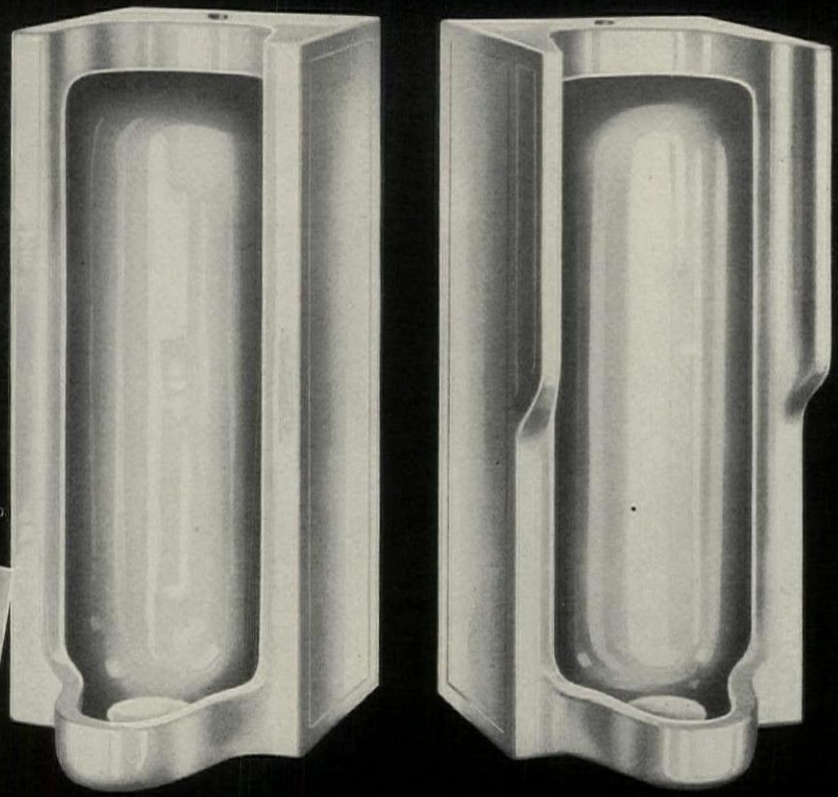
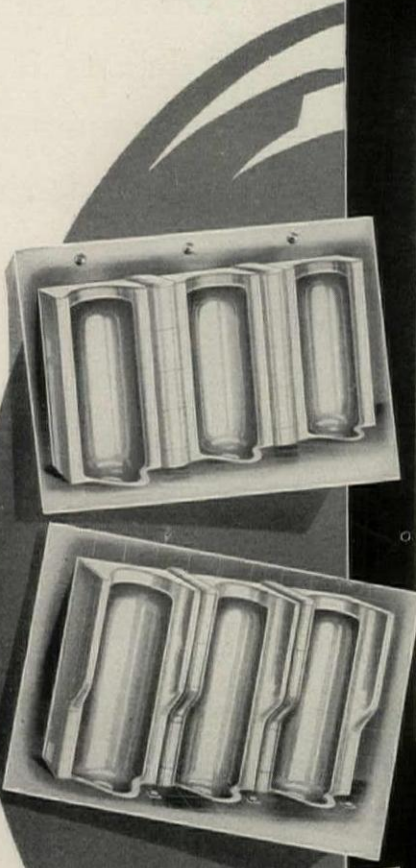


"It Pays to Modernize Your Plumbing and Heating"

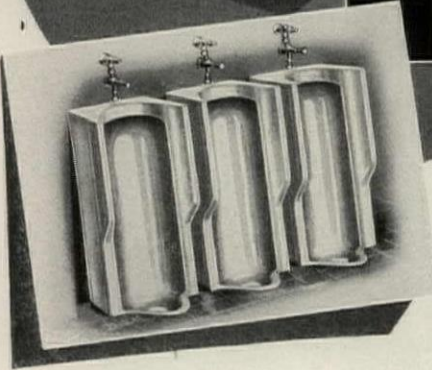
KOHLER CO., Founded 1873, KOHLER, WIS. · Shipping Point, Sheboygan, Wis. · Branches in Principal Cities

KOHLER OF KOHLER
Plumbing Fixtures

-Not the Ordinary Urinal -
IT IS MADE OF GENUINE VITREOUS CHINA



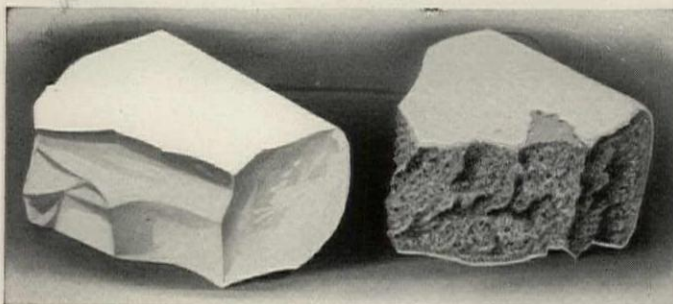
DOUGLAS



What's the Difference Between a Genuine Vitreous China Urinal Stall and an ordinary One?

The same difference that you would understand in considering a water closet or lavatory made of anything but Genuine Vitreous China.

The superiority of vitreous china over other materials being well known—the advantages of specifying Douglas urinal stalls are apparent.—Bear in mind they will not craze or discolor, that they are easily kept clean and absolutely impervious.



A Sectional Piece of Douglas Vitreous China Urinal

A Sectional Piece of the Ordinary Urinal

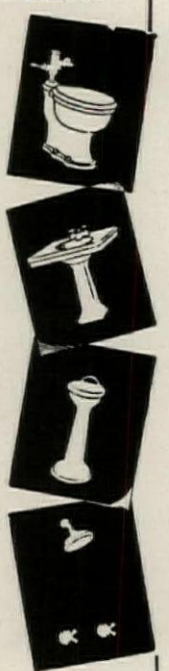
Write for Catalogue and list of Buildings where the Genuine Douglas Vitreous China Urinal Stalls are being used.

Manufactured by
The John Douglas Co.

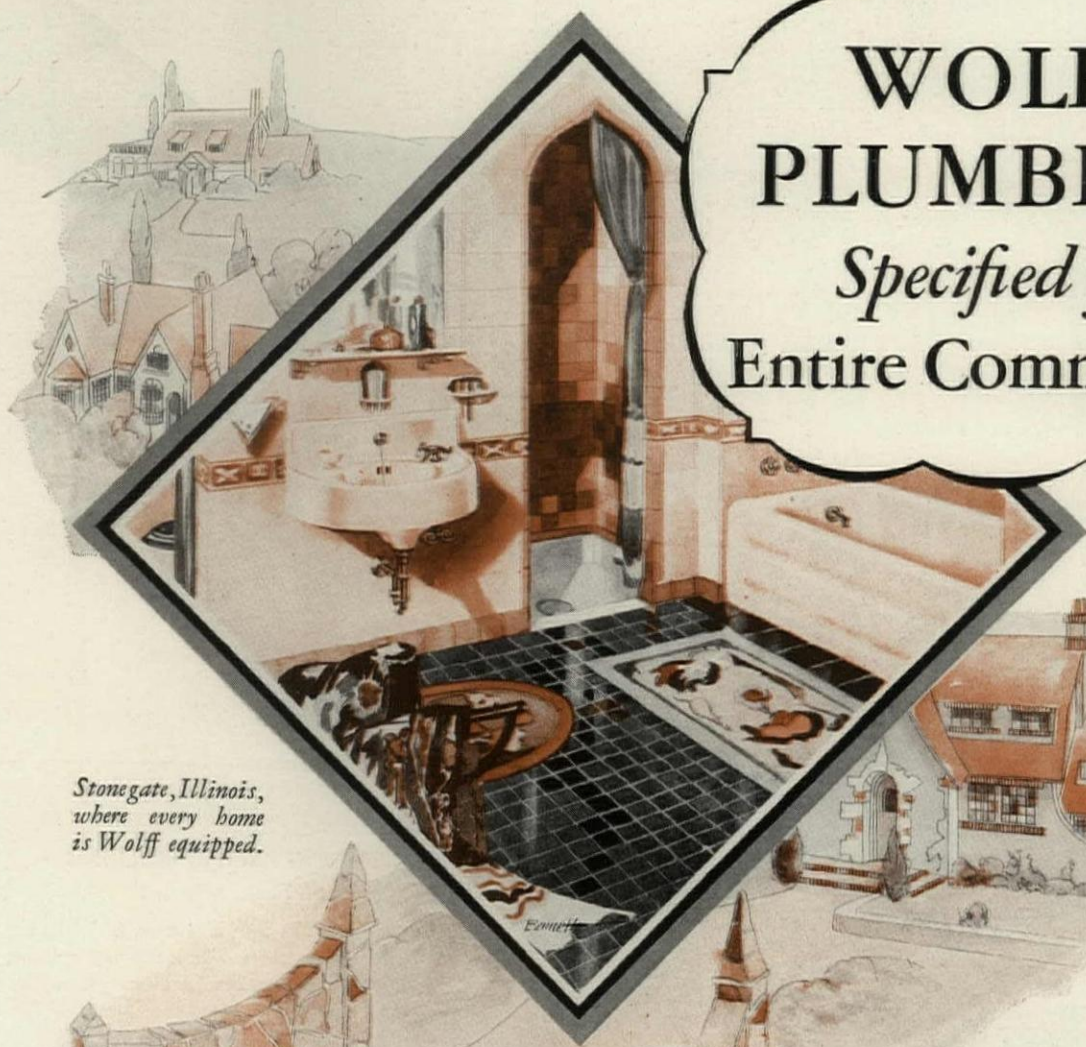
Makers of High Grade
Plumbing Fixtures

General Office:
Cincinnati

Factories:
Cincinnati, O.
Trenton, N. J.



**WOLFF
PLUMBING**
Specified for
Entire Community



*Stonegate, Illinois,
where every home
is Wolff equipped.*



AN aesthetic beauty that gives a distinctive character to each bathroom, and outlasts many years of hard wear, contributed largely to the decision of the architect who specified Wolff plumbing fixtures for all residences in Stonegate, Illinois.

"Duro" enamel, scientifically applied according to the Wolff formula, and fused to the surfaces at an immense temperature, assures a finish as hard as marble that remains unscarred by vigorous friction and rough scouring. The

widespread adoption of Wolff fixtures in all parts of the country marks the recognition accorded to the permanent character of these attractive color tones.

The widely varied tints are faultlessly matched in the vitreous ware of each installation, and all Wolff "DURO" brass fixtures, both exposed and invisible parts, measure up to the unexcelled quality-standard of the enameled ware. This avoids the frequent error of permitting inferior brass fittings to impair the general effect.

WOLFF

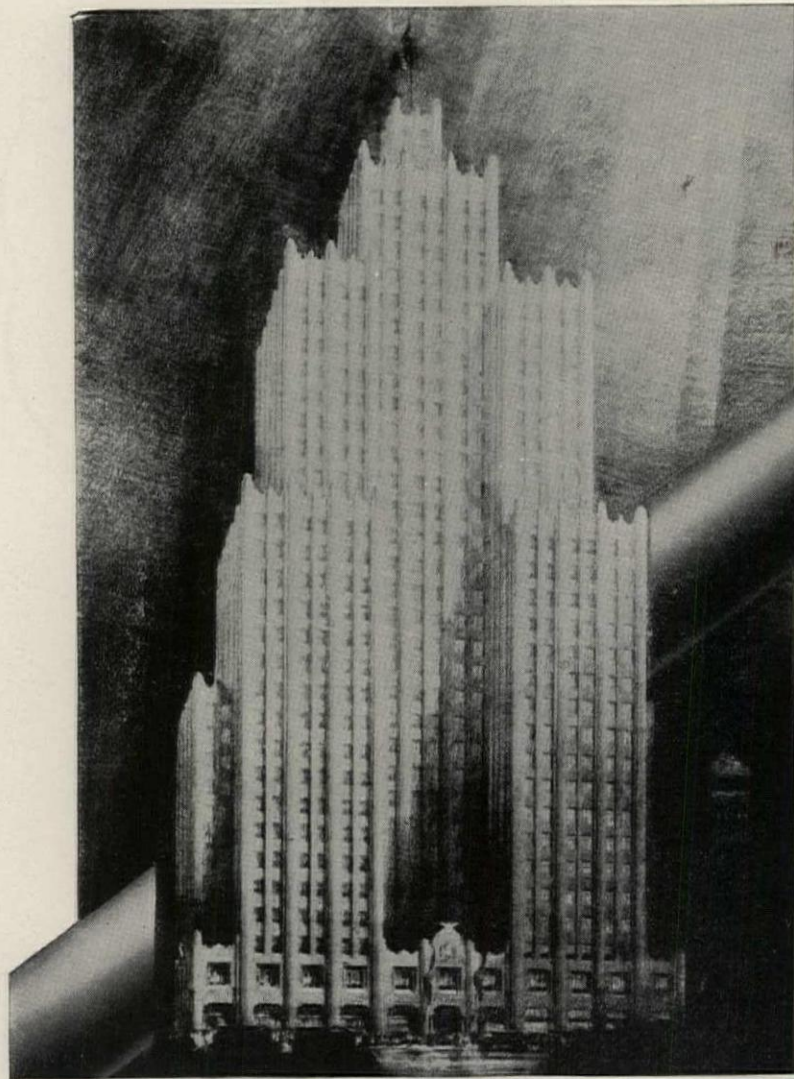


**WHY BE
ASHAMED
OF YOUR
BATHROOM?**

SUPERIOR PLUMBING FIXTURES

WOLFF CO., Established 1855. General Offices: 2058 W. Fulton St., CHICAGO
Branches and Distributors in All Principal Cities

The illustration shows a graceful effect obtained by installing the Berkeley tub with the Glendale lavatory and the Superior closet, with the shower recess and fixtures separate from the tub. We can submit to you an extremely broad choice of suggested combinations, in enamel, vitreous and brass ware, and shall be glad to send you catalog and full details on request.



MISSOURI PACIFIC BUILDING

St. Louis, Missouri

*Architect, E. M. Tucker; Engineer, E. A. Hadley;
Plumbing Contractors, The De Bord Company;
Heating Contractors, Bradley Heating Company.*

The Spirit of St. Louis . . .

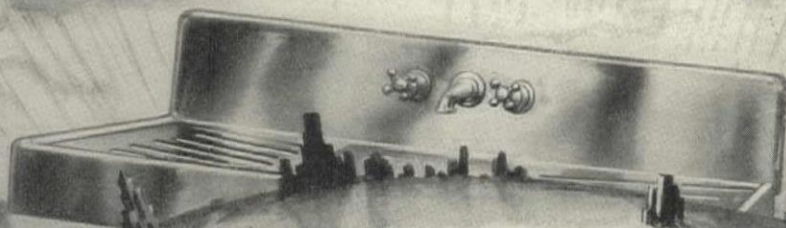
THE will of a great city—to go ahead. Here one finds a determination to build greater—to expand—to do real things—a typical American populace. St. Louis, on the tongue of the world, interprets modern progress. From here went, with unflinching bravery, the mighty Lindbergh—symbolic of the spirit of her people. St. Louis looks ahead—prepares—builds well. Thus, in selecting the materials for her modern buildings—choice is the natural result of a “do it well” spirit—quality being the major consideration. The Missouri Pacific Building with its towering

lines of beauty and stability faithfully exemplifies, in building measures, the spirit of this great city. Translated into practical terms, it means—care and precision in specifications. The architects, engineers and contractors responsible realized their task and met it. Thus, for the major pipe tonnage they selected “NATIONAL” Pipe—typical of progress and leadership in building materials. To resist corrosion—particularly pitting—butt-weld sizes ½ to 3-inch are made by the special Scale Free Process—an exclusive “NATIONAL” pipe feature.

NATIONAL TUBE COMPANY • Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

THE WORLD IS WAITING FOR A NEW AND BETTER SINK



\$2,000

IN PRIZES

FOR MONEL METAL SINK DESIGNS

ARCHITECTS, domestic economists, and enlightened housekeepers are constantly fostering improvements in household equipment. Many of them believe that the ordinary kitchen sink of today presents a great opportunity for development along the line of greater convenience, durability and sanitation.

Until recently, progress in kitchen sink design has been obstructed by limitations imposed by the materials from which kitchen sinks were produced.

Monel Metal is a readily workable Nickel alloy, available in all customary forms (including sheet, rod, wire, angles, tubing, castings, etc.) and its silvery appearance, ease of cleaning, great strength, rust-immunity, and corrosion-resistance offer an unusual combination of desirable sink properties. The use of Monel Metal will permit greater flexibility in

new kitchen sink designs. Therefore, The International Nickel Company, Inc. has donated \$2,000 to be awarded in prizes for the best Monel Metal kitchen sink designs entered in a competition conducted under the auspices of THE ART ALLIANCE OF AMERICA.

The Committee of Judges will include eminent architects, designers and experts in kitchen management. The Competition will continue from January 1st to March 5th, 1929.

You are cordially invited to enter this Sink Design Competition. Conditions of the Contest, entry blanks, and additional information can be secured from The Art Alliance of America. Address your inquiry to The Art Alliance of America, 65 East 56th St., New York, N. Y. Use the coupon.

Monel Metal is a technically controlled Nickel-Copper alloy of high Nickel content. It is mined, smelted, refined, rolled and marketed solely by The International Nickel Company, Inc. The name "Monel Metal" is a registered trade mark.

THE ART ALLIANCE OF AMERICA
65 East 56th Street, New York, N. Y.

Please send me complete information about the Monel Metal Kitchen Sink Design Competition, including conditions of contest, entry blank, etc.

NAME _____ [Please Print]
 ADDRESS _____
 OCCUPATION _____



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Los Angeles Piers 230-232 are fully equipped with "Kinnear" Rolling Doors of rust-resisting ARMCO Ingot Iron. The corrosive salt atmosphere made it essential that this long-lasting iron be chosen.



UP....DOWN....THROUGH THE YEARS WITH ARMCO INGOT IRON



Oval: At the Willys-Overland plant, Toledo, Ohio, this "Kinnear" chain-hoist rolling door of ARMCO Ingot Iron assures long-time, low-cost service. The entire building is equipped with these modern doors.

Below: Every loading platform entrance of this Canadian Rail and Harbor Terminal at Toronto is protected with "Kinnear" Rolling Doors of ARMCO Ingot Iron. Fireproof, thiefproof, easily-operated and, above all, durable, these doors will long be a credit to the architect who chose them—Charles H. Moores.

ROLLING slat doors are now sure to last as long as the rest of the structure. To their many commendable features is added that of durability—ARMCO Ingot Iron durability.

Whether you select the motor-controlled or the hand-controlled door, you can assure your clients more than safety, fire protection, and easy operation. You can assure a full measure of usefulness.

ARMCO Ingot Iron is ideally fitted for rolling door service. It is highly refined, virtually freed from rust-promoting impurities. Every sheet is dependably pure and uniform. The galvanized coating is heavy and uniform, and lends added protection to the pure iron beneath.

If you are planning commercial or other types of buildings that require rolling doors you will want to have all the facts about ARMCO Ingot Iron doors before you specify.

Shall we send you complete information?

THE AMERICAN ROLLING MILL CO.

Executive Offices, Middletown, Ohio

Export: The ARMCO International Corporation

Cable Address—ARMCO, Middletown (O)

District Offices

Chicago
Cincinnati
Cleveland

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New York
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Pittsburgh
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San Francisco



ARMCO INGOT IRON RESISTS RUST



**That Beauty May Endure
Use Time-Tested Puddled
Wrought Iron**

Deep in the structure of Reading Puddled Wrought Iron Pipe, guarding every inmost fiber of the Iron from rust, are filaments of protective silicious slag.

It is by puddling—kneading and working of the fiery hot, pure iron and slag in the furnace—that these rust-resisting filaments are distributed so uniformly in the metal.

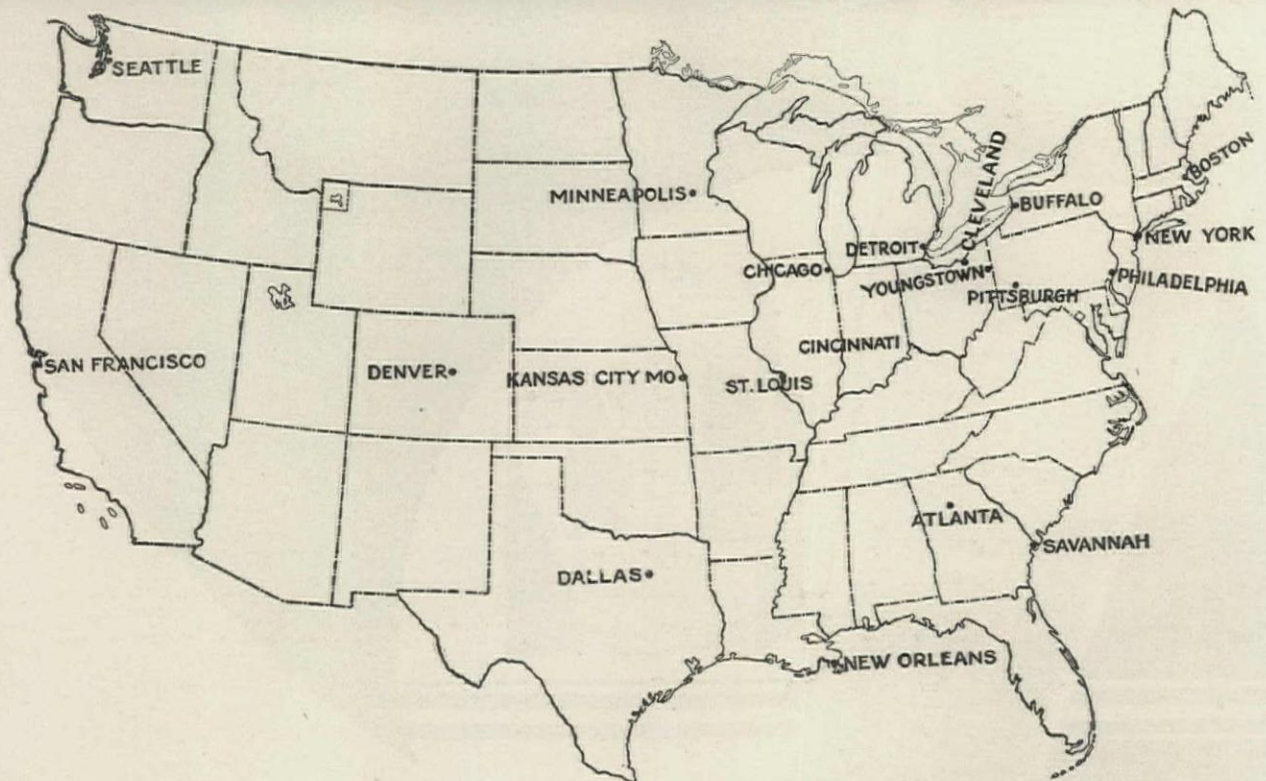
That is why you can specify Reading Puddled Wrought Iron Pipe with the confidence that it will last for generations—that walls and floors need not be torn open within a few short years for costly pipe repairs.

Reading Pipe has stood the test of time, the only test that tells the truth about pipe performance. It is not a new or untried product. So that the beauty of your buildings may endure, insist on *puddled* wrought iron—and look for the Reading name and spiral knurl mark on every piece.

READING PIPE
GENUINE PUDDLED WROUGHT IRON

READING IRON COMPANY, Reading, Pennsylvania

- | | | | | | | | | | | |
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| Atlanta | - | Buffalo | - | Detroit | - | New York | - | St. Louis | - | Fort Worth |
| Baltimore | - | Chicago | - | Houston | - | Pittsburgh | - | Tulsa | - | Seattle |
| Boston | - | Cincinnati | - | Los Angeles | - | Cleveland | - | San Francisco | - | Philadelphia |



20 Service Stations for Sound Advice in Steel

THE YOUNGSTOWN SHEET AND TUBE COMPANY maintains twenty "service stations" for the dispensing of sound advice on any question connected with the selection of pipe, sheet-metal, electrical conduit or any steel materials in which architects and engineers may be interested.

At each of these district sales offices you will

find advisors schooled in steel—men with a thorough training and wide experience who are anxious to serve you and give you the benefit of their specialized knowledge.

You are urged to call upon them freely to help you with any of your problems, and it is understood, of course, that their advice entails no obligation whatsoever.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

One of the oldest manufacturers of copper-bearing steel, under the well-known and established trade name "Copperoid."

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BOSTON—80 Federal St.
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CHICAGO—Conway Bldg.
CINCINNATI—Union Trust Bldg.

CLEVELAND—Union Trust Bldg.
DALLAS—Magnolia Bldg.
DENVER—Continental Oil Bldg.
DETROIT—Fisher Bldg.

KANSAS CITY, MO.—Commerce Bldg.

MINNEAPOLIS—Andrus Bldg.
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NEW YORK—30 Church St.
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PITTSBURGH—Oliver Bldg.

LONDON REPRESENTATIVE—The Youngstown Steel Products Co.
Dashwood House, Old Broad St., London, E. C. England

SAN FRANCISCO—55 New Montgomery St.
SAVANNAH—M and M T Terminals
SEATTLE—Central Bldg.
ST. LOUIS—1501 Locust St.
YOUNGSTOWN—Stambaugh Bldg.

Contributing Member

SHEET STEEL
TRADE EXTENSION COMMITTEE

YOUNGSTOWN



A Donald Douglass Aquatint study of the New York Central Railroad Station, Buffalo, N. Y. ~ Alfred Fellheimer and Steward Wagner, New York, Architects ~ Walsh Construction Co., Syracuse, N. Y., General Contractor ~ Chippewa Plumbing Co., Buffalo, N. Y., Plumbing Contractor ~ William E. Shattuck, Buffalo, N. Y., Heating Contractor . . . Jenkins Valves were selected for the plumbing and heating of this station
 Jenkins Bros. ~ New York ~ Boston ~ Philadelphia ~ Chicago . . . Jenkins Bros. Ltd. ~ Montreal ~ London.

Always marked with the Diamond
Jenkins Valves
 SINCE 1864

acid leaks


are destructive, dangerous and insanitary—and such leaks are sure to happen when ordinary drain pipe is installed to carry corrosive wastes.

Duriron soil pipe alone resists the attack of all chemicals while providing an approved plumbing material that is as permanent as the building.

Duriron is guaranteed and does not need the guarantee.

for complete engineering data see 1928-29 Sweet's or write


**The Duriron Company
Dayton, Ohio**

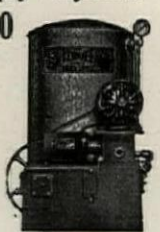
You need this Specification Book

Free This reference book on water supply, electric light and sewage disposal, gives you data and specifications for handling any private utility job from a cottage or bungalow to the largest country hotel, club or estate. It's free—if requested. If it doesn't answer *all* your problems, KEWANEE engineers the country over are at your service. One of them is near you.

KEWANEE



"Bungalow Model Jr." Water Supply System
Now \$103.00



For the average residence this new Kewanee "Bungalow Model" puts in "city water" comforts at a surprisingly low cost. It has the same high Kewanee quality and "Engineered" Excellence as the other 200 Kewanee systems for water supply, electric lighting and sewage disposal. Automatic and requires only occasional oiling. Write for the Architect's Specification Book Today
KEWANEE PRIVATE UTILITIES CO.
 442 S. Franklin St. Kewanee, Ill.
Dealer Correspondence Invited

COWING

Pressure Relieving

JOINT

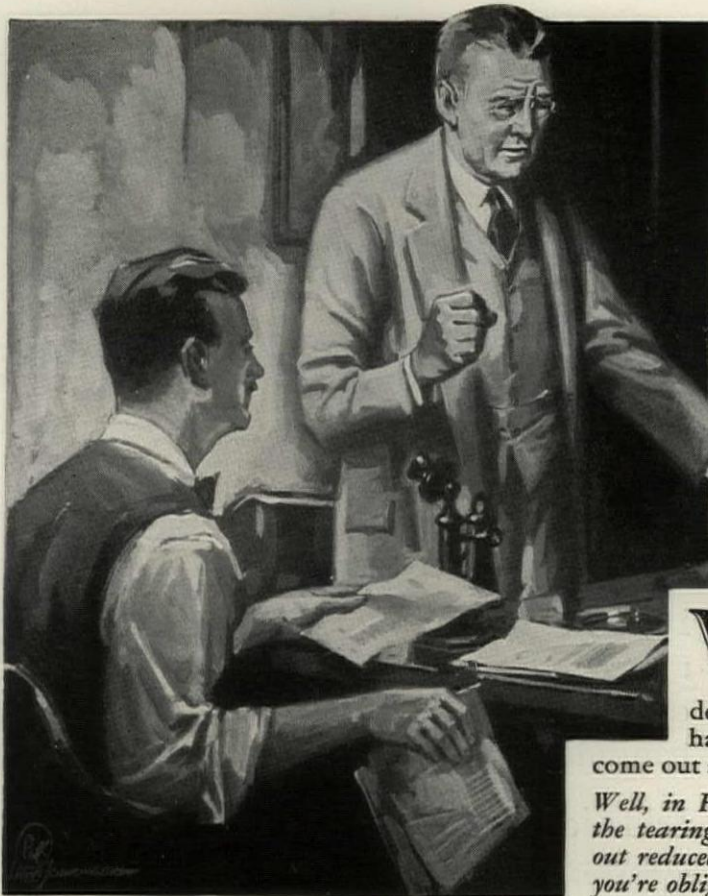
Patented September 1, 1925

A Positive Safeguard Against Broken Stone or Terra Cotta in any Building

THIS neat and eternal joint saves the face of the building. It zones the facade. It equalizes developed variances by yielding to compression. It delivers automatic and exact compensation for such ungovernable factors as shortening of steel, temperature changes, wind stresses, settlement, excessive floor loads, vibration, faulty setting and any stresses that cause spalls or breaks. The cost is negligible.

Write for our Booklet Describing this Joint

Cowing Pressure Relieving Joint Co.
 160 N. Wells St. Chicago, Ill.



for 5% more
 ...why didn't the
 Architects insist
 ?

WHY, man, our repair bills are frightful.
 I know it, Mr. Grippen, but I think we may as well get set for more. It's no use deceiving ourselves. About a third of our water lines have gone to pieces, and the whole system will have to come out as fast as we can get around to making replacements.

Well, in Heaven's name, have the tearing down and ripping out reduced to a minimum. If you're obliged to open up a floor or wall, make a clean job of everything that's behind it.

That's just what we are doing. What are we using for replacements?

On the advice of Good & Strong, we are putting in nothing but Byers Pipe, genuine wrought iron; and when I see it in the lines, I tell you the red spiral around every length looks good to me. I know from experience that Byers can be depended on for a lifetime. You and I will never have to worry over it. I've always blamed the architects for not specifying it all through to begin with.

They did have Byers in their first specifications, Johnson; but we balked at the extra expense and allowed other pipe to be installed. The saving looked big enough to us at that time to seem desirable. Hm, Hm! How much

did we reckon we were saving, anyhow?

About \$2,000, it must have been, if my figures are correct. Well, we've spent more than twice that much for repairs to date; and you say the worst is yet to come. Looks as though we blundered pretty badly.

Like many others, we must have overlooked the fact that 90% of the cost in an average pipe system consists of labor, fittings, valves, and various added items; the best of pipe represents only about 10%, the cheapest between 5 and 6%. If that had been realized, surely we wouldn't have taken the chance we did. This cost bulletin just received from the Byers people makes it very clear.

* * * *

Send for Bulletin No. 38

"The Installation Cost of Pipe." Contains cost analyses of scores of heating, plumbing, and other pipe systems. Shows the high cost of replacing rusted pipe and the folly of using cheap pipe.

A. M. BYERS COMPANY
 Established 1864 Pittsburgh, Pa.

Top: Pacific Telephone and Telegraph Building, San Francisco, Calif.

Architects, Miller & Pfeuger, San Francisco; Engineers, Atkins & Parker, San Francisco; Plumbing Contractor, Alexander Coleman, San Francisco. Byers Pipe used in hot and cold water supply, vacuum and fire lines, drainage, drinking water, and pump lines.

Middle: Hotel Shelton, New York City

Architect, Arthur Loomis Harmon, New York; Sanitary Engineer, William C. Tucker, New York; Plumbing Contractors, George E. Gibson Co., New York. Byers Pipe used for plumbing.

Left: State Capitol, Topeka, Kan.

Architect, R. L. Gamble, State Architect, Topeka; Heating Contractor, Minor D. Woodling Heating Co., Kansas City. Byers Pipe used for heating.

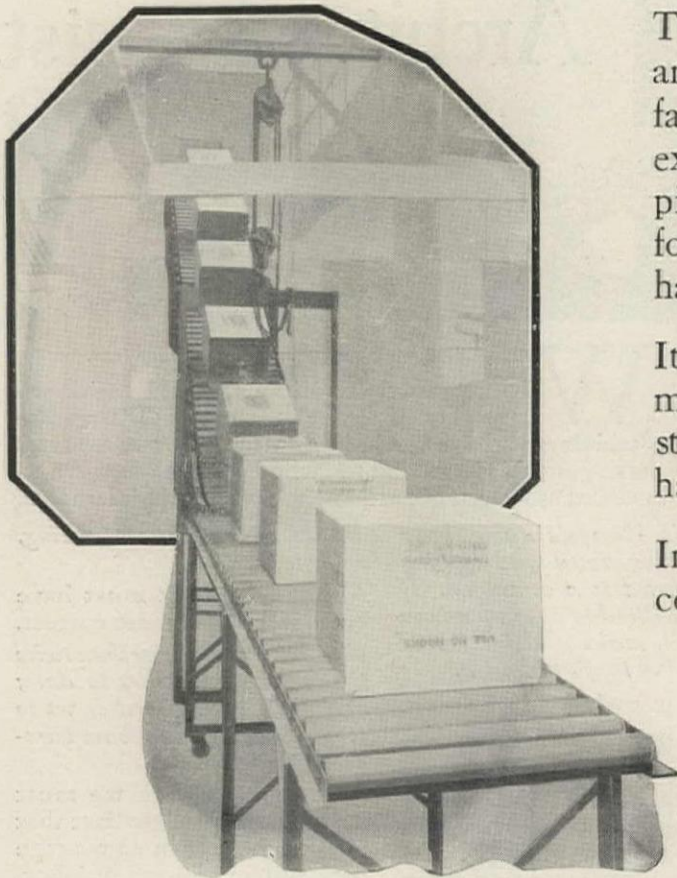
Right: Tennessee State Memorial, Nashville, Tenn.

Architects, McKim, Mead & White, New York; Associate Architect, E. E. Dougherty, Nashville, Tenn.; Consulting Engineers, Tenney & Ohmes, New York; Heating Contractors, Gowans & Haley Co., Nashville. Byers Pipe used for heating.



BYERS PIPE
 GENUINE WROUGHT IRON

A much larger percentage of workers produce more per day



The roller conveyor shown here is part of an extensive system of conveyors in a paint factory. This particular conveyor section extends from the storage room to the shipping floor getting cases of paint out ready for train or truck in very short time with handling practically eliminated.

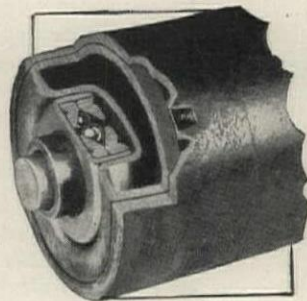
It is because of such conveyor arrangements that factories realize in many instances more than 75% reduction in net handling costs.

Included in this system are gravity, slat conveyors, and incline elevators, each contributing to certain production savings in every department.

Similar systems save as high as 93% of their original cost every 12 months.

THE THREE POINT BEARING FOR HEAVY USE

The Roller— $2\frac{7}{8}$ -in. in Dia., heavy gauge steel $5/16$ -in. dia. steel balls, hardened by special process. $13/16$ -in. cold rolled shaft. Locked in a frame the size of which is determined by the load to be carried. Called a three-point bearing because the balls are in contact with the ball race at three points, thereby distributing weight and wear evenly and lengthening the life of the Conveyor.



Standard Conveyors are used daily in many well known warehouses, factories, hospitals, docks, and other places where material handling is a problem. May we tell you more about how other architects have successfully included them in their plans?

STANDARD

CONVEYOR COMPANY

NORTH ST. PAUL, MINNESOTA

New York Office, 420 Lexington Avenue
Chicago Office, 549 West Washington Street
Philadelphia Office, 3110 Market Street
Cleveland Office, 1108 Hippodrome Building
Buffalo Office, 908 Elliott Square

Kansas City Office, 419 Manufacturers' Ex. Bldg.
Milwaukee Office, 209 Wisconsin Avenue
Los Angeles Office, 335 So. San Pedro St.
Seattle Office, 321 Lumber Exchange
Charlotte Office, 301 Builders Bldg.

*The Vintage of
1929*

Continues the tradition of the original formula;—the one proven method of producing *Genuine Wrought Iron Pipe.*



*There is no
substitute for
COHOES PIPE*

For 75 years Cohoes has been keeping faith with architects and contractors — its future grows out of its past. Cohoes, as from its beginning, makes pipe of incomparable quality.

Send for the Handbook of Pipe Facts. Contains much valuable information you need in specifications and installing.

COHOES ROLLING MILL CO.
COHOES, NEW YORK

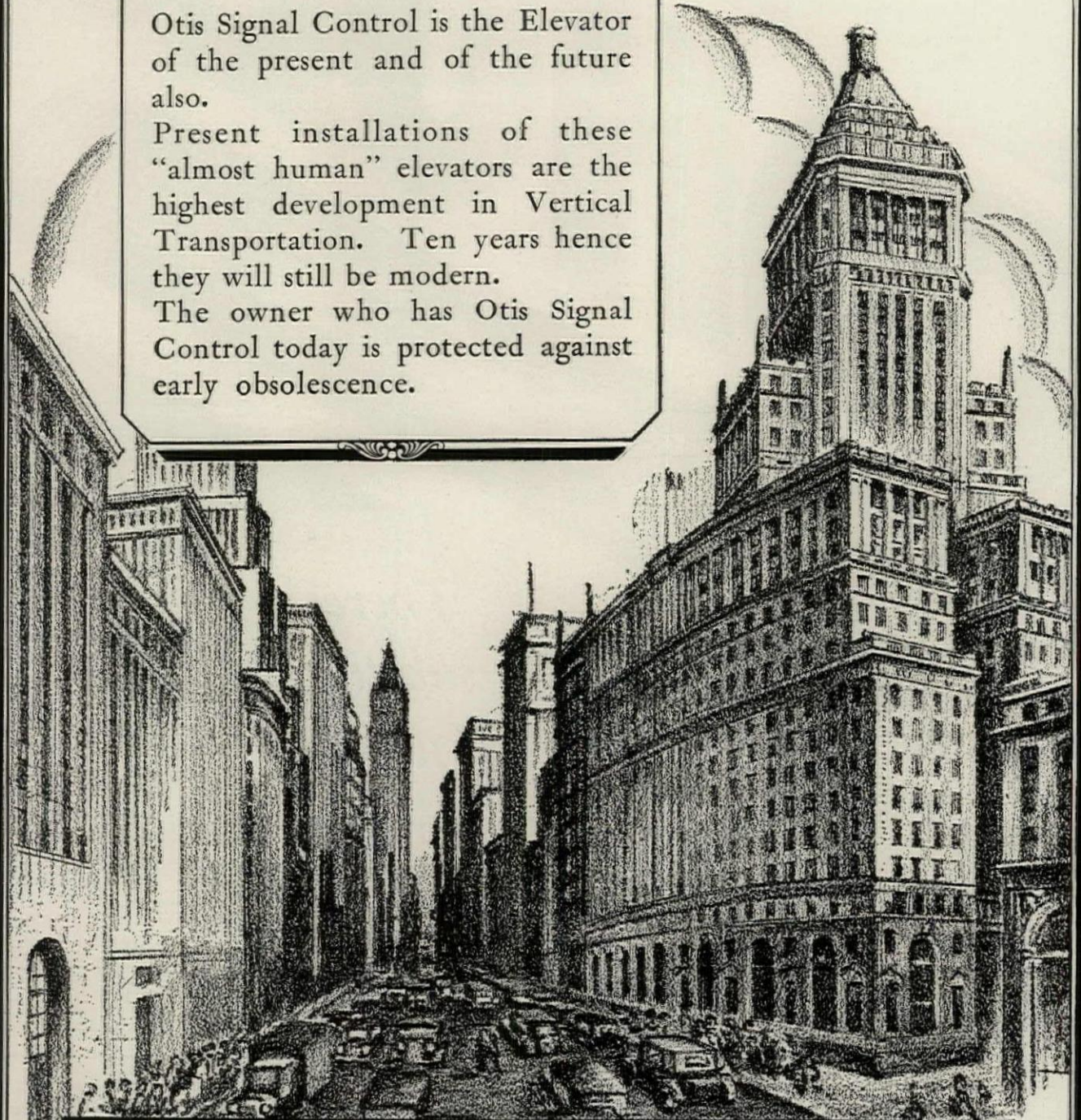
BRANCH OFFICES: PHILADELPHIA · CHICAGO · LOS ANGELES · NEW YORK · CLEVELAND · MINNEAPOLIS · BOSTON · NORFOLK · FORT WORTH



Otis Signal Control is the Elevator of the present and of the future also.

Present installations of these "almost human" elevators are the highest development in Vertical Transportation. Ten years hence they will still be modern.

The owner who has Otis Signal Control today is protected against early obsolescence.



OTIS ELEVATOR COMPANY
OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD



Selected List of Manufacturers' Publications

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 383 Madison Ave., New York, or the manufacturer direct, in which case kindly mention this publication.

ACOUSTICS

- R. Guastavino Co.**, 40 Court St., Boston.
Akoustolith Plaster. Brochure, 6 pp., 8½ x 11 ins. Important data on a valuable material.
- U. S. Gypsum Co.**, 205 W. Monroe St., Chicago, Ill.
A Scientific Solution of an Old Architectural Problem. Folder 6 pp., 8½ x 11 ins. Describes Sabinite Acoustical Plaster.

AIR FILTERS

- Staynew Filter Corporation**, Rochester, N. Y.
Protectomotor High Efficiency Industrial Air Filters. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Data on valuable detail of apparatus.

BASEMENT WINDOWS

- Genfire Steel Company**, Youngstown, Ohio.
Architectural Details. Booklet, 28 pp., 8½ x 11 ins. Details on steel windows. A. I. A. File No. 16E.

BATHROOM FITTINGS

- A. P. W. Paper Co.**, Albany, N. Y.
Onliwon for Fine Buildings. Folder, 8 pp., 3¼ x 6 ins. Illustrated. Deals with toilet paper fittings of metal and porcelain.
- Architects' File Card. 8½ x 11 ins. Illustrated. Filing card on toilet paper and paper towel cabinets.
- A Towel Built for Its Job. Booklet, 8 pp., 4¼ x 9½ ins. Illustrated. Paper Towel System and Cabinets.
- Cabinets and Fixtures. Booklet, 31 pp., 5¼ x 4¼ ins. Illustrated. Catalog and price list of fixtures and cabinets.

BRICK

- American Face Brick Association**, 1751 Peoples Life Building, Chicago, Ill.
Brickwork in Italy. 298 pages, size 7½ x 10½ ins., an attractive and useful volume on the history and use of brick in Italy from ancient to modern times, profusely illustrated with 69 line drawings, 300 half-tones, and 20 colored plates with a map of modern and XII century Italy. Bound in linen. Price now \$3.00, postpaid (formerly \$6.00). Half Morocco, \$7.00.
- Industrial Buildings and Housing. Bound Volume, 112 pp. 8½ x 11 ins. Profusely illustrated. Deals with the planning of factories and employes' housing in detail. Suggestions are given for interior arrangements, including restaurants and rest rooms. Price now \$1.00, postpaid (formerly \$2.00).
- Common Brick Mfrs. Assn. of America**, 2134 Guarantee Title Bldg., Cleveland.
Brick; How to Build and Estimate. Brochure, 96 pp., 8½ x 11 ins. Illustrated. Complete data on use of brick.
- The Heart of the Home. Booklet, 23 pp., 8½ x 11 ins. Illustrated. Price 25 cents. Deals with construction of fireplaces and chimneys.
- Skintled Brickwork. Brochure, 15 pp., 8½ x 11 ins. Illustrated. Tells how to secure interesting effects with common brick.
- Building Economy. Monthly magazine, 22 pp., 8½ x 11 ins. Illustrated. \$1 per year, 10 cents a copy. For architects, builders and contractors.

CEMENT

- Carney Company, The**, Mankato, Minn.
A Remarkable Combination of Quality and Economy. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Important data on valuable material.
- Kosmos Portland Cement Company**, Louisville, Ky.
Kosmortar for Enduring Masonry. Folder, 6 pp., 3½ x 6½ ins. Data on strength and working qualities of Kosmortar.
- Kosmortar, the Mortar for Cold Weather. Folder, 4 pp., 3½ x 6½ ins. Tells why Kosmortar should be used in cold weather.
- Louisville Cement Co.**, 315 Guthrie St., Louisville, Ky.
BRIXMENT for Perfect Mortar. Self-filing handbook, 8½ x 11 ins. 16 pp. Illustrated. Contains complete technical description of BRIXMENT for brick, tile and stone masonry, specifications, data and tests.
- Missouri Portland Cement Company**, St. Louis, Kansas City, Memphis.
Twenty-four Hour Cement. Booklet, 15 pp., 8½ x 11 ins. Illustrated. Data on a cement which makes a quick-drying concrete.
- Precautions for Concrete Paving Construction in Cold Weather. Folder, 4 pp. 6 x 9 ins.
- Design and Control of Concrete Mixtures. Booklet, 32 pp. 8½ x 11 ins. Illustrated.
- Concrete Paving Construction in Hot Weather. Booklet. 11 pp. 6 x 9 ins. Illustrated.
- Pennsylvania-Dixie Cement Corp'n**, 131 East 46th St., New York.
Celluloid Computing Scale for Concrete and Lumber, 4½ x 2½ ins. Useful for securing accurate computations of aggregates and cement; also for measuring lumber of different sizes.
- Portland Cement Association**, Chicago.
Concrete Masonry Construction. Booklet, 47 pp., 8½ x 11 ins. Illustrated. Deals with various forms of construction.

CEMENT—Continued

- Town and Country Houses of Concrete Masonry. Booklet, 19 pp., 8½ x 11 ins. Illustrated.
- Facts About Concrete Building Tile. Brochure, 16 pp., 8½ x 11 ins. Illustrated.
- The Key to Firesafe Homes. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
- Design and Control of Concrete Mixtures. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
- Portland Cement Stucco. Booklet, 64 pp., 8½ x 11 ins. Illustrated.
- Concrete in Architecture. Bound Volume. 60 pp., 8½ x 11 ins., Illustrated. An excellent work, giving views of exteriors and interiors.

CONCRETE BUILDING MATERIALS

- Kosmos Portland Cement Company**, Louisville, Ky.
High Early Strength Concrete, Using Standard Kosmos Portland Cement. Folder, 1 p., 8½ x 11 ins. Complete data on securing high strength concrete in short time.

CONCRETE COLORINGS

- The Master Builders Co.**, 7016 Euclid Ave., Cleveland.
Color Mix, Colored Hardened Concrete Floors (integral). Brochure. 16 pp. 8½ x 11 ins. Illustrated. Data on coloring for floors.
- Dychrome. Concrete Surface Hardener in Colors. Folder. 4 pp. 8 x 11 ins. Illustrated. Data on a new treatment.

CONSTRUCTION, FIREPROOF

- Master Builders Co.**, Cleveland, Ohio.
Color Mix. Booklet, 18 pp., 8½ x 11 ins. Illustrated. Valuable data on concrete hardener, waterproofer and dustproofer in permanent colors.
- National Fire Proofing Co.**, 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 ins. 32 pp. Illustrated. A treatise on fireproof floor construction.
- Northwestern Expanded Metal Co.**, 1234 Old Colony Building, Chicago, Ill.
Northwestern Expanded Metal Products. Booklet. 8½ x 10¼ ins. 16 pp. Fully illustrated, and describes different products of this company, such as Kno-burn metal lath, 20th Century Corrugated. Plaster-Sava and Longspan lath channels, etc.
- A. I. A. Sample Book. Bound volume, 8½ x 11 ins., contains actual samples of several materials and complete data regarding their use.

CONSTRUCTION, STONE AND TERRA COTTA

- Cowing Pressure Relieving Joint Company**, 100 North Wells St., Chicago, Ill.
Pressure Relieving Joint for Buildings of stone, terra cotta or marble. Booklet. 16 pp., 8½ x 11 ins. Illustrated. Deals with preventing cracks, spalls and breaks.

DAMP-PROOFING

- Genfire Steel Company**, Youngstown, Ohio.
Waterproofing Handbook. Booklet. 8½ x 11 ins. 80 pp. A. I. A. File No. 7. Illustrated. Thoroughly covers subject of waterproofing concrete, wood and steel preservatives, dusting and hardening concrete floors and accelerating the setting of concrete. Free distribution.
- The Master Builders Co.**, 7016 Euclid Ave., Cleveland.
Waterproofing and Dampproofing Specification Manual. Booklet. 18 pp., 8½ x 11 ins. Deals with methods and materials used.
- Waterproofing and Dampproofing. File. 36 pp. Complete descriptions and detailed specifications for materials used in building and concrete.
- Sonneborn Sons, Inc., L.**, 116 Fifth Ave., New York.
Specification Sheet, 8½ x 11 ins. Descriptions and specifications of compounds for dampproofing interior and exterior surfaces.
- The Vortex Mfg. Co.**, Cleveland, Ohio.
Par-Lock Specification "Forms A and B" for dampproofing and plaster key over concrete and masonry surfaces.
- Par-Lock Specification "Form J" for dampproofing tile wall surfaces that are to be plastered.
- Par-Lock Dampproofing. Specification Forms C, F, I and J Sheets 8½ x 11 ins. Data on gun-applied asphalt dampproofing for floors and walls.

DOORS AND TRIM, METAL

- The American Brass Company**, Waterbury, Conn.
Anaconda Architectural Bronze Extruded Shapes. Brochure, 180 pp., 8½ x 11 ins., illustrating and describing more than 2,000 standard bronze shapes of cornices, jamb casings, mouldings, etc.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 151

DOORS AND TRIM, METAL—Continued

- Richards-Wilcox Mfg. Co.,** Aurora, Ill.
Fire-Doors and Hardware. Booklet. 8½ x 11 ins. 64 pp. Illustrated. Describes entire line of tin-clad and corrugated fire doors, complete with automatic closers, track hangers and all the latest equipment—all approved and labeled by Underwriters' Laboratories.
- Truscon Steel Company,** Youngstown, Ohio.
Copper Alloy Steel Doors. Catalog 110. Booklet, 48 pp. 8½ x 11 ins. Illustrated.

DOORS, SOUNDPROOF

- Irving Hamlin,** Evanston, Ill.
The Evanston Soundproof Door. Folder, 8 pp., 8½ x 11 ins. Illustrated. Deals with a valuable type of door.

DUMBWAITERS

- Sedgwick Machine Works,** 151 West 15th St., New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ ins. 60 pp. Illustrated. Catalog and pamphlets, 8½ x 11 ins. Illustrated. Valuable data on dumbwaiters.

ELECTRICAL EQUIPMENT

- Baldor Electric Co.,** 4358 Duncan Avenue, St. Louis.
Baldor Electric Motors. Booklet, 14 pp., 8 x 10½ ins. Illustrated. Data regarding motors.
- General Electric Co.,** Merchandise Dept., Bridgeport, Conn.
Wiring System Specification Data for Apartment Houses and Apartment Hotels. Booklet, 20 pp. 8 x 10 ins. Illustrated.
- "Electrical Specification Data for Architects." Brochure, 36 pp., 8 x 10½ ins. Illustrated. Data regarding G. E. wiring materials and their use.
- "The House of a Hundred Comforts." Booklet, 40 pp., 8 x 10½ ins. Illustrated. Dwells on importance of adequate wiring.
- Pick & Company, Albert,** 208 West Randolph St., Chicago, Ill.
School Cafeterias. Booklet. 9 x 6 ins. Illustrated. The design and equipment of school cafeterias with photographs of installation and plans for standardized outfits.
- Westinghouse Electric & Mfg. Co.,** East Pittsburgh, Pa.
Electric Power for Buildings. Brochure. 14 pp., 8½ x 11 ins. Illustrated. A publication important to architects and engineers.
- Variable-Voltage Central Systems as applied to Electric Elevators. Booklet, 13 pp., 8½ x 11 ins. Illustrated. Deals with and important detail of elevator mechanism.
- Modern Electrical Equipment for Buildings. Booklet, 8½ x 11 ins. Illustrated. Lists many useful appliances.
- Electrical Equipment for Heating and Ventilating Systems. Booklet, 24 pp., 8½ x 11 ins. Illustrated. This is "Motor Application Circular 7379."
- Westinghouse Panelboards and Cabinets (Catalog 42-A). Booklet, 32 pp., 8½ x 11 ins. Illustrated. Important data on these details of equipment.
- Beauty; Power; Silence; Westinghouse Fans (Dealer Catalog 45). Brochure, 16 pp., 8½ x 11 ins. Illustrated. Valuable information on fans and their uses.
- Electric Range Book for Architects (A. I. A. Standard Classification 31 G-4). Booklet, 24 pp., 8½ x 11 ins. Illustrated. Cooking apparatus for buildings of various types.
- Westinghouse Commercial Cooking Equipment (Catalog 280). Booklet, 32 pp., 8½ x 11 ins. Illustrated. Equipment for cooking on a large scale.
- Electric Appliances (Catalog 44-A). 32 pp., 8½ x 11 ins. Deals with accessories for home use.

ELEVATORS

- Otis Elevator Company,** 260 Eleventh Ave., New York, N. Y.
Otis Push Button Controlled Elevators. Descriptive leaflets. 8½ x 11 ins. Illustrated. Full details of machines, motors and controllers for these types.
- Otis Geared and Gearless Traction. Elevators of All Types. Descriptive leaflets. 8½ x 11 ins. Illustrated. Full details of machines, motors and controllers for these types.
- Escalators. Booklet, 8½ x 11 ins. 22 pp. Illustrated. Describes use of escalators in subways, department stores, theaters and industrial buildings. Also includes elevators and dock elevators.
- Richards-Wilcox Mfg. Co.,** Aurora, Ill.
Elevators. Booklet. 8½ x 11 ins. 24 pp. Illustrated. Describes complete line of "Ideal" elevator door hardware and checking devices, also automatic safety devices.
- Sedgwick Machine Works,** 151 West 15th St., New York, N. Y.
Catalog and descriptive pamphlets, 4¼ x 8¼ ins. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.
- Catalog and pamphlets, 8½ x 11 ins. Illustrated. Important data on different types of elevators.

ESCALATORS

- Otis Elevator Company,** 260 Eleventh Ave., New York, N. Y.
Escalators. Booklet, 32 pp. 8½ x 11 ins. Illustrated. A valuable work on an important item of equipment.

FIREPROOFING

- Concrete Engineering Co.,** Omaha, Nebr.
"Handbook of Fireproof Construction." Booklet, 53 pp., 8½ x 11 ins. Valuable work on methods of fireproofing.

FIREPROOFING—Continued

- Genfire Steel Company,** Youngstown, Ohio.
Fireproofing Handbook, 8½ x 11 ins. 32 pp. Illustrated. Gives methods of construction, specifications, data on Herringbone metal lath, steel, tile, Trussit solid partitions, steel joists. Self-Sentering formless concrete construction.
- North Western Expanded Metal Co.,** 407 South Dearborn St., Chicago.
A. I. A. Sample Book. Bound volume, 8½ x 11 ins. Contains actual samples of several materials and complete data regarding their use.

FLOOR HARDENERS (CHEMICAL)

- Master Builders Co.,** Cleveland, Ohio.
Concrete Floor Treatment. File, 50 pp. Data on Securing hardened dustproof concrete.
- Concrete Floor Treatments—Specification Manual. Booklet, 23 pp., 8½ x 11 ins. Illustrated. Valuable work on an important subject.
- Sonneborn Sons, Inc., L.,** 116 Fifth Ave., New York, N. Y.
Lapidolith, the liquid chemical hardener. Complete sets of specifications for every building type in which concrete floors are used, with descriptions and results of tests.

FLOORS—STRUCTURAL

- Truscon Steel Co.,** Youngstown, Ohio.
Truscon Floretyle Construction. Booklet. 8½ x 11 ins. 16 pp. Illustrations of actual jobs under construction. Lists properties and information on proper construction. Proper method of handling and tables of safe loads.
- Structural Gypsum Corporation,** Linden, N. J.
Gypsteel Pre-cast Fireproof Floors. Booklet, 36 pp., 8½ x 11 ins. Illustrated. Data on flooring.

FLOORING

- Armstrong Cork Co. (Linoleum Division),** Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog. 8½ x 11 ins. 40 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors.
- Armstrong's Linoleum Pattern Book, 1927. Catalog. 3¼ x 6 ins. 272 pp. Color Plates. Reproduction in color of all patterns of linoleum and cork carpet in the Armstrong line.
- Quality Sample Book. 3¼ x 5¼ ins. Showing all gauges and thicknesses in the Armstrong line of linoleums.
- Linoleum Layer's Handbook. 5 x 7 ins. 32 pp. Instructions for linoleum layers and others interested in learning most satisfactory methods of laying and taking care of linoleum.
- Enduring Floors of Good Taste. Booklet. 6 x 9 ins. 48 pp. Illustrated in color. Explains use of linoleum for offices, stores, etc., with reproductions in color of suitable patterns, also specifications and instructions for laying.
- Blabon Company, Geo. W.,** Nicetown, Philadelphia, Pa.
Planning the Color Schemes for your Home. Brochure illustrated in color; 36 pp., 7½ x 10½ ins. Gives excellent suggestions for use of color in flooring for houses and apartments.
- Handy Quality Sample Folder of Linoleums. Gives actual samples of "Battleship Linoleum," cork carpet, "Feltex," etc.
- Blabon's Linoleum. Booklet illustrated in color; 128 pp., 3¼ x 8¼ ins. Gives patterns of a large number of linoleums.
- Blabon's Plain Linoleum and Cork Carpet. Gives quality samples, 3 x 6 ins. of various types of floor coverings.
- Bonded Floors Company, Inc.,** 1421 Chestnut St., Philadelphia, Pa.
A series of booklets, with full color inserts showing standard colors and designs. Each booklet describes a resilient floor material as follows:
- Battleship Linoleum. Explains the advantages and uses of this durable, economical material.
- Marble-ized (Cork Composition) Tile. Complete information on cork-composition marble-ized tile and many artistic effects obtainable with it.
- Treadlite (Cork Composition) Tile. Shows a variety of colors and patterns of this adaptable cork composition flooring.
- Natural Cork Tile. Description and color plates of this super-quiet, resilient floor.
- Resilient Floors in Schools. Resilient Floors in Stores. Resilient Floors in Hospitals. Resilient Floors in Offices. Resilient Floors in Apartments and Hotels. Booklets, 8 pp., 8½ x 11 ins. Illustrated.
- Specifications for Resilient Floors. Leather bound booklet, 48 pp., 8½ x 11 ins. Illustrated. Practical working specifications for installing battleship linoleum, cork composition tile and cork tile.
- Carter Bloxonend Flooring Co.,** Keith & Perry Bldg., Kansas City, Mo.
Bloxonend Flooring. Booklet. 3¼ x 6¼ ins. 20 pp. Illustrated. Describes uses and adaptability of Bloxonend Flooring to concrete, wood or steel construction, and advantages over loose wood blocks.
- File Folder. 9¼ x 11¼ ins. For use in connection with A. I. A. system of filing. Contains detailed information on Bloxonend Flooring in condensed loose-leaf form for specification writer and drafting room. Literature embodied in folder includes standard Specification Sheet covering the use of Bloxonend in general industrial service and Supplementary Specification Sheet No. 1, which gives detailed description and explanation of an approved method for installing Bloxonend in gymnasiums, armories, drill rooms and similar locations where maximum resiliency is required.

SPECIFICATIONS

Supply and erect, in accordance with the manufacturer's drawings to be approved by the engineer, one duplex Jennings Sewage Ejector consisting of two receiving pots each with individual motor-driven compressor and equipment in accordance with the following specifications.

CAPACITY

Each ejector shall have a capacity of () gallons per minute against ()ft. discharge head measured at the ejector discharge. This includes the static head to highest point in the discharge line from the invert of the inlet and also the friction head in the discharge line.

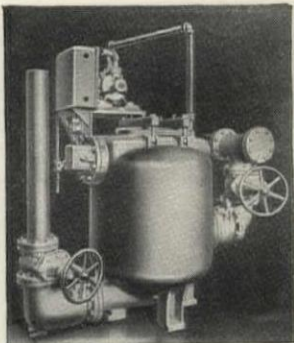
MOTOR-DRIVEN COMPRESSOR

The compressors shall be Nash Hytor, with sufficient capacity to discharge the contents of the receiving pot in one-half a minute or less. These shall be of cast iron construction, the shaft being mounted on ball bearings carried outside the casing. Each compressor shall be mounted on heavy cast iron base, direct connected through flexible coupling to a General Electric typeRPM,HP motor wound for (current available at the installation). The compressor shall be of the rotary type depending upon liquid for its displacing action, furnishing compressed air when running and constituting a free vent to the atmosphere when stopped. There shall be no air storage tank, automatic air valves or air under pressure while not pumping sewage.

SEWAGE POT

The receiving pots shall be of heavy, close grained cast iron, each with a capacity of () gallons and each complete with inlet and discharge gate valves and with special inlet and discharge check valves as

*When you specify this ejector
you discard complicating air valves*



This Jennings Sewage Ejector is supplied in capacities up to 1500 g.p.m. Heads up to 50 feet

LOOK over these specifications carefully. Note that no mention is made of air valves or other intricate devices.

The inefficient practice of using high pressure air reduced by means of such valves for low pressure ejector service is not employed. Air valves, air storage tanks, and reciprocating compressors—always potential sources of leakage and other troubles—have been eliminated. A Jennings Sewage Ejector makes possible highly simplified design because air is compressed, delivered and used only when sewage is being moved.

For raising unscreened sewage or drainage from basements below street sewer level, the Jennings Sewage Ejector provides an efficient unit that will give years of trouble-free service at low operating cost.

Write for Bulletin 67

Jennings Pumps

THE NASH ENGINEERING CO. 12 WILSON ROAD, SOUTH NORWALK, CONN.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 152

FLOORING—Continued

- Thomas Moulding Floor Co.**, 165 W. Wacker Drive, Chicago.
Better Floors. Folder. 4 pp. 11¼ x 13¾ ins. Illustrated. Floors for office, administration and municipal buildings.
Better School Floors. Folder, 4 pp., 11¼ x 13¾ ins. Illustrated.
Characteristics, Specifications and Uses. Brochure. 16 pp. 11¼ x 13¾ ins. Illustrated. Data on floors.
- Structural Gypsum Corporation**, Linden, N. J.
Gypsteel Pre-cast Fireproof Floors. Booklet, 36 pp., 8½ x 11 ins. Illustrated. Data on floorings.
- U. S. Gypsum Co.**, Chicago.
Pyrobar Floor Tile. Folder. 8½ x 11 ins. Illustrated. Data on building floors of hollow tile and tables on floor loading.
- United States Quarry Tile Co.**, Parkersburg, W. Va.
Quarry Tiles for Floors. Booklet, 119 pp., 8½ x 11 ins. Illustrated. General catalog. Details of patterns and trim for floors.
Art Portfolio of Floor Designs. 9¼ x 12¼ ins. Illustrated in colors. Patterns of quarry tiles for floors.
- U. S. Rubber Co.**, 1790 Broadway, New York.
Period Adaptations for Modern Floors. Brochure. 8 x 11 ins. 60 pp. Richly illustrated. A valuable work on the use of rubber tile for flooring in interiors of different historic styles.

FURNITURE

- American Seating Co.**, 14 E. Jackson Blvd., Chicago, Ill.
Ara Ecclesiastica Booklet. 6 x 9 ins. 48 pp. Illustrations of church fittings in carved wood.
Theatre Chairs. Booklet. 6 x 9 ins. 48 pp. Illustrations of theatre chairs.
- Kittinger Co.**, 1893 Elmwood Ave., Buffalo, N. Y.
Kittinger Club & Hotel Furniture. Booklet. 20 pp. 6¼ x 9½ ins. Illustrated. Deals with fine line of furniture for hotels, clubs, institutions, schools, etc.
Kittinger Club and Hotel Furniture. Booklet. 20 pp. 6 x 9 ins. Illustrated. Data on furniture for hotels and clubs.
A Catalog of Kittinger Furniture. Booklet, 78 pp., 14 x 11 ins. Illustrated. General Catalog.
- McKinney Mfg. Co.**, Pittsburgh.
Forethought Furniture Plans. Sheets, 6¼ x 9 ins., drawn to ¼-inch scale. An ingenious device for determining furniture arrangement.
- New York Galleries**, Madison Avenue and 48th Street, New York.
A group of Distinguished Interiors. Brochure, 4 pp., 8¾ x 11¼ ins. Filled with valuable illustrations.

GARAGES

- Ramp Buildings Corporation**, 21 East 40th St., New York.
Building Garages for Profitable Operation. Booklet. 8½ x 11 ins. 16 pp. Illustrated. Discusses the need for modern mid-city parking garages, and describes the d'Humy Motoramp system of design, on the basis of its superior space economy and features of operating convenience. Gives cost analyses of garages of different sizes, and calculates probable earnings.
Garage Design Data. Series of informal bulletins issued in loose-leaf form, with monthly supplements.

GLASS CONSTRUCTION

- Adamson Flat Glass Co.**, Clarksburg, W. Va.
Quality and Dependability. Folder, 2 pp., 8½ x 11 ins. Illustrated. Data in the company's product.
- Libbey-Owens Sheet Glass Co.**, Toledo, Ohio.
Flat Glass. Brochure, 11 pp., 5¼ x 7¾ ins. Illustrated. History of manufacture of flat, clear, sheet glass.
- Mississippi Wire Glass Co.**, 220 Fifth Ave., New York.
Mississippi Wire Glass. Catalog. 3¾ x 8½ ins. 32 pp. Illustrated. Covers the complete line.

GREENHOUSES

- King Construction Company**, North Tonawanda, N. Y.
King Greenhouses for Home or Estate. Portfolio of half-tone prints, varnished, 8¼ x 10½ ins.
- William H. Lutton Company**, 267 Kearney Ave., Jersey City, N. J.
Greenhouses of Quality. Booklet, 50 pp., 8½ x 11 ins. Illustrated. Conservatories making use of Lutton Patented Galvanized Steel V-Bar.

HARDWARE

- P. & F. Corbin**, New Britain, Conn.
Early English and Colonial Hardware. Brochure, 8½ x 11 ins. An important illustrated work on this type of hardware.
Locks and Builders' Hardware. Bound Volume, 486 pp., 8½ x 11 ins. An exhaustive, splendidly prepared volume.
Colonial and Early English Hardware. Booklet, 48 pp. 8½ x 11 ins. Illustrated. Data on hardware for houses in these styles.
- Cutler Mail Chute Company**, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet. 4 x 9¼ ins. 8 pp. Illustrated.
- McKinney Mfg. Co.**, Pittsburgh.
Forged Iron by McKinney. Booklet. 6 x 9 ins. Illustrated. Deals with an excellent line of builders' hardware.
Forged Lanterns by McKinney. Brochure, 6 x 9 ins. Illustrated. Describes a fine assortment of lanterns for various uses.
- Richards-Wilcox Mfg. Co.**, Aurora, Ill.
Distinctive Garage Door Hardware. Booklet, 8½ x 11 ins. 65 pp. Illustrated. Complete information accompanied by data and illustrations on different kinds of garage door hardware.
Distinctive Elevator Door Hardware. Booklet, 89 pp., 16 x 10½ ins. Illustrated.
- Russell & Erwin Mfg. Co.**, New Britain, Conn.
Hardware for the Home. Booklet, 24 pp., 3½ x 6 ins. Deals with residence hardware.

HARDWARE—Continued

- Door Closer Booklet. Brochure, 16 pp., 3¼ x 6 ins. Data on a valuable detail. Garage Hardware Booklet, 12 pp., 3¼ x 6 ins. Hardware intended for garage use.
Famous Homes of New England. Series of folders on old homes and hardware in style of each.

HEATING EQUIPMENT

- American Blower Co.**, 6004 Russell St., Detroit.
Heating and Ventilating Utilities. A binder containing a large number of valuable publications, each 8½ x 11 ins., on these important subjects.
- American Radiator Company, The**, 40 West 40th St., N. Y. C.
Ideal Boilers for Oil Burning. Catalog 5½ x 8½ ins. 36 pp. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.
Corto—The Radiator Classic. Brochure, 5½ x 8½ ins. 16 pp. Illustrated. A brochure on a space-saving radiator of beauty and high efficiency.
Ideal Arcola Radiator Warmth. Brochure, 6¼ x 9½ ins. Illustrated. Describes a central all-on-one-floor heating plant with radiators for small residences, stores, and offices.
How Shall I Heat My Home? Brochure, 16 pp., 5¼ x 8½ ins. Illustrated. Full data on heating and hot water supply.
New American Radiator Products. Booklet, 44 pp., 5 x 7¾ ins. Illustrated. Complete line of heating products.
A New Heating Problem. Brilliantly Solved. Brochure, 4 pp. 10¼ x 15 ins. Illustrated. Data on the IN-AIRID invisible air valve.
In-Airid, the Invisible Air Valve. Folder. 8 pp. 3½ x 6 ins. Illustrated. Data on a valuable detail of heating.
The 999 ARCO Packless Radiator Valve. Folder. 8 pp. 3½ x 6 ins. Illustrated.
- James B. Clow & Sons**, 534 S. Franklin St., Chicago.
Clow Gasteam Vented Heating System. Brochure, 24 pp. 8½ x 11 ins. Illustrated. Deals with a valuable form of heating equipment for using gas.
- C. A. Dunham Company**, 450 East Ohio St., Chicago, Ill.
Dunham Radiator Trap. Bulletin 101, 8 x 11 ins. 12 pp. Illustrated. Explains working of this detail of heating apparatus.
Dunham Packless Radiator Valves. Bulletin 104, 8 x 11 ins. 8 pp. Illustrated. A valuable brochure on valves.
Dunham Return Heating System. Bulletin 109, 8 x 11 ins. Illustrated. Covers the use of heating apparatus of this kind.
Dunham Vacuum Heating System. Bulletin 110, 8 x 11 ins. 12 pp. Illustrated.
The Dunham Differential Vacuum Heating System. Bulletin 114. Brochure. 8 pp. 8 x 11 ins. Illustrated. Deals with heating for small buildings.
The Dunham Differential Vacuum Heating System. Bulletin 115. Brochure. 12 pp. 8 x 11 ins. Illustrated. Deals with heating for large buildings.
- Excelsco Products Corporation**, 119 Clinton St., Buffalo, N. Y.
Excelsco Water Heater. Booklet. 12 pp. 3 x 6 ins. Illustrated. Describing the new Excelsco method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)
- The Fulton Siphon Company**, Knoxville, Tenn.
Siphon Temperature Regulators. Illustrated brochures, 8½ x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments.
Siphon Heating Specialties. Catalog No. 200. 192 pp. 3½ x 6¼ ins. Important data on heating.
- S. T. Johnson Co.**, Oakland, Calif.
Bulletin No. 4A. Brochure. 8 pp., 8½ x 11 ins. Illustrated. Data on different kinds of oil-burning apparatus.
Bulletin No. 31. Brochure. 8 pp. 8½ x 11 ins. Illustrated. Deals with Johnson Rotary Burner With Full Automatic Control.
- Kewanee Boiler Corporation**, Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 ins. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 78. 6 x 9 ins. Illustrated. Describes Kewanee Fire-box Boilers with specifications and setting plans.
Catalog No. 79. 6 x 9 ins. Illustrated. Describes Kewanee power boilers and smokeless tubular boilers with specifications.
- May Oil Burner Corp.**, Baltimore, Md.
Adventures in Comfort. Booklet. 24 pp. 6 x 9 ins. Illustrated. Non-technical data on oil as fuel.
Taking the Quest out of the Question. Brochure. 16 pp. 6 x 9 ins. Illustrated. For home owners interested in oil as fuel.
- McQuay Radiator Corporation**, 35 East Wacker Drive, Chicago, Ill.
McQuay Visible Type Cabinet Heater. Booklet. 3 pp. 8½ x 11 ins. Illustrated. Cabinets and radiators adaptable to decorative schemes.
McQuay Concealed Radiators. Brochure. 3 pp. 8½ x 11 ins. Illustrated.
McQuay Unit Heater. Booklet. 8 pp. 8½ x 11 ins. Illustrated. Gives specifications and radiator capacities.
- Milwaukee Valve Co.**, Milwaukee, Wis.
MILVACO Vacuum & Vapor Heating System. Nine 4-p. bulletins, 8½ x 11 ins. Illustrated. Important data on heating.
MILVACO Vacuum & Vapor Heating Specialties. Nine 4-p. bulletins, 8½ x 11 ins. Illustrated. Deal with a valuable line of specialties used in heating.
- Modine Mfg. Company**, Racine, Wis.
Thermodyne Unit Heater. Brochure. 24 pp. 8½ x 11 ins. Illustrated. Apparatus for industrial heating and drying.

For HOMES AND SMALL BUILDINGS

Outstanding Points

1. *Attractive*—Durable empire green enamel finish, with glossy black trim. Fine lines and proportions.
2. *Easily Set*—Sectional portion shipped assembled—base complete with grate bars. Low erection costs. Double test before shipment eliminates leaks.
3. *Insulated*—A thick layer of rock wool fills every crevice between jacket and boiler.
4. *Efficient*—Double set of three flue ways provides a long forward and back fire travel, and assures a maximum of heat absorption.



Outstanding Points

5. *Convenient*—Exceptionally deep fire-pot with large capacity permits heavy charges, and thus requires only infrequent attention.
6. *Dependable*—Its dependability, efficiency, and heating qualities have been demonstrated on many varied installations. This boiler has passed with flying colors the test of actual service.
7. *Time-Saving*—Large doors make firing and cleaning quick, simple and easy tasks.
8. *Adaptable*—Burns hard or soft coal, coke, oil, or gas—all with a maximum of fuel efficiency and little labor.

The National Jacketed Boiler has a trim, durable, dirt-defying empire green jacket, that houses a dependable, efficient boiler. It burns hard or soft coal, coke, oil, or gas. It is furnished for either steam, vapor, or hot water systems. It is easy to tend, economical to operate, trust-worthy and effective. The fire box is exceptionally large. It permits heavy fuel charges. It provides ample space for

proper combustion. It decreases the attention necessary. The long forward and back fire travel assures maximum heat absorption. A thick layer of rock wool insulation decreases heat loss. For the home or small building, the National Jacketed Boiler is an attractive, dependable source of controlled, economical, healthful warmth, a permanent source of comfort and satisfaction.

NATIONAL RADIATOR CORPORATION

Manufacturer of Radiators and Boilers

Nine Plants devoted to National Service through these Branch Offices and Warehouses:

Baltimore, Md.—2600-2622 Matthews St.	Boston, Mass.—93-97 Oliver St.	Buffalo, N. Y.—259-265 Delaware Ave.
Chicago, Ill.—2445 N. Keeler Ave.	Cleveland, Ohio—935 E. 63rd St.	Indianapolis, Ind.—431 W. Georgia St.
Cincinnati, Ohio—3530-36 Spring Grove Ave.	Johnstown, Pa.—221 Central Ave.	Milwaukee, Wis.—124-130 Jefferson St.
New York, N. Y.—55 W. 42nd St.	Omaha, Neb.—108-112 S. Tenth St.	Philadelphia, Pa.—121 N. Broad St.
Pittsburgh, Pa.—1509 Arrott Bldg.	Richmond, Va.—3032 Norfolk St.	St. Louis, Mo.—1042 Central Industrial St.
Washington, D. C.—2205 Fifth St., N. E.		



NATIONAL JACKETED BOILER



SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 154

HEATING EQUIPMENT—Continued

- Thermodyne Cabinet Heater. Booklet. 12 pp. 8½ x 11 ins. Illustrated. Cabinet heaters for buildings of different kinds.
- Nash Engineering Company**, South Norwalk, Conn.
No. 37. Devoted to Jennings Hytor Return Line Vacuum Heating Pumps, electrically driven, and supplied in standard sizes up to 300,000 square feet equivalent direct radiation.
No. 16. Dealing with Jennings Hytor Air Line Heating Pumps.
No. 17. Describing Jennings Hytor Condensation Pumps, sizes up to 70,000 square feet equivalent direct radiation.
No. 25. Illustrating Jennings Return Line Vacuum Heating Pumps. Size M, for equivalent direct radiation up to 5,000 square feet.
- National Radiator Corporation**, Johnstown, Pa.
Aero Radiators; Beauty and Worth. Catalog 34. Booklet. 6 x 9 ins., 20 pp., describing and illustrating radiators and accessories.
Six Great Companies Unite to Form a Great Corporation. Booklet, 27 pp., 8½ x 10½ ins. Illustrated. Valuable data on heating.
Heating Homes the Modern Way. Booklet, 8½ x 11¼ ins. Illustrated. Data on the Petro Burner.
Residence Oil Burning Equipment. Brochure, 6 pp., 8½ x 11 ins. Illustrated. Data regarding Petro Burner in a bulletin approved by Investigating Committee of Architects and Engineers.
- Oil Heating Institute**, 420 Madison Ave., New York.
What about the Supply of Oil Fuel? Booklet, 16 pp., 5½ x 8 ins. Illustrated.
- Petroleum Heat & Power Co.**, 511 Fifth Avenue, New York.
Petro Mechanical Oil Burner & Air Register. Booklet, 23 pp., 8½ x 11 ins. Illustrated. Data on industrial installations of Petro Burners.
Present Accepted Practice in Domestic Oil Burners. Folder, 4 pp., 8½ x 11 ins. Illustrated. A reprint from Heating and Ventilating Magazine.
- Sarco Company, Inc.**, 183 Madison Ave., New York City, N. Y.
Steam Heating Specialties. Booklet, 6 pp., 6 x 9 ins. Illustrated. Data on Sarco Packless Supply Valves and Radiator Traps for vacuum and vapor heating systems.
Equipment Steam Traps and Temperature Regulations. Booklet, 6 pp., 6 x 9 ins. Illustrated. Deals with Sarco Steam Traps for hospital, laundry and kitchen fixtures and the Sarco Self-contained Temperature Regulation for hot water service tanks.
- B. F. Sturtevant Company**, Hyde Park, Boston, Mass.
Tempervane Heating Units, Catalog 363. Booklet, 44 pp., 8½ x 11 ins. Illustrated. Data on "Heating Every Corner with Maximum Economy."
- Trane Co., The**, La Crosse, Wis.
Bulletin 14. 16 pp. 8½ x 10½ ins. Covers the complete line of Trane Heating Specialties, including Trane Bellows Traps, and Trane Bellows Packless Valves.
Bulletin 20. 24 pp. 8½ x 10½ ins. Explains in detail the operation and construction of Trane Condensation. Vacuum, Booster, Circulating, and similar pumps.
How to Cut Heating Costs. Booklet, 18 pp., 8½ x 11 ins. Illustrated.

HOSPITAL EQUIPMENT

- The Frink Co., Inc.**, 24th St. and Tenth Ave., New York City.
Catalog 426. 7 x 10 ins. 16 pp. A booklet illustrated with photographs and drawings, showing the types of light for use in hospitals, as operating table reflectors, limolite and multilite concentrators, ward reflectors, bed lights and microscopic reflectors, giving sizes and dimensions, explaining their particular fitness for special uses.
- Holophane Company**, 342 Madison Avenue, New York.
Lighting Specific for Hospitals. Booklet, 29 pp. 8½ x 11 ins. Illustrated.
- The International Nickel Company**, 67 Wall St., New York, N. Y.
Hospital Applications of Monel Metal. Booklet. 8½ x 11½ ins. 16 pp. Illustrated. Gives types of equipment in which Monel Metal is used, reasons for its adoption, with sources of such equipment.
- The Pick-Barth Companies**, Chicago and New York.
Some Thoughts About Hospital Food Service Equipment. Booklet, 21 pp., 7½ x 9¼ ins. Valuable data on an important subject.
- Wilnot Castle Company**, Rochester, N. Y.
Sterilizer Equipment for Hospitals. Book, 76 pp., 8½ x 11 ins. Illustrated. Gives important and complete data on sterilization of utensils and water, information on dressings, etc.
Sterilizer Specifications. Brochure, 12 pp., 8½ x 11 ins. Practical specifications for use of architects and contractors.
Architects' Data Sheets. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Information on piping, venting, valving and wiring for hospital sterilizer installations.
Hospital Sterilizing Technique. Five booklets. 8 to 16 pp. 6 x 9 ins. Illustrated. Deals specifically with sterilizing instruments, dressings, utensils, water, and rubber gloves.

HOTEL EQUIPMENT

- Pick & Company**, Albert, 208 West Randolph St., Chicago, Ill.
Some Thoughts on Furnishing a Hotel. Booklet. 7½ x 9 ins. Data on complete outfitting of hotels.

INCINERATORS

- Home Incinerator Co.**, Milwaukee, Wis.
The Decent Way. Burn it with Gas. Brochure, 30 pp., 5¼ x 7¼ ins. inside. Illustrated. Incinerator sanitation equipment for residence use.

INCINERATORS—Continued

- A. I. A. File**. 12 pp., 8¼ x 10¼ ins. inside. Suggestions for architect on incineration, showing installation and equipment.
- Specialized Home Comforts Service Plan Book. 40 pp., 8½ x 11 ins. inside, illustrated. A complete outline of the many advantages of incineration.
- Blue Star Standards in Home Building. 16 pp., 5¼ x 8½ ins. inside. Illustrated, explaining fully the Blue Star principles, covering heat, incineration, refrigeration, etc.
- Kerner Incinerator Company**, 715 E. Water St., Milwaukee, Wis.
Incinerators (Chimney-fed). Catalog No. 15 (Architect and Builders' Edition). Size 8½ x 11 ins. 16 pp. Illustrated. Describes principles and design of Kernerator Chimney-fed Incinerators for residences, apartments, hospitals, schools, apartment hotels, clubs and other buildings. Shows all standard models and gives general information and working data.
Sanitary Elimination of Household Waste, booklet, 4 x 9 ins. 16 pp. Illustrated. Gives complete information on the Kernerator for residences.
Garbage and Waste Disposal for Apartment Buildings, folder, 8½ x 11 ins. 16 pp. Illustrated. Describes principle and design of Kernerator-Chimney-fed Incinerator for apartments and gives list of buildings where it has been installed.
Sanitary Disposal of Waste in Hospitals. Booklet. 4 x 9 ins. 12 pp. Illustrated. Shows how this necessary part of hospital service is taken care of with the Kernerator. Gives list of hospitals where installed.
The Kernerator (Chimney-fed) Booklet. Catalog No. 17. 20 pp. 8½ x 11 ins. Illustrated. Data on a valuable detail of equipment.

INSULATING LUMBER

- Masonite Corporation**, 111 West Washington St., Chicago, Ill.
Booklet, 12 pp., 8½ x 11 ins. Illustrated. Gives complete specifications for use of insulating lumber and details of construction involving its use.

INSULATION

- Armstrong Cork & Insulation Co.**, Pittsburgh, Pa.
The Insulation of Roofs with Armstrong's Corkboard. Booklet. Illustrated. 7½ x 10½ ins. 32 pp. Discusses means of insulating roofs of manufacturing or commercial structures.
Insulation of Roofs to Prevent Condensation. Illustrated booklet. 7½ x 10½ ins. 36 pp. Gives full data on valuable line of roof insulation.
Filing Folder for Pipe Covering Data. Made in accordance with A. I. A. rules.
"The Cork Lined House Makes a Comfortable Home." 5 x 7 ins. 32 pp. Illustrated.
Armstrong's Corkboard. Insulation for Walls and Roofs of Buildings. Booklet, 66 pp., 9½ x 11¼ ins. Illustrates and describes use of insulation for structural purposes.
- Cabot, Inc., Samuel**, Boston, Mass.
Cabot's Insulating Quilt. Booklet. 7½ x 10½ ins. 24 pp. Illustrated. Deals with a valuable type of insulation.
- Celite Products Co.**, 1320 South Hope St., Los Angeles, Calif.
Insulation of Breechings and Stacks. Folder, 2 pp. 8½ x 11 ins. Illustrated.
- Structural Gypsum Corporation**, Linden, N. J.
Heat Insulation Value of Gynsteel. Folder, 4 pp., 8½ x 11 ins. Brochure, by Charles L. Norton, of M. I. T.

JOISTS

- Bates Expanded Steel Truss Co.**, East Chicago, Ind.
Catalog No. 4. Booklet, 32 pp., 8½ x 11 ins. Illustrated. Gives details of truss construction with loading tables and specifications.
- Genfire Steel Company**, Youngstown, Ohio.
Steel Joists. 8½ x 11 ins. 32 pp. A. I. A. File Number 13G. Illustrated. Complete data on T-Bar and Plate-Girder joists, including construction details and specifications.

KITCHEN EQUIPMENT

- The International Nickel Company**, 67 Wall St., New York, N. Y.
Hotels, restaurants and Cafeteria Applications of Monel Metal. Booklet. 8½ x 11 ins. 32 pp. Illustrated. Gives types of equipment in which Monel Metal is used, with service data and sources of equipment.
- Pick & Company, Albert**, 208 W. Randolph St., Chicago, Ill.
School Cafeteria Portfolio. 17 x 11 ins. 44 pp. Illustrated. An exhaustive study of the problems of school feeding, with copious illustrations and blue prints. Very valuable to the architect.
School Cafeterias. Booklet. 9 x 6 ins. Illustrated. The design and equipment of school cafeterias with photographs of installation and plans for standardized outfits.

LABORATORY EQUIPMENT

- Alberene Stone Co.**, 153 West 23rd Street, New York City.
Booklet 8¼ x 11¼ ins., 26 pp. Stone for laboratory equipment, shower partitions, stair treads, etc.
- Duriron Company**, Dayton, Ohio.
Duriron Acid, Alkali and Rust-proof Drain Pipe and Fittings. Booklet, 8½ x 11 ins., 20 pp. Full details regarding a valuable form of piping.

LANTERNS

- Todhunter, Arthur**, 119 E. 57th St., New York.
Hand Wrought Lanterns. Booklet, 5¼ x 6¼ ins. 20 pp. Illustrated in Black and White. With price list. Lanterns appropriate for exterior and interior use, designed from old models and meeting the requirements of modern lighting.

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buckle or warp. Any kind of roofing can be laid over it with as complete assurance of permanence as over the deck itself. The selection of Armstrong's Corkboard for the Fisher Building is convincing evidence that its merits have been satisfactorily proved to both architects and owners.

Write for any one or all of these three books: "The Insulation of Roofs with Armstrong's Corkboard," "The Insulation of Roofs to Prevent Condensation," and "Architects' Filing Catalog" (containing detailed information, drawings and specifications). Armstrong Cork & Insulation Company, 132 Twenty-fourth Street, Pittsburgh, Pa.; McGill Building, Montreal; 11 Brant Street, Toronto 2.

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for the Roofs of All Kinds of Buildings

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 156

LATH, METAL AND REINFORCING

- Genfire Steel Company**, Youngstown, Ohio.
Herringbone Metal Lath Handbook. 8½ x 11 ins. 32 pp. Illustrated. Standard specifications for Cement Stucco on Herringbone. Rigid Metal Lath and interior plastering.
- National Steel Fabric Co.**, Pittsburgh.
Better Walls for Better Homes. Brochure. 16 pp. 7¼ x 11¼ ins. Illustrated. Metal lath, particularly for residences.
- Steelex for Floors. Booklet. 24 pp. 8½ x 11 ins. Illustrated.
Combined reinforcing and form for concrete or gypsum floors and roofs.
- Steelex Data Sheet No. 1. Folder. 8 pp. 8½ x 11 ins. Illustrated. Steelex for floors on steel joists with round top chords.
- Steelex Data Sheet No. 2. Folder. 8 pp. 8½ x 11 ins. Illustrated. Steelex for floors on steel joists with flat top flanges.
- Steelex Data Sheet No. 3. Folder. 8 pp. 8½ x 11 ins. Illustrated. Steelex for folders on wood joists.
- Northwestern Expanded Metal Co.**, 1234 Old Colony Building, Chicago, Ill.
Northwestern Expanded Metal Products. Booklet, 8½ x 10½ ins., 20 pp. Fully illustrated, and describes different products of this company, such as Kno-burn metal lath, 20th Century Corrugated, Plasta-saver and longspan lath channels, etc.
- Longspan ¾-inch Rib Lath. Folder 4 pp., 8½ x 11 ins. Illustrated. Deals with a new type of V-Rib expanded metal.
- A. I. A. Sample Book. Bound volume, 8½ x 11 ins. Contains actual samples of several materials and complete data regarding their use.
- Norwest Metal Lath. Folder. 8½ x 11 ins. Illustrated. Data on Flat Rib Lath.
- Truscon Steel Company**, Youngstown, Ohio.
Truscon ¾-inch Hy-Rib for Roofs, Floors and Walls. Booklet, 8½ x 11 ins., illustrating Truscon ¾-inch Hy-Rib as used in industrial buildings. Plates of typical construction. Progressive steps of construction. Specification and load tables.

LAUNDRY CHUTES

- The Pfaudler Company**, 217 Cutler Building, Rochester, N. Y.
Pfaudler Glass-Lined Steel Laundry Chutes. Booklet, 5¼ x 7¾ ins. 16 pp. Illustrated. A beautifully printed brochure describing in detail with architects' specifications THE PFAUDLER GLASS LINED STEEL LAUNDRY CHUTES. Contains views of installations and list of representative examples.

LAUNDRY MACHINERY

- American Laundry Machinery Co.**, Norwood Station, Cincinnati, Ohio.
Functions of the Hotel and Hospital Laundry. Brochure, 8 pp., 8½ x 11 ins. Valuable data regarding an important subject.

LIBRARY EQUIPMENT

- Art Metal Construction Co.**, Jamestown, N. Y.
Planning the Library for Protection and Service. Brochure. 52 pp. 8½ x 11 ins. Illustrated. Deals with library fittings of different kinds.
- Library Bureau Division, Remington Rand, N. Tonawanda, N. Y.
Like Stepping into a Story Book. Booklet. 24 pp. 9 x 12 ins. Deals with equipment of Los Angeles Public Library.

LIGHTING EQUIPMENT

- The Frink Co., Inc.**, 24th St. and 10th Ave., New York City.
Catalog 415, 8½ x 11 ins. 46 pp. Photographs and scaled cross-sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polarite Signs.
- Holophane Company, Inc.**, 342 Madison Ave., New York.
The Lighting of Schools; A Guide to Good Practice. Booklet. 24 pp. 8½ x 11 ins. Illustrated.
- Lighting Specifications for Hospitals. Brochure, 30 pp. 8½ x 11 ins. Illustrated.
- Industrial Lighting. Bulletin 448A. Booklet, 24 pp. 8½ x 11 ins. Illustrated.
- Holophane Catalog. Booklet, 48 pp. 8½ x 11 ins. Combination catalog and engineering data book.
- The Lighting of Schools. A Guide to Good Practice. Booklet. 24 pp. 8½ x 11 ins. Illustrated.
- Smyser-Royer Co.**, 1700 Walnut Street, Philadelphia.
Catalog "J" on Exterior Lighting Fixtures. Brochure, illustrated, giving data on over 300 designs of standards, lanterns and brackets of bronze or cast iron.
- Todhunter**, 119 East 57th St., New York.
Lighting Fixtures, Lamps and Candlesticks. 24 pp. 8½ x 11 ins. Illustrated. Fine assortment of lighting accessories.
- Westinghouse Electric & Manufacturing Co.**
Industrial Lighting Equipment. Booklet, 32 pp. 8½ x 11 ins. Illustrated.
- Commercial Lighting. Brochure, 24 pp. 8½ x 11 ins. Illustrated.
- Airport and Floodlighting Equipment. Booklet, 20 pp. 8½ x 11 ins. Illustrated.

LUMBER

- National Lumber Mfrs. Assn.**, Washington, D. C.
Use of Lumber on the Farm. Booklet, 38 pp., 8½ x 11 ins. Illustrated.

MAIL CHUTES

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

MANTELS

- Arthur Todhunter**, 119 E. 57th St., New York, N. Y.
Georgian Mantels. New Booklet. 24 pp., 5¼ x 6¼ ins. A fully illustrated brochure on eighteenth century mantels. Folders give prices of mantels and illustrations and prices of fireplace equipment.

MARBLE

- The Georgia Marble Company**, Tate, Ga., New York Office, 1328 Broadway.
Why Georgia Marble is Better. Booklet. 3¾ x 6 ins. Gives analysis, physical qualities, comparison of absorption with granite, opinions of authorities, etc.
- Convincing Proof. 3¾ x 6 ins. 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.
- Hurt Building, Atlanta; Senior High School and Junior College, Muskegon, Mich. Folders, 4 pp. 8½ x 11 ins. Details.

METALS

- The International Nickel Company**, 67 Wall St., New York, N. Y.
The Choice of a Metal. Booklet, 6¼ x 3 ins. 166 pp. Illustrated. Monel Metal—its qualities, use and commercial forms, briefly described.

MILL WORK—See also Wood

- Curtis Companies Service Bureau**, Clinton, Iowa.
Architectural Interior and Exterior Woodwork. Standardized Book. 9 x 11½ ins. 240 pp. Illustrated. This is an Architects' Edition of the complete catalog of Curtis Woodwork, as designed by Trowbridge & Ackerman. Contains many color plates.
- Better Built Homes. Vols. XV-XVIII incl. Booklet. 9 x 12 ins. 40 pp. Illustrated. Designs for houses of five to eight rooms, respectively, in several authentic types, by Trowbridge & Ackerman, architects for the Curtis Companies.
- Curtis Details. Booklet, 19½ x 23½ ins. 20 pp. Illustrated. Complete details of all items of Curtis woodwork, for the use of architects.
- Hartmann-Sanders Company**, 2155 Elston Ave., Chicago, Ill.
Column Catalog, 7½ x 10 ins. 48 pp. Illustrated. Contains prices on columns 6 to 36 ins. diameter, various designs and illustrations of columns and installations.
- The Pergola Catalog. 7½ x 10 ins. 64 pp. Illustrated. Contains illustrations of pergola lattices, garden furniture in wood and cement, garden accessories.
- Klein & Co., Henry, Inc.**, 11 East 37th St., New York, N. Y.
Two Driwood Interiors. Folder, 4 pp. 6¼ x 9 ins. Illustrated. Use of Moulding for paneling walls.
- A New Style in Interior Decoration. Folder, 4 pp. 6¼ x 9 ins. Illustrated. Deals with interior woodwork.
- Driwood Period Mouldings in Ornamented Wood. Booklet. 28 pp. 8½ x 11 ins. Illustrated.
- How Driwood Period Mouldings in Ornamented Wood Set a New Style in Decoration. Folder.
- Roddis Lumber and Veneer Co.**, Marshfield, Wis.
Roddis Doors. Brochure, 24 pp., 5¼ x 8½ ins. Illustrated price list of doors for various types of buildings.
- Roddis Doors, Catalog G. Booklet, 183 pp., 8½ x 11 ins. Completely covers the subject of doors for interior use.
- Roddis Doors for Hospitals. Brochure, 15 pp., 8½ x 11 ins. Illustrated work on hospital doors.
- Roddis Doors for Hotels. Brochure, 15 pp., 8½ x 11 ins. Illustrated work on doors for hotel and apartment buildings.
- Clinton Metallic Paint Co.**, Clinton, N. Y.
Clinton Mortar Colors. Folder. 8½ x 11 ins. 4 pp. Illustrated in colors, gives full information concerning Clinton Mortar Colors with specific instructions for using them.

MORTAR AND CEMENT COLORS

- Color Card. 6½ x 3¼ ins. Illustrates in color the ten shades in which Clinton Mortar Colors are manufactured.
- Something new in Stucco. Folder, 3½ x 6 ins. An interesting folder on the use of coloring matter for stucco-coated walls.

ORNAMENTAL PLASTER

- Jacobson & Co.**, 241 East 44th St., New York.
A book of Old English Designs. Brochure. 47 plates. 12 x 9 ins. Deals with a fine line of decorative plaster work.
- Architectural and Decorative Ornaments. Cloth bound volume. 183 plates. 9 x 12 ins. 18 plates. Price, \$3.00. A general catalog of fine plaster ornaments.
- Geometrical ceilings. Booklet. 23 plates. 7 x 9 ins. An important work on decorative plaster ceilings.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

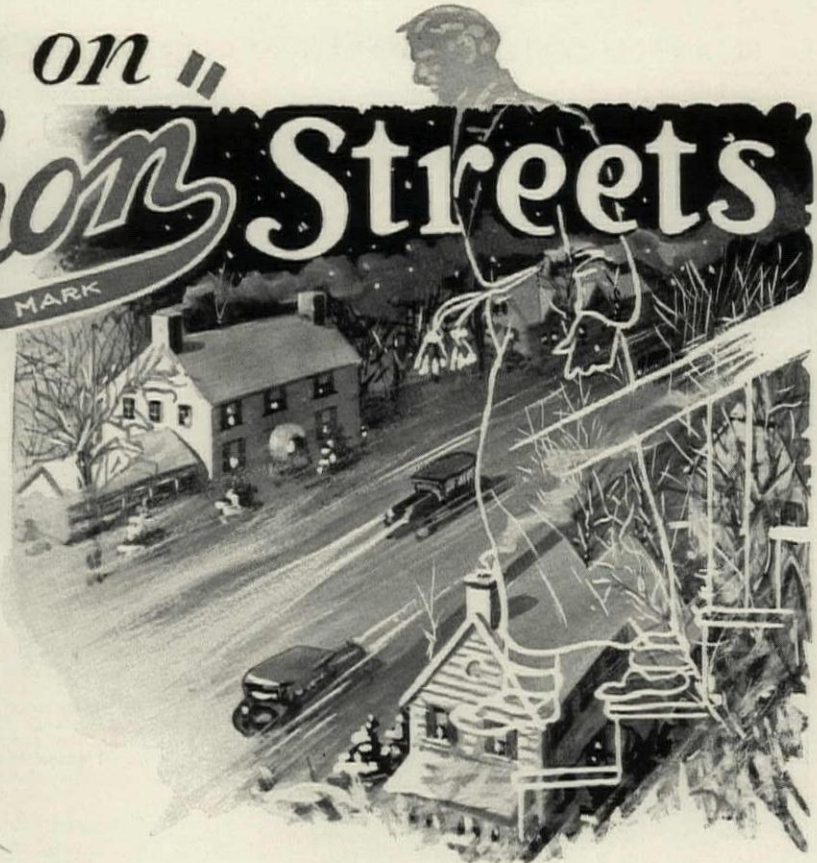
- Cabot, Inc., Samuel**, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ ins. 16 pp. Illustrated.
- National Lead Company**, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book, 5½ x 3¼ ins. 100 pp. Gives directions and formulae for painting various surfaces of wood, plaster, metals, etc., both interior and exterior.
- Red Lead in Paste Form. Booklet, 6¼ x 3½ ins. 16 pp. Illustrated. Directions and formulae for painting metals.
- Came Lead. Booklet, 8¼ x 6 ins. 12 pp. Illustrated. Describes various styles of lead cames.
- Pratt & Lambert, Inc.**, Buffalo, N. Y.
Specification Manual for Paint, Varnishing and Enameling. Booklet, 38 pp., 7½ x 10½ ins. Complete specifications for painting, varnishing and enameling interior and exterior wood, plaster, and metal work.
- Sherwin-Williams Company**, 601 Canal Rd., Cleveland, Ohio.
Painting Concrete and Stucco Surfaces. Bulletin No. 1. 8½ x 11 ins. 8 pp. Illustrated. A complete treatise with complete specifications on the subject of Painting of Concrete and Stucco Surfaces. Color chips of paint shown in bulletin.
- Enamel Finish for Interior and Exterior Surfaces. Bulletin No. 2. 8½ x 11 ins. 12 pp. Illustrated. Thorough discussion, including complete specifications for securing the most satisfactory enamel finish on interior and exterior walls and trim.
- Painting and Decorating of Interior Walls. Bulletin No. 3. 8½ x 11 ins. 20 pp. Illustrated. An excellent reference book on Flat Wall Finish, including texture effects, which are taking the country by storm. Every architect should have one on file.

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SYPHON Damper Regulators for every Steam, Hot Water or Vapor Heating System, are today standard factory equipment with 36 of the nation's leading boiler manufacturers. What an endorsement! "Sylphon" Streets are today in every town. Home keepers are forever freed from that wearisome up and down stairs vigil to regulate dampers. They are saving bothersome labor, and fuel costs as well.

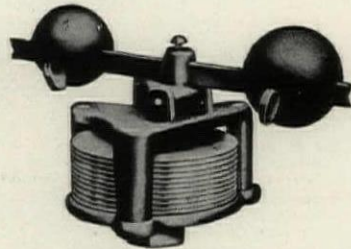


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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 158

PAINTS, STAINS, VARNISHES and WOOD FINISHES—Continued

- Protective Paints for Metal Surfaces. Bulletin No. 4. 8½ x 11 ins. 12 pp. Illustrated. A highly technical subject treated in a simple, understandable manner.
- Sonneborn Sons, Inc., L., Dept. 4, 116 Fifth Avenue., New York. Paint Specifications. Booklet, 8½ x 10¾ ins. 4 pp.
- U. S. Gutta Percha Paint Co., Providence, R. I. Barreled Sunlight. Booklet, 8½ x 11 ins. Data on "Barreled Sunlight" with specifications for its use.
- Valentine & Co., 456 Fourth Ave., New York. How to Use Valspar. Illustrated booklet, 32 pp., 3¼ x 8 ins. Deals with domestic uses for Valspar.
- How to Keep Your House Young. Illustrated brochure, 23 pp., 7 x 8½ ins. A useful work on the upkeep of residences.
- Architectural Four-Hour Varnishes and Enamels. Booklet, 8 pp., 4¼ x 6 ins. Data on a useful line of materials.

PAPER

- A. P. W. Paper Co., Albany, N. Y. "Here's a Towel Built for Its Job." Folder, 8 pp., 4 x 9 ins. Deals with "Onliwon" paper towels.

PARCEL DELIVERY DEVICES

- Receivador Sales Company, Grand Rapids, Mich. Architects' Portfolio. Booklet, 12 pp. 8½ x 11 ins. Illustrated. Deals with delivery problems and their solution.

PARTITIONS

- Circle A. Products Corporation, New Castle, Ind. Circle A. Partitions Sectional and Movable. Brochure. Illustrated. 8½ x 11¼ ins. 32 pp. Full data regarding an important line of partitions, along with Erection Instructions for partitions of three different types.
- Hauserman Company, E. F., Cleveland, Ohio. Hollow Steel Standard Partitions. Various folders, 8½ x 11 ins. Illustrated. Give full data on different types of steel partitions, together with details, elevations and specifications.
- Improved Office Partition Company, 25 Grand St., Elmhurst, L. I. Telesco Partition. Catalog. 8¼ x 11 ins. 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
- Detailed Instructions for erecting Telesco Partitions. Booklet. 24 pp. 8½ x 11 ins. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.
- Richards-Wilcox Mfg. Co., Aurora, Ill. Partitions. Booklet. 7 x 10 ins. 32 pp. Illustrated. Describes complete line of track and hangers for all styles of sliding parallel, accordion and flush door partitions.
- U. S. Gypsum Co., Chicago. Pyrobar Partition and Furring Tile. Booklet. 8½ x 11 ins. 24 pp. Illustrated. Describes use and advantages of hollow tile for inner partitions.

PIPE

- American Brass Company, Waterbury, Conn. Bulletin B-1. Brass Pipe for Water Service. 8½ x 11 ins. 28 pp. Illustrated. Gives schedule of weights and sizes (I.P.S.) of seamless brass and copper pipe, shows typical installations of brass pipe, and gives general discussion of the corrosive effect of water on iron, steel and brass pipe.
- American Rolling Mill Company, Middletown, Ohio. How ARMO Dredging Products Cut Costs. Booklet, 16 pp., 6 x 9 ins. Data on dredging pipe.
- Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill. Catalog "A." 4 x 16½ ins. 700 pp. Illustrated. Shows a full line of steam, gas and water works supplies.
- Cohoes Rolling Mill Company, Cohoes, N. Y. Cohoes Pipe Handbook. Booklet, 40 pp., 5 x 7½ ins. Data on wrought iron pipe.
- Duriron Company, Inc., Dayton, Ohio. Duriron Acid, Alkali, Rust-proof Drain Pipe and Fittings. Booklet, 20 pp., 8½ x 11 ins., illustrated. Important data on a valuable line of pipe.
- National Tube Co., Frick Building, Pittsburgh, Pa. "National" Bulletin No. 2. Corrosion of Hot Water Pipe, 8½ x 11 ins. 24 pp. Illustrated. In this bulletin is summed up the most important research dealing with hot water systems. The text matter consists of seven investigations by authorities on this subject.
- "National" Bulletin No. 3. The Protection of Pipe Against Internal Corrosion, 8½ x 11 ins. 20 pp. Illustrated. Discusses various causes of corrosion, and details are given of the deactivating and deaerating systems for eliminating or retarding corrosion in hot water supply lines.
- "National" Bulletin No. 25. "National" Pipe in Large Buildings. 8½ x 11 ins. 88 pp. This bulletin contains 254 illustrations of prominent buildings of all types, containing "National" Pipe, and considerable engineering data of value to architects, engineers, etc.
- Modern Welded Pipe. Book of 88 pp. 8½ x 11 ins., profusely illustrated with halftone and line engravings of the important operations in the manufacture of pipe.

PLASTER

- Best Bros. Keene's Cement Co., Medicine Lodge, Kans. Information Book. Brochure, 24 pp., 5 x 9 ins. Lists grades of plaster manufactured; gives specifications and uses for plaster.
- Plasterers' Handbook. Booklet, 16 pp., 3½ x 5½ ins. A small manual for use of plasterers.
- Interior Walls Everlasting. Brochure, 20 pp., 6¼ x 9¼ ins. Illustrated. Describes origin of Keene's Cement and views of buildings in which it is used.

PLUMBING EQUIPMENT

- C. F. Church Mfg. Co., Holyoke, Mass. Catalog S. W.-3. Booklet, 95 pp., 7¾ x 10½ ins. Illustrated. Data on Sani-White and Sani-Black toilet seats.
- Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill. Catalog "M." 9¼ x 12 ins. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.
- Crane Company, 836 S. Michigan Ave., Chicago, Ill. Plumbing Suggestions for Home Builders. Catalog. 3 x 6 ins. 80 pp. Illustrated.
- Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ ins. 34 pp. Illustrated.
- Planning the Small Bathroom. Booklet. 5 x 8 ins. Discusses planning bathrooms of small dimensions.
- John Douglas Co., Cincinnati, Ohio. Douglas Plumbing Fixtures. Bound Volume. 200 pp. 8½ x 11 ins. Illustrated. General catalog.
- Another Douglas Achievement. Folder. 4 pp. 8½ x 11 ins. Illustrated. Data on new type of stall.
- Hospital. Brochure. 60 pp. 8½ x 11 ins. Illustrated. Deals with fixtures for hospitals.
- Duriron Company, Dayton, Ohio. Duriron Acid, Alkali and Rust-Proof Drain Pipe and Fittings. Booklet, 8½ x 11 ins., 20 pp. Full details regarding a valuable form of piping.
- Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. Watrous Patent Flush Valves, Duojet Water Closets, Liquid Soap Fixtures, etc. 8½ x 11 ins., 136 pp., loose-leaf catalog, showing roughing-in measurements, etc.
- Maddock's Sons Company, Thomas, Trenton, N. J. Catalog "K." 10½ x 7½ ins. 242 pp. Illustrated. Complete data on vitreous china plumbing fixtures with brief history of Sanitary Pottery.
- Speakman Company, Wilmington, Del. Catalog K. Booklet, 150 pp., 8½ x 10¾ ins. Illustrated. Data on showers and equipment details.
- Trenton Potteries Company, Trenton, N. J. The Blue Book of Plumbing. Bound volume. 181 pp. 8½ x 10½ ins. Illustrated.

PUMPS

- Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill. Bulletin E. 7¾ x 10¼ ins. 32 pp. Illustrated. Catalog. Complete descriptions, with all necessary data, on Standard Service Pumps, Indian Brand Pneumatic Tanks, and Complete Water Systems, as installed by Kewanee Private Utilities Co.
- The Trane Co., LaCrosse, Wis. Trane Small Centrifugal Pumps. Booklet. 3¼ x 8 ins. 16 pp. Complete data on an important type of pump.
- Weil Pump Co., 215 W. Superior St., Chicago. Pumps. Booklet, 8½ x 11 ins. Illustrated. Individual bulletins with specifications on sewage ejectors, and bilge, house, condensation, booster and boiler feed pumps.

RADIO EQUIPMENT

- Radio Corporation of America, Woolworth Building, New York City, N. Y. R. C. A. Antenna Distribution System for Multiple Receivers. Booklet, 15 pp. 8½ x 11 ins. Illustrated. Apparatus for apartment houses and similar large buildings.
- R. C. A. Centralized Radio Receiving Equipment. Brochure, 8 pp. 9 x 11 ins. Illustrated. Radio equipment for hotels, hospitals, etc.

RAMPS

- Ramp Buildings Corporation, 21 East 40th St., New York. Building Garages for Profitable Operation. Booklet. 8½ x 11 ins. 16 pp. Illustrated. Discusses the need for modern mid-city, parking garages, and describes the d'Humy Motoramp system of design, on the basis of its superior space economy and features of operating convenience. Gives cost analyses of garages of different sizes, and calculates probable earnings.
- Garage Design Data. Series of informal bulletins issued in loose-leaf form, with monthly supplements.

REFRIGERATION

- The Fulton Syphon Company, Knoxville, Tenn. Temperature Control of Refrigeration Systems. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Deals with cold storage, chilling of water, etc.

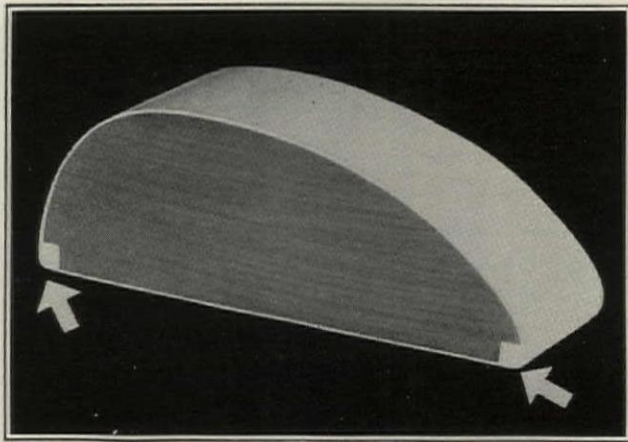
REINFORCED CONCRETE—See also Construction, Concrete

- Genfire Steel Company, Youngstown, Ohio. Self-Centering Handbook. 8½ x 11 ins. 36 pp. Illustrated. Methods and specifications on reinforced concrete floors, roofs and floors with a combined form and reinforced material.
- Trusco Steel Company, Youngstown, Ohio. Shearing Stresses in Reinforced Concrete Beams. Booklet. 8½ x 11 ins. 12 pp.
- North Western Expanded Metal Company, Chicago, Ill. Designing Data. Book. 6 x 9 ins. 96 pp. Illustrated. Covers the use of Econo Expanded Metal for various types of reinforced concrete construction.
- Longspan ¾-inch Rib Lath. Folder 4 pp., 8½ x 11 ins. Illustrated. Deals with a new type of V-Rib expanded metal.

ROOFING

- The Barrett Company, 40 Rector St., New York City. Architects' and Engineers' Built-up Roofing Reference Series; Volume IV Roof Drainage System. Brochure. 63 pp. 8½ x 11¼ ins. Gives complete data and specifications for many details of roofing.

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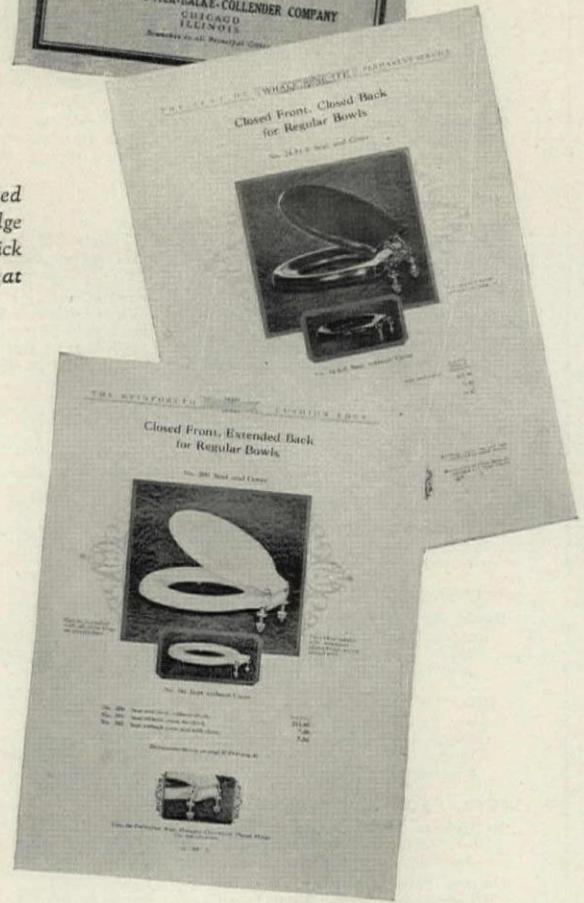
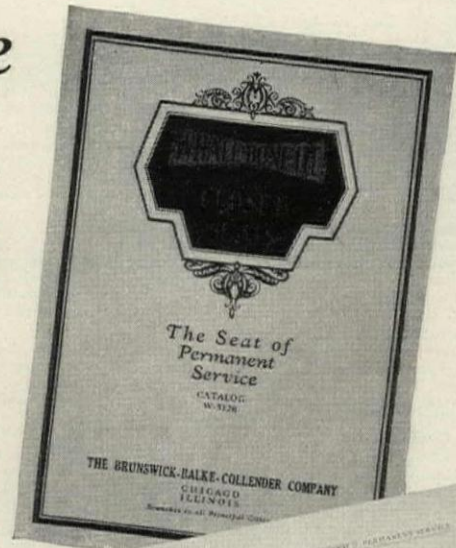
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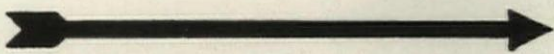
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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 160

ROOFING—Continued

- Bird & Son, Inc.,** E. Walpole, Mass.
Bird's Roofs. Folder, 16 pp., 3½ x 6 ins. Illustrated. Data of roofing materials.
- Heinz Roofing Tile Co.,** 1925 West Third Avenue, Denver.
Plymouth-Shingle Tile with Sprocket Hips. Leaflet, 8½ x 11 ins. Illustrated. Shows use of English shingle tile with special hips.
Italian Promenade Floor Tile. Folder, 2 pp., 8½ x 11 ins. Illustrated. Floor tiling adapted from that of Davanzati Palace.
Mission Tile. Leaflet, 8½ x 11 ins. Illustrated. Tile such as are used in Italy and southern California.
Georgian Tile. Leaflet, 8½ x 11 ins. Illustrated. Tiling as used in old English and French farmhouses.
- Ludowici-Celadon Company,** 104 So. Michigan Ave., Chicago, Ill.
"Ancient" Tapered Mission Tiles. Leaflet, 8½ x 11 ins. 4 pp. Illustrated. For architects who desire something out of the ordinary, this leaflet has been prepared. Describes briefly the "Ancient" Tapered Mission Tiles, hand-made with full corners and designed to be applied with irregular exposures.
- Structural Gypsum Corporation,** Linden, N. J.
Relative Effectiveness of Various Types of Roofing Construction in Preventing Condensation of the Under Surface. Folder, 4 pp., 8¾ x 11 ins. Important data on the subject.
Gypsteel Pre-cast Fireproof Roofs. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Information regarding a valuable type of roofing.
- U. S. Gypsum Co.,** Chicago, Ill.
Pyrobar Roof Construction. Booklet, 8 x 11 ins. 48 pp. Illustrated. Gives valuable data on the use of tile in roof construction.
Sheetrock Pyrofill Roof Construction. Folder, 8½ x 11 ins. Illustrated. Covers use of roof surfacing which is poured in place.

SEWAGE DISPOSAL

- Kewanee Private Utilities,** 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¾ ins. 40 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SCREENS

- American Brass Co., The,** Waterbury, Conn.
Facts for Architects About Screening. Illustrated folder, 9½ x 11¾ ins., giving actual samples of metal screen cloth and data on fly screens and screen doors.
- Athey Company,** 6015 West 65th St., Chicago, Ill.
The Athey Perennial Window Shade. An accordion pleated window shade, made from translucent Herringbone woven Coutil cloth, which raises from the bottom and lowers from the top. It eliminates awnings, affords ventilation, can be dry-cleaned and will wear indefinitely.
- Orange Screen Co.,** Maplewood, N. J.
Orsco Aluminum Screens. Booklet, 8 pp., 8 x 11 ins. Illustrated. Data on a valuable line of screens.
Orsco Screens and Other Products. Brochure, 20 pp., 8 x 11 ins. Illustrated. Door and window screens and other hardware.

SHADE CLOTH AND ROLLERS

- Columbia Mills, Inc.,** 225 Fifth Avenue, New York.
Window Shade Data Book. Folder, 28 pp., 8½ x 11 ins. Illustrated.

SHELVING-STEEL

- David Lupton's Sons Company,** Philadelphia, Pa.
Lupton Steel Shelving. Catalog E. Illustrated brochure, 40 pp., 8½ x 11 ins. Deals with steel cabinets, shelving, racks, doors, partitions, etc.

SOUND DEADENER

- Cabot, Inc.,** Samuel, Boston, Mass.
Cabot's Deadening Quilt. Brochure, 7½ x 10½ ins., 28 pp. Illustrated. Gives complete data regarding a well-known protection against sound.

STEEL PRODUCTS FOR BUILDING

- Bethlehem Steel Company,** Bethlehem, Pa.
Steel Joists and Stanchions. Booklet, 72 pp., 4 x 6¾ ins. Data for steel for dwellings, apartment houses, etc.
- Genfire Steel Company,** Youngstown, Ohio.
Herringbone Metal Lath Handbook. 8½ x 11 ins. 32 pp. Illustrated. Standard specifications for Cement Stucco on Herringbone.
Rigid Metal Lath and interior plastering.
Fireproofing Handbook. 8½ x 11 ins. 32 pp. Illustrated. Describes the full line of products manufactured by the Genfire Steel Company.
- Steel Frame House Company,** Pittsburgh. (Subsidiary of McClintic-Marshall Corp.)
Steel Framing for Dwellings. Booklet, 16 pp. 8½ x 11 ins. Illustrated.
Steel Framing for Gasoline Service Stations. Brochure, 8 pp. 8½ x 11 ins. Illustrated.
Steel Frame Standard Gasoline Service Stations. Booklet, 8 pp. 8½ x 11 ins. Illustrated. Three standard designs of stations.
- Westinghouse Electric & Mfg. Co.,** East Pittsburgh, Pa.
The Arc Welding of Structural Steel. Brochure, 32 pp., 8½ x 11 ins. Illustrated. Deals with an important structural process.

STONE, BUILDING

- Indiana Limestone Company,** Bedford, Ind.
Volume 3, Series A-3. Standard Specifications for Cut Indiana Limestone work, 8½ x 11 ins. 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.

STONE, BUILDING—Continued

- Vol. 1. Series B. Indiana Limestone Library. 6 x 9 ins. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
- Vol. 4. Series B. Booklet. New Edition. 8½ x 11 ins. 64 pp. Illustrated. Indiana Limestone as used in Banks.
- Volume 5. Series B. Indiana Limestone Library. Portfolio. 11½ x 8¾ ins. Illustrated. Describes and illustrates the use of stone for small houses with floor plans of each.
- Volume 6. Series B—Indiana Limestone School and College Buildings. 8½ x 11 ins., 80 pages, illustrated.
- Volume 12, Series B—Distinctive Homes of Indiana Limestone. 8½ x 11 ins., 48 pages, illustrated.
- Old Gothic Random Ashlar. 8½ x 11 ins., 16 pages. Illustrated.

STORE FRONTS

- Brasco Manufacturing Co.,** 5025-35 South Wabash Avenue, Chicago, Ill.
Catalog No. 31. Series 500. All-Copper Construction. Illustrated brochure. 20 pp. 8½ x 11 ins. Deals with store fronts of a high class.
Brasco Copper Store Fronts. Catalog No. 32. Series 202.
Brasco Standard Construction. Illustrated brochure. 16 pp. 8½ x 11 ins. Complete data on an important type of building.
Detail Sheets. Set of seven sheets; printed on tracing paper, showing full sized details and suggestions for store front designing, enclosed in envelope suitable for filing. Folds to 8½ x 11 ins.
- Davis Solid Architectural Bronze Sash.** Set of five sheets, printed on tracing paper, giving full sized details and suggestions for designing of special bronze store front construction, enclosed in envelope suitable for filing. Folds to 8½ x 11 ins.
- The Kawneer Company,** Niles, Mich.
Store Front Suggestions. Booklet, 96 pp., 6 x 8½ ins. Illustrated. Shows different types of Kawneer Solid Copper Store Fronts.
Catalog K. 1927 Edition. Booklet, 32 pp., 8½ x 11 ins. Illustrated. Details of Kawneer Copper Store Fronts.
Detail Sheets for Use in Tracing. Full-sized details on sheets 17 x 22 ins.
Kawneer Construction in Solid Bronze or Copper. Booklet, 64 pp., 8½ x 11 ins. Illustrated. Complete data on the subject.
- Modern Bronze Store Front Co.,** Chicago Heights, Ill.
Introducing Extruded Bronze Store Front Construction. Folder, 4 pp., 8½ x 11 ins. Illustrated. Contains full sized details of metal store fronts.
- Zouri Drawn Metals Company,** Chicago Heights, Ill.
Zouri Safety Key-Set Store Front Construction. Catalog. 8½ x 10½ ins. 60 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.
International Store Front Construction. Catalog. 8½ x 10 ins. 70 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.

TERRA COTTA

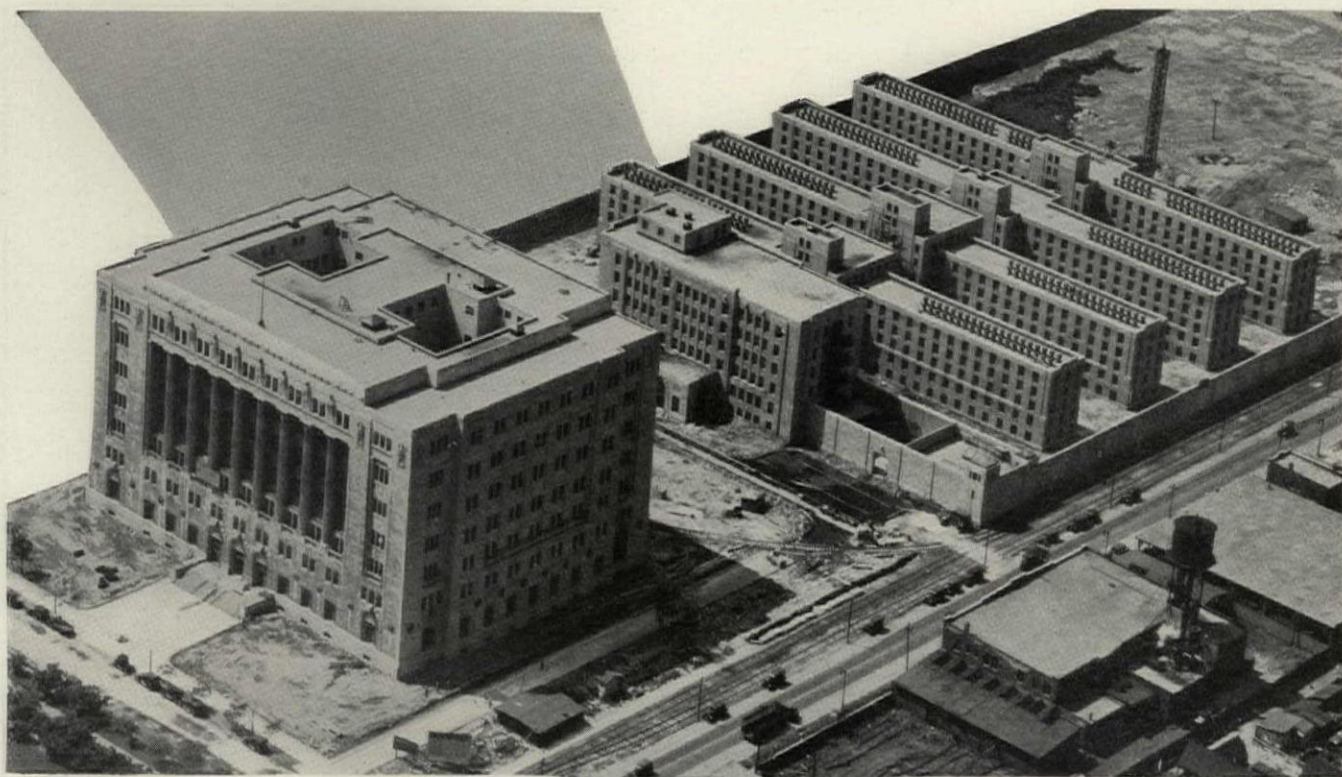
- National Terra Cotta Society,** 19 West 44th St., New York, N. Y.
Standard Specifications for the Manufacture, Furnishing and Setting of Terra Cotta. Brochure. 8½ x 11 ins. 12 pp. Complete Specification, Glossary of Terms Relating to Terra Cotta and Short Form Specification for incorporating in Architects' Specification.
Color in Architecture. Revised. Edition. Permanently bound volume, 9½ x 12¾ ins., containing a treatise upon the basic principles of color in architectural design, illustrating early European and modern American examples. Excellent illustrations in color.
Present Day Schools. 8½ x 11 ins. 32 pp. Illustrating 42 examples of school architecture with article upon school building design by James O. Betelle, A. I. A.
Better Banks. 8½ x 11 ins. 32 pp. Illustrating many banking buildings in terra cotta with an article on its use in bank design by Alfred C. Bossom, Architect.

TILE, HOLLOW

- National Fire Proofing Co.,** 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 ins. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Standard Fireproofing Bulletin 171. 8½ x 11 ins. 32 pp. Illustrated. A treatise on the subject of hollow tile as used for floors, girder, column and beam covering and similar construction.
Natco Double Shell Load Bearing Tile Bulletin. 8½ x 11 ins. 6 pp. Illustrated.
Natco Uninbacker Tile Bulletin. 8½ x 11 ins. 4 pp. Illustrated.
Natco Header Backer Tile Bulletin. 8½ x 11 ins. 4 pp. Illustrated.
Natcofor Bulletin. 8½ x 11 ins. 6 pp. Illustrated.
Natco Face Tile for the Up-to-Date. Farm Bulletin. 8½ x 11 ins.

TILES

- Kraftile Company,** 55 New Montgomery St., San Francisco.
High Fired Faience Tile. Booklet. 32 pp. 8½ x 11 ins. Illustrated. Presents a fine line of tiles for different purposes.
- United States Quarry Tile Co.,** Parkersburg, W. Va.
Quarry Tiles for Floors. Booklet, 119 pp., 8½ x 11 ins. Illustrated. General catalog. Details of patterns and trim for floors.
Art Portfolio of Floor Designs. 9¼ x 12¼ ins. Illustrated in colors. Patterns of quarry tiles for floors.



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R. J. Shank, 925 Grand Ave., Des Moines, Ia.
Rex W. Williams, 402 Scott Bldg., Salt Lake City, Utah
Clarence Drucker, 307 Minna St., San Francisco, Cal.
L. C. Coombs, 1010 North Garden St., Los Angeles, Cal.
Richard O'Brien, 524 22nd St. North, Seattle, Wash.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 162

VALVES

- Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 51. General Catalog. Illustrated. Describes the complete line of the Crane Co.
- C. A. Dunham Co., 450 East Ohio St., Chicago.
The Dunham Packless Radiator Valve Brochure, 12 pp., 8 x 11 ins. Illustrated. Data on an important type of valve.
- Jenkins Bros., 80 White St., New York.
The Valve Behind a Good Heating System. Booklet. 4½ x 7¼ ins. 16 pp. Color plates. Description of Jenkins Radiator Valves for steam and hot water, and brass valves used as boiler connections.
- Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ ins. 16 pp. Illustrated. Description of Jenkins Brass Globe, Angle Check and Gate Valves commonly used in home plumbing, and Iron Body Valves used for larger plumbing installations.

VENETIAN BLINDS

- Burlington Venetian Blind Co., Burlington, Vt.
Venetian Blinds. Booklet. 7 x 10 ins., 24 pp. Illustrated. Describes the "Burlington" Venetian blinds, method of operation, advantages of installation to obtain perfect control of light in the room.

VENTILATION

- American Blower Co., Detroit, Mich.
American H. S. Fans. Brochure, 28 pp., 8½ x 11 ins. Data on an important line of blowers.
- Duriron Company, Dayton, Ohio.
Acid-proof Exhaust Fans. Folder. 8 x 10½ ins. 8 pp. Data regarding fans for ventilation of laboratory fume hoods.
Specification Form for Acid-proof Exhaust Fans. Folder, 8 x 10½ ins.
- Globe Ventilator Company, 205 River St., Troy, N. Y.
Globe Ventilators Catalog. 6 x 9 ins. 32 pp. Illustrated profusely. Catalog gives complete data on "Globe" ventilators as to sizes, dimensions, gauges of material and table of capacities. It illustrates many different types of buildings on which "Globe" ventilators are in successful service, showing their adaptability to meet varying requirements.
- Staynew Filter Corporation, Rochester, N. Y.
Protectomotor High Efficiency Industrial Air Filters. Booklet. 20 pp., 8½ x 11 ins. Illustrated. Data on valuable detail of apparatus.

WATERPROOFING

- Genfire Steel Company, Youngstown, Ohio.
Waterproofing Handbook. Booklet. 8½ x 11 ins. 80 pp. Illustrated. Thoroughly covers subject of waterproofing concrete, wood and steel preservatives, dustproofing and hardening concrete floors, and accelerating the setting of concrete. Free distribution.
- Master Builders Company, Cleveland, Ohio.
Waterproofing and Dampproofing and Allied Products. Sheets in loose index file, 9 x 12 ins. Valuable data on different types of materials for protection against dampness.
Waterproofing and Dampproofing File. 36 pp. Complete descriptions and detailed specifications for materials used in building with concrete.
- Sommers & Co., Ltd., 342 Madison Ave., New York City.
"Permantile Liquid Waterproofing" for making concrete and cement mortar permanently impervious to water. Also circulars on floor treatments and cement colors. Complete data and specifications. Sent upon request to architects using business stationery. Circular size, 8½ x 11 ins.
- Sonneborn Sons, Inc., L., 116 Fifth Ave., New York, N. Y.
Pamphlet. 3¼ x 8¾ ins. 8 pp. Explanation of waterproofing principles. Specifications for waterproofing walls, floors, swimming pools and treatment of concrete, stucco and mortar.
- The Vortex Mfg. Co., 1978 West 77th St., Cleveland, Ohio.
Par-Lock Specification "Form D" for waterproofing surfaces to be finished with Portland cement or tile.
Par-Lock Specification "Forms E and G" membrane waterproofing of basements, tunnels, swimming pools, tanks to resist hydrostatic pressure.
Par-Lock Waterproofing. Specification Forms D, E, F and G. Sheets, 8½ x 11 ins. Data on combinations of gun-applied asphalt and cotton or felt membrane, built up to suit requirements.
Par-Lock Method of Bonding Plaster to Structural Surfaces. Folder, 6 pp. 8½ x 11 ins. Official Bulletin of Approved Products,—Investigating Committees of Architects and Engineers.

WEATHER STRIPS

- Athey Company, 6035 West 65th St., Chicago.
The Only Weatherstrip with a Cloth to Metal Contact. Booklet. 16 pp., 8½ x 11 ins. Illustrated. Data on an important type of weather stripping.



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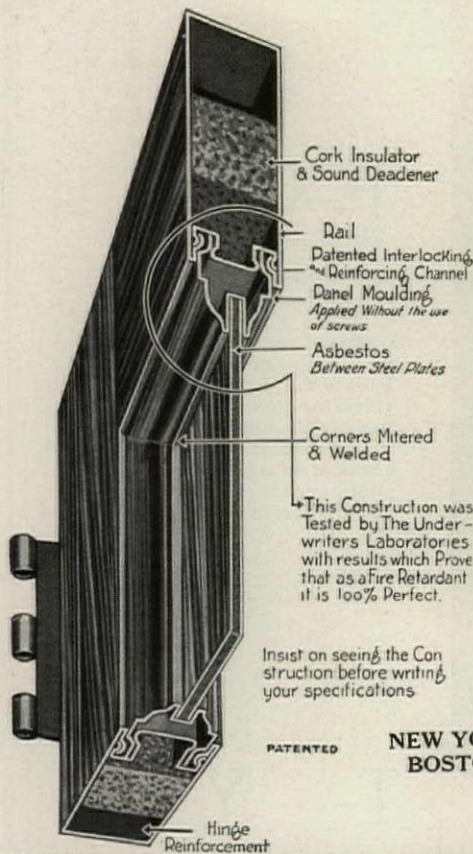
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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 164

WINDOWS

- The Kawneer Company, Niles, Mich.**
Kawneer Solid Nickel Silver Windows. In casement and weight-hung types and in drop-down transom type. Portfolio, 12 pp., 9 x 11½ ins. Illustrated, and with demonstrator.
- David Lupton's Sons Company, Philadelphia, Pa.**
Lupton Pivoted Sash. Catalog 12-A. Booklet, 48 pp., 8½ x 11 ins. Illustrates and describes windows suitable for manufacturing buildings.

WINDOWS, CASEMENT

- Crittall Casement Window Co., 10951 Hearn Ave., Detroit, Mich.**
Catalog No. 22. 9 x 12 ins. 76 pp. Illustrated. Photographs of actual work accompanied by scale details for casements and composite steel windows for banks, office buildings, hospitals and residences.
- Genfire Steel Company, Youngstown, Ohio.**
Architectural Details, Casement Windows and Doors. 8½ x 11 ins. 28 pp. A. I. A. File No. 16e. Specifications and construction details.
- Hope & Sons, Henry, 103 Park Ave., New York, N. Y.**
Catalog. 12¼ x 18¼ ins. 30 pp. Illustrated. Full size details of outward and inward opening casements.
- The Kawneer Company, Niles, Mich.**
Kawneer Solid Nickel Silver Windows. In casement and weight-hung types and in drop-down transom type. Portfolio, 12 pp., 9 x 11½ ins. Illustrated, and with demonstrator.
- David Lupton's Sons Company, Philadelphia, Pa.**
Lupton Casement of Copper Steel. Catalog C-217. Booklet, 24 pp., 8½ x 11 ins. Illustrated brochure on casements, particularly for residences.
- Lupton Heavy Casements. Detail Sheet No. 101, 4 pp., 8½ x 11 ins. Details and specifications only.
- Lupton Residence Casements of Steel. Catalog C-209. Brochure, 24 pp., 8½ x 11 ins. Illustrated.
- Richards-Wilcox Mfg. Co., Aurora, Ill.**
Casement Window Hardware. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Shows typical installations, detail drawings, construction details, blue-prints if desired. Describes AIR-way Multifold Window Hardware.
- Architectural Details. Booklet. 8½ x 11 ins. 16 pp. Tables of specifications and typical details of different types of construction.
- List of Parts for Assembly. Booklet. 8½ x 11 ins. 16 pp. Full lists of parts for different units.

WINDOW SHADES AND ROLLERS

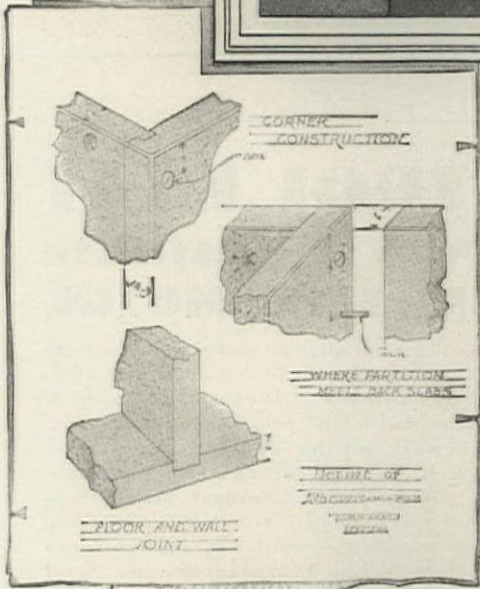
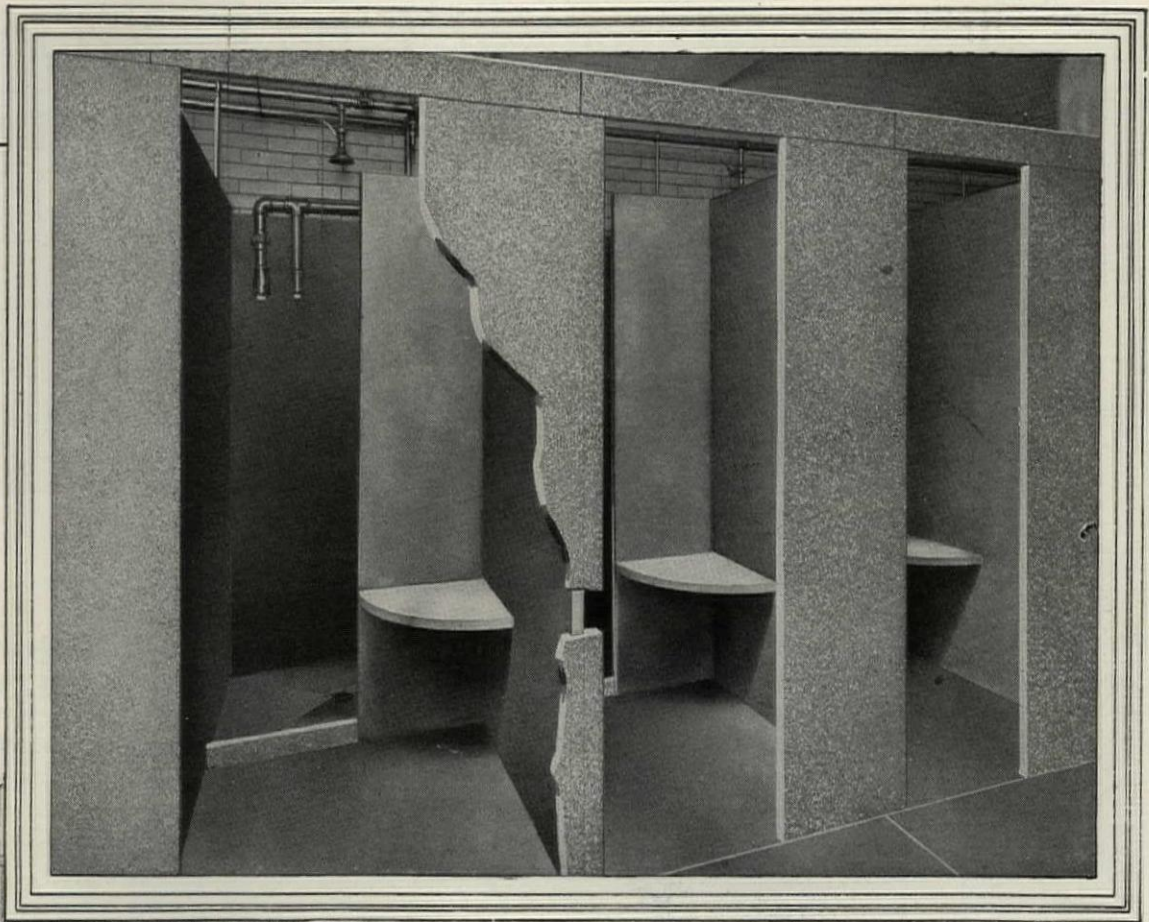
- Columbia Mills, Inc., 225 Fifth Avenue, New York.**
Window Shade Data Book. Folder, 28 pp., 8½ x 11 ins. Illustrated.

WINDOWS, STEEL AND BRONZE

- Genfire Steel Company, Youngstown, Ohio.**
Architectural Details, Steel Pivoted, Commercial and Architectural Projected Windows. 8½ x 11 ins. 24 pp. A. I. A. File No. 16e. Specification and construction details.
- David Lupton's Sons Company, Philadelphia, Pa.**
A Rain-shed and Ventilator of Glass and Steel. Pamphlet, 4 pp., 8½ x 11 ins. Deals with Pond Continuous Sash. Sawtooth Roofs, etc.
- How Windows Can Make Better Homes. Booklet. 3¾ x 7 ins. 12 pp. An attractive and helpful illustrated publication on use of steel casements for domestic buildings.
- Truscon Steel Company, Youngstown, Ohio.**
Drafting Room Standards. Book. 8½ x 11 ins. 120 pages of mechanical drawings showing drafting room standards, specifications and construction details of Truscon Steel Windows, Steel Lintels, Steel Doors and Mechanical Operators.
- Truscon Solid Steel Double-Hung Windows. 24 pp. Booklet. 8½ x 11 ins. Containing illustrations of buildings using this type of window. Designs and drawings of mechanical details.
- Continuous Steel windows and Mechanical Operators. Catalog 126. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

WOOD—See also Millwork

- American Walnut Mfrs. Association, 618 So. Michigan Blvd., Chicago, Ill.**
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- Curtis Companies Service Bureau, Clinton, Iowa.**
Better Built Homes. Vols. XV-XVIII, incl. Booklet. 9 x 12 ins. 40 pp. Illustrated. Designs for houses of five to eight rooms, respectively, in several authentic types, by Trowbridge & Ackerman, architects, for the Curtis Companies.
- National Lumber Mfrs. Assn., Washington.**
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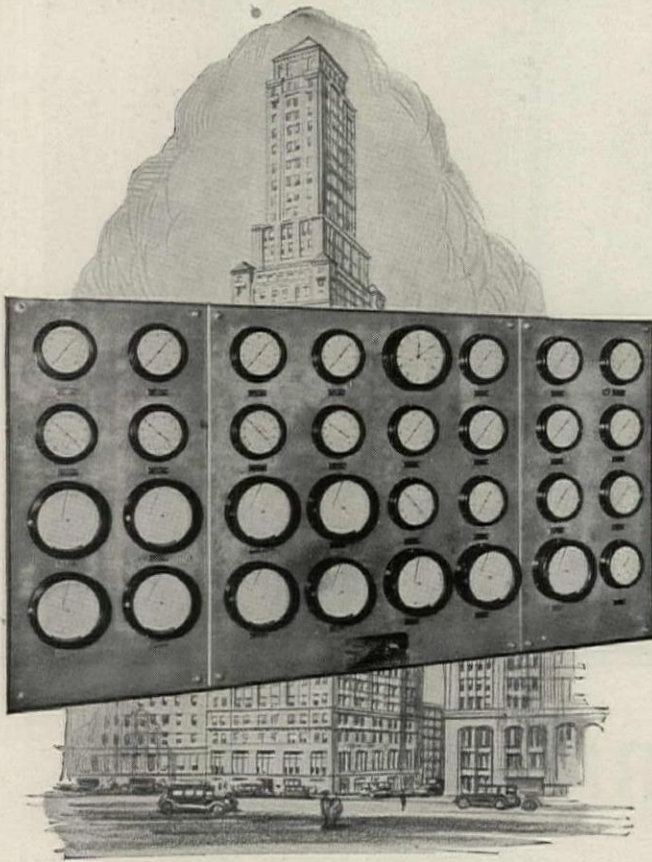
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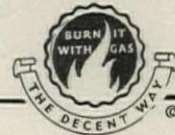
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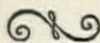
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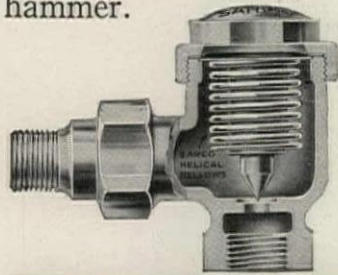


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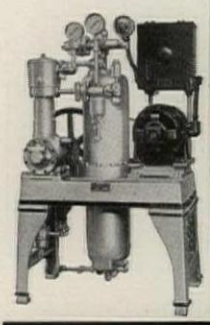
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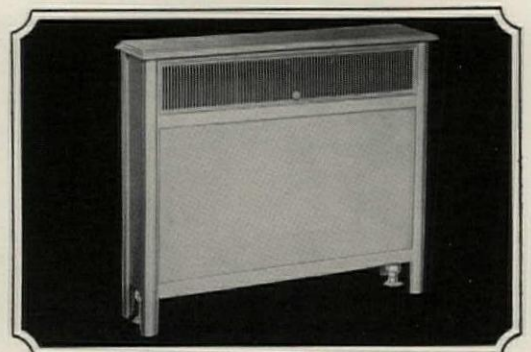
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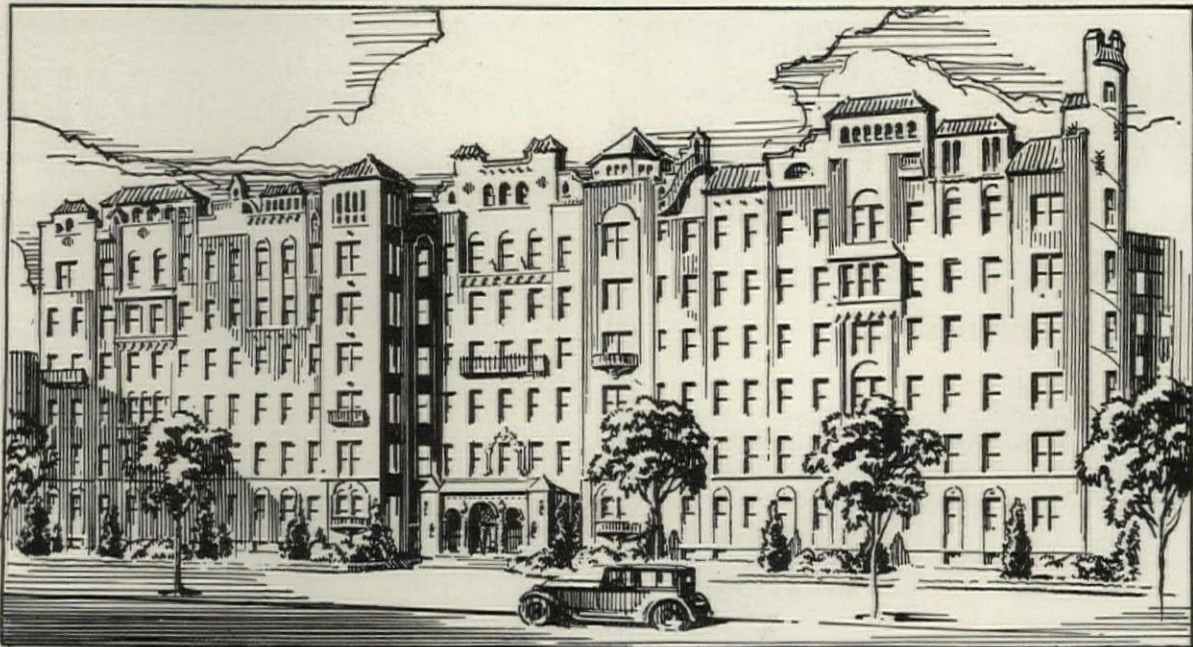
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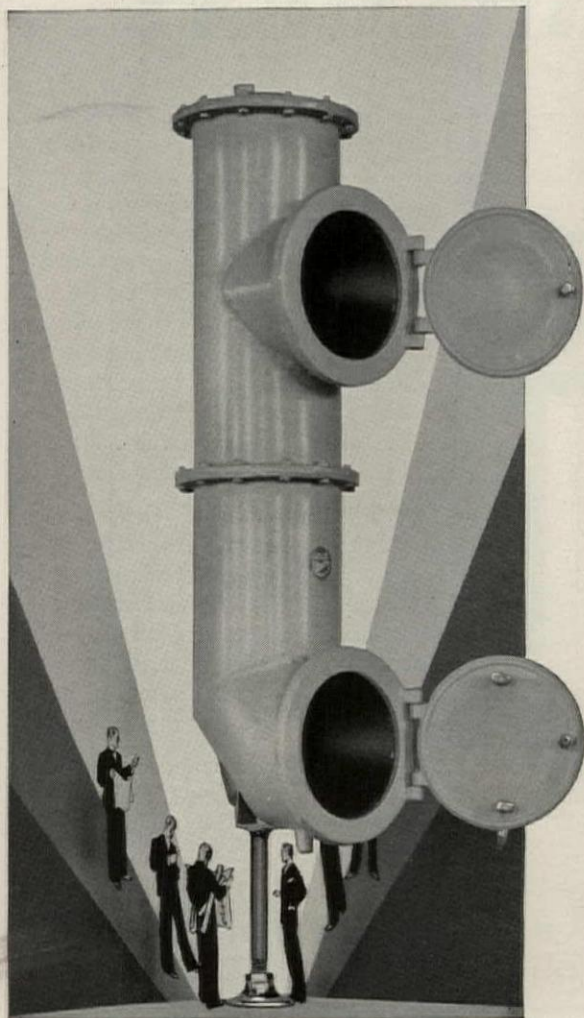
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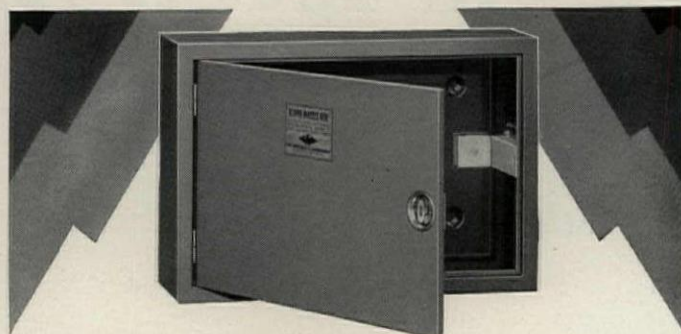
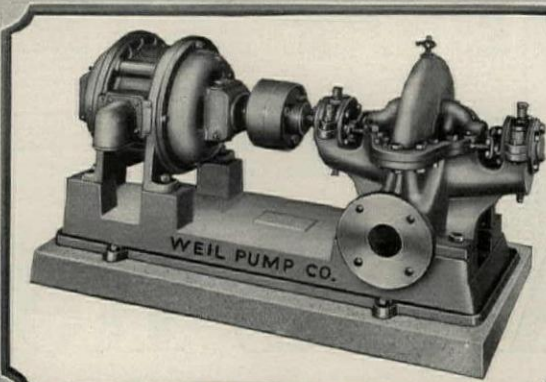
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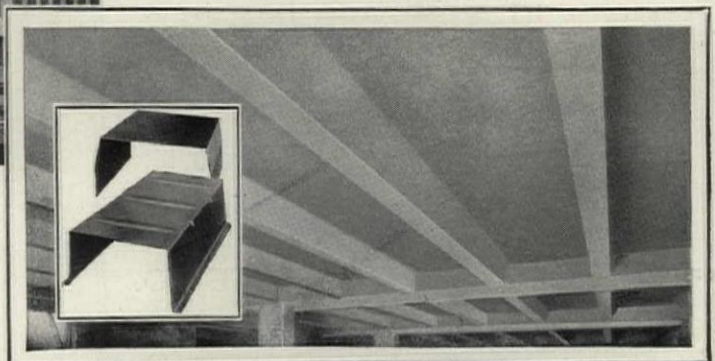
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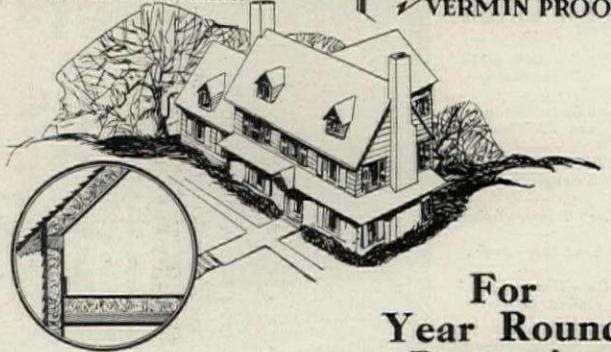
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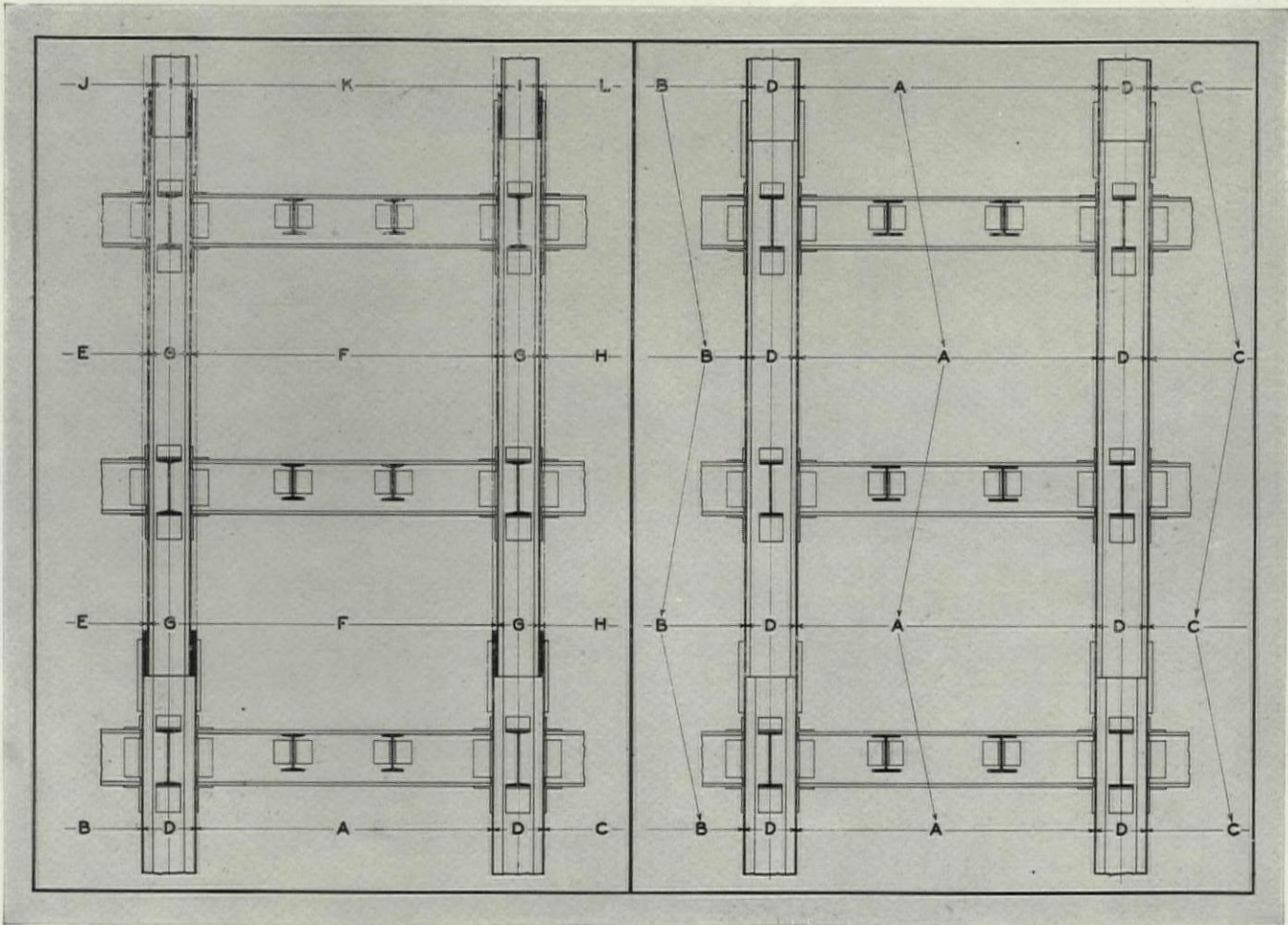
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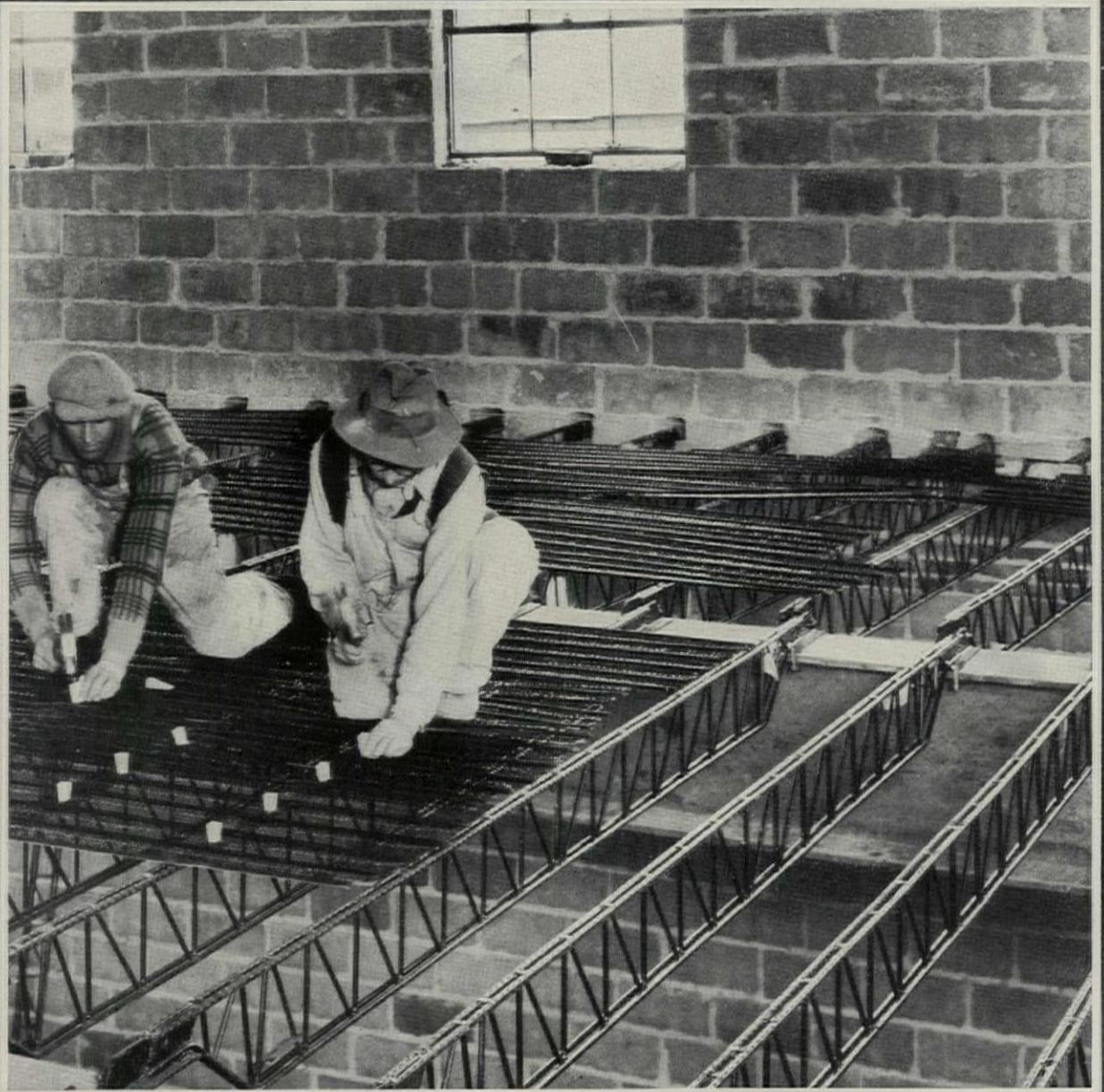
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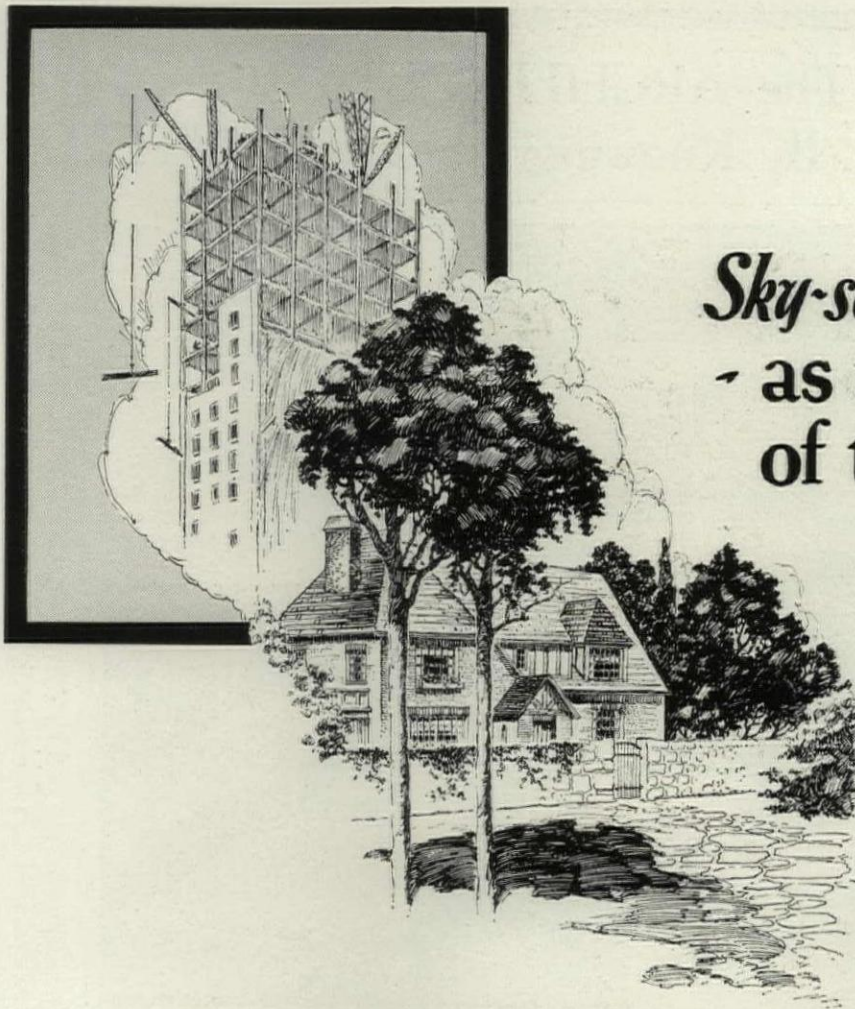
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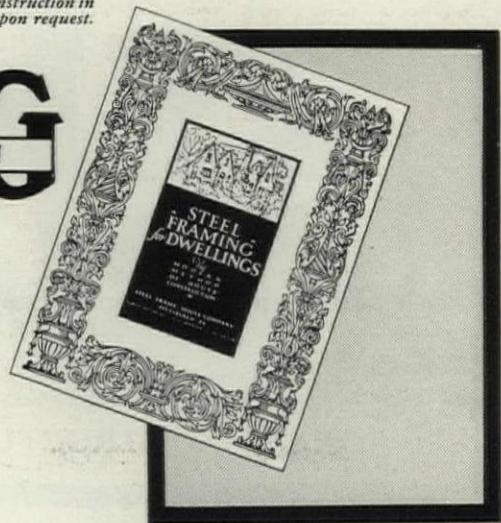
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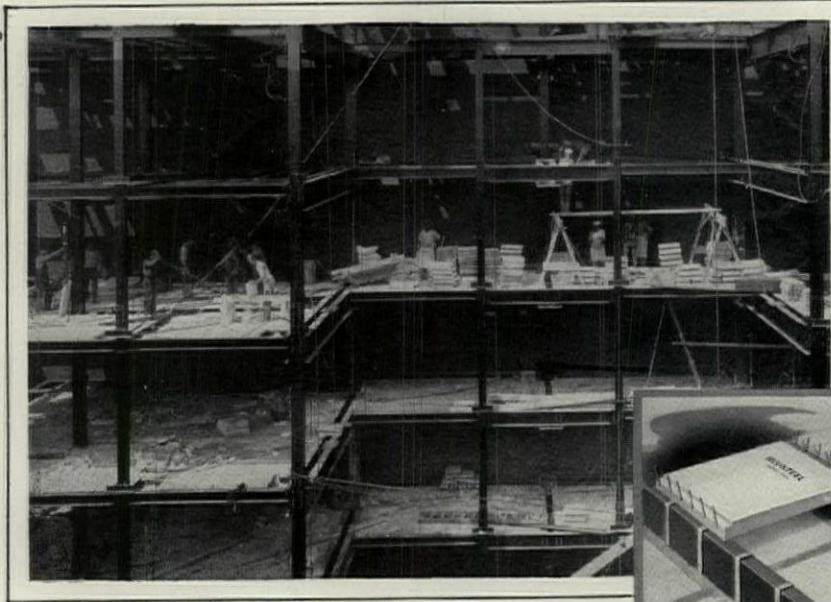
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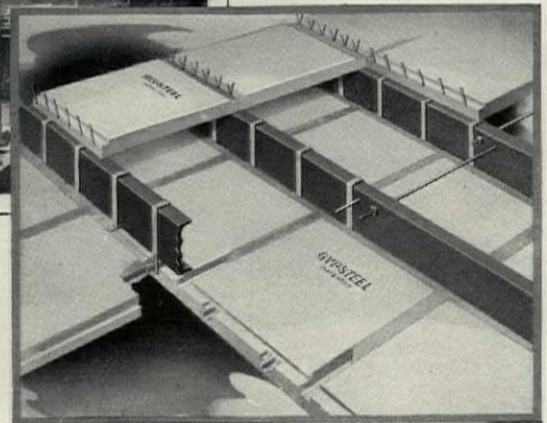


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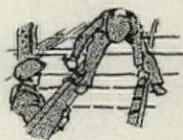
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- PROFIT, represented by.....weeks income realized by earlier occupancy \$.....

Sweets has four pages on Gypsteel. For smooth architectural ceilings, use Gypsteel Pre-cast Floors.
If showing of beams no objection, Gypsteel Poured-in-place Floors.
For light weight, fire-proof roofs, Gypsteel 30 in. or long span Pre-cast slabs.
For sound- and fire-proof partitions, Gypsteel Hollow Partition Tiles.

GYPSTEEL



Hanging ceiling slabs



Clinching ceiling slab hangers



Grouting ceiling slabs



Laying Gypsteel floor slabs

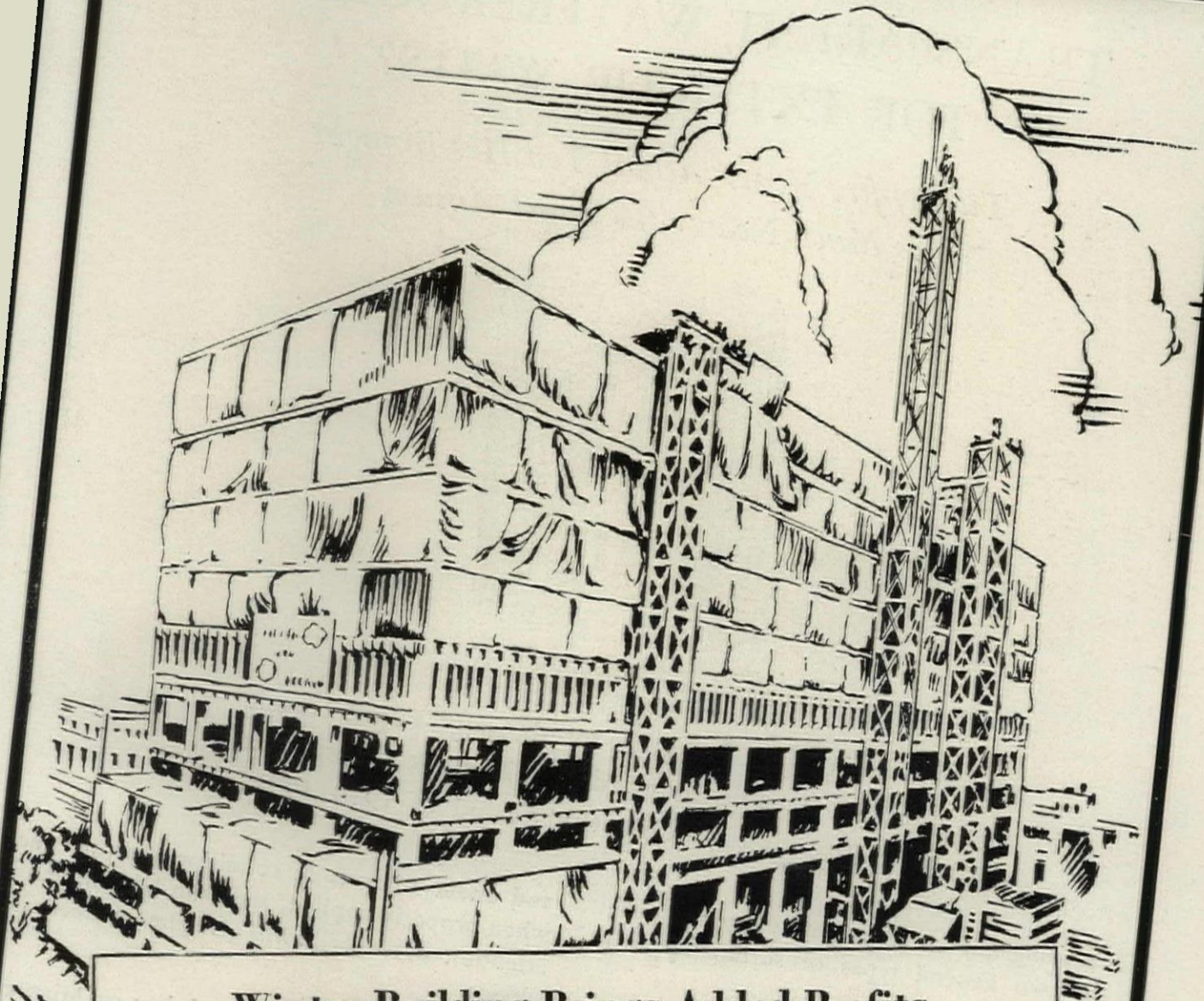


Tying the reinforcement together.

General Offices:
Linden, N. J.

STRUCTURAL GYPSUM CORPORATION

Sales Offices in
Principal Cities



Winter Building Brings Added Profits

Winter, that bugaboo of the building business has been laid forever. *Now*, work goes on 12 months per year instead of only 8.

Those 4 months of hibernation often thin down profits to the point of loss. For labor must be high-paid when it holidays one-third of the year. And the cost of *everything* continues—taxes, interest—they go on as regularly as winter succeeds summer.

When production fails and costs continue—

failure sticks its ugly head into the picture.

But now, fast concrete, canvas and salamanders keep reinforced concrete work awake all year. No particular hardships are suffered from winter building—moreover, men don't loaf when the thermometer says zero!

Hibernation is a help to nobody. Carry on all year and gain those extra months of money. And remember: reinforced concrete assures: beauty, speed, strength, permanence, economy.

REINFORCED CONCRETE

Concrete Reinforcing Steel Institute
Tribune Tower
Chicago

Rail Steel Bar Association
Builders Building
Chicago

WHAT IS THE LIFE OF TRANSPARENT WATERPROOFING FOR EXTERIOR WALLS?

*Twenty-five Years' Actual Test Has Brought
Us Much Nearer the Exact Answer*



*Interborough Rapid Transit Co. Sub-Station
606 West 143rd St., N. Y. C.*

This building and 10 other Interborough Rapid Transit buildings have been treated with Minwax Transparent Waterproofings during the period of 1910-1929.

IN reading this advertisement, do not confuse the two general types of surface applied waterproofing.

- No. 1. Lies as a film on the surface to be protected. Any break in this film spoils its protective qualities.
- No. 2. Penetrates deeply, and becomes an integral part of the surface to be protected.

Long ago, and without the shadow of a doubt, it has been demonstrated that a penetrating material, such as Minwax, far outlasts, is more efficient, and more economical than the ordinary surface film material.

*How long do Minwax Transparent
Waterproofings last?*

Used on exposed exterior walls, frankly, we don't know. What we do know however, after twenty-five years of experience with it in all types of buildings, in all parts of the country,

and under all sorts of conditions, is this: that when properly applied, and with but minimum attention thereafter, it will give almost indefinite service.

For complete information and data on Minwax Transparent Waterproofings, sign and mail the coupon below.

MINWAX COMPANY, INC.
11 West 42nd Street, New York
230 E. Ohio Street, Chicago



MINWAX CO., 11 W. 42d St., N.Y. — 230 E. Ohio St., Chicago
Please send circular on Minwax Transparent Waterproofings, and checking list on exposed wall waterproofing.

Individual _____

c/o Firm _____ Street _____

City _____ State _____

GYPSTEEL

Partition Tile

The Basic Why Back of This Better Tile

IT'S better because it's stronger. It's stronger, because the crystals of the Gypsum lie closer and interlace tighter.

So much for the FACTS.

Now for the reasons WHY.

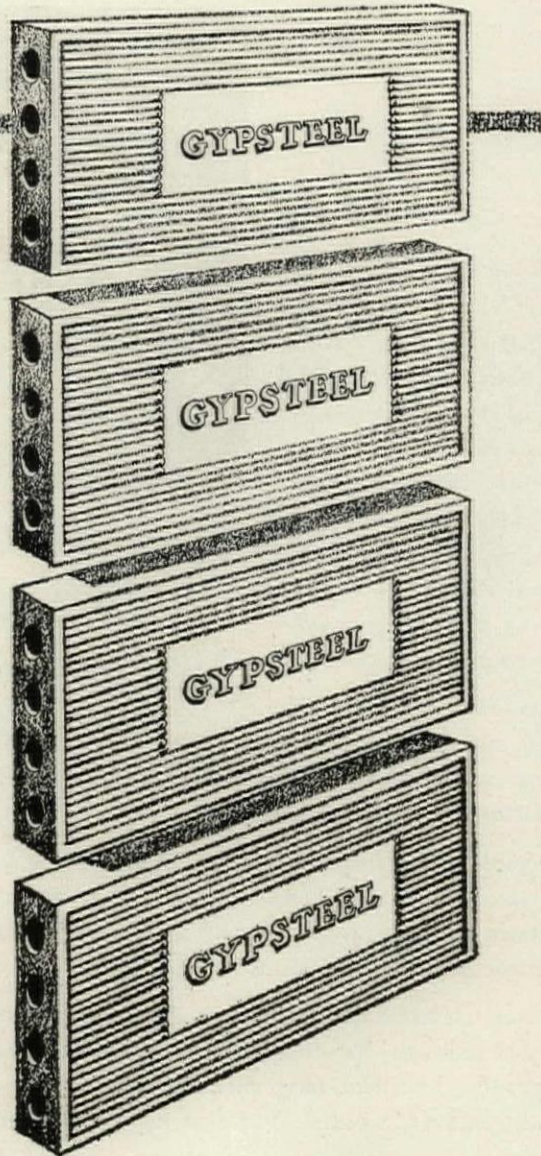
Where Gypsum is made from phosphate rock by the Gypsteel Process, certain elements are removed by solution and others substituted. The result is a purer Gypsum.

This Gypsteel Process with its rigid chemical control, also produces a perfect, uniformly sized, crystal. These crystals *bind together like bricks in a wall*. This perfect crystal structure and unique purity give to Gypsteel Gypsum, its remarkable strength and toughness.

Gypsteel Partition Tile, moulded of this Gypsum, have unequaled strength. They disclose in tests, from two to two and one-half times the crushing strength of other Gypsum tile.

All of which means a far *stronger* partition and greatly *reduced breakage* in transportation, handling and erection. This cuts down costs.

This *better* block costs *no more* than those not as good.



DELIVERIES

Immediate truck deliveries made from stock in New York Metropolitan zone. Freight shipments also.

STRUCTURAL GYPSUM CORPORATION

General Offices:
Linden, N.J.

Sales Offices:
In Principal Cities

The FLOOR you specify *must meet definite* CONDITIONS

THERE is nothing "standard" about Johns-Manville Industrial Flooring in the sense that one certain type of flooring has to fulfill requirements in all kinds of plants. One flooring couldn't. That's why Industrial Flooring is actually made-to-order by our engineers to meet each case.

Johns-Manville Industrial Flooring meets any combination of specific conditions because its composition may be modified to give it special characteristics that fit individual needs.

Adaptable to any shape or slope of floor, equally long-lived indoors or exposed to weather, Johns-Manville Industrial Flooring supplies your clients a floor specially designed to meet the particular conditions in their plants.

The heaviest traffic has no effect on this flooring through years. J-M Industrial Flooring will not absorb dampness, is water-proof and resilient, facts which contribute to the welfare and comfort of workers. J-M Flooring is also relatively



Johns-Manville Industrial Flooring
is "MADE-TO-ORDER"
to be right everywhere

quiet and will not originate dust. The chemicals in ordinary industrial use will not damage this flooring.

In any establishment which is operated along modern lines the real value of a floor is never measured in its actual cost, but rather by its cost per year and by the degree to which it meets all your

clients' requirements. Johns-Manville Industrial Flooring will stand up for an amazing length of time under the most severe abuse. When other floors crack, and become dusty or pitted, Johns-Manville Industrial Flooring will be found for years to be as good as the day it was laid.

When you specify J-M Industrial Flooring you insure lowest possible year-by-year flooring cost. You also insure maximum comfort for employees, and continuous operations uninterrupted by floor repairs.

Write for our booklet, "What More Could You Expect of a Floor?". It will give you complete data.

Address: Architects' Service Department,
Johns-Manville Corporation,
292 Madison Avenue, New York City.

Johns-Manville

INDUSTRIAL FLOORING



So successful in his home —he installed them in his theatres

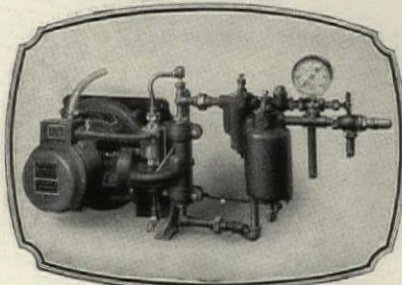
... and his
*Johnson Oil
Burners save
52% in fuel
costs*

WHEN a product sells itself after a thorough test under actual operating conditions, that product has to be right.

Real efficiency means phenomenal savings. But this reduction of 52% in fuel costs is not an isolated case. Similar performances by the score are being made every day by Johnson Oil Burners.

That is why you find Johnson oil burning equipment wherever comfort and efficiency are paramount. In small homes, large buildings, factories and industrial plants from Maine to California, Johnson Oil Burners are receiving enthusiastic endorsement for carefree, dependable, economical performance.

Leading architects and heating engineers are familiar with Johnson performance. They know they can recommend Johnson Oil Burners for every heating and power purpose. They



The Johnson Rotary Automatic Oil Burner



YOU WILL FIND OUR LOCAL

REPRESENTATIVE'S ADDRESS IN YOUR TELEPHONE DIRECTORY

THE COLLINGSWOOD THEATRE
UNDER DIRECTION OF
THE LESSY AMUSEMENT CO.
HADDON & FERN COLLINGSWOOD, N. J.

MAY 24, 1928.

S. T. JOHNSON CO.,
311 N. 20th St.
Philadelphia, Pa.

Gentlemen:

The splendid operation of your burners prompts me to write to you.

In 1926 you installed for me one of your Full Automatic Burners in my home. This burner has been satisfactory in every way. It gives us an even temperature at all times throughout the house and is a great aid towards cleanliness in eliminating the handling of ashes.

After having obtained such wonderful results with the burner in my home, I did not hesitate to use a Johnson Burner in the Diamond Theatre. During the fall of 1926 and the spring of 1927 we used 9,800 gallons of 19-23 Baume Oil at 5¢ cents per gallon (\$498.75). The consumption the previous year was approximately the same. Two years previously we used 68 tons of stove coal at \$15.50 per ton (\$1,064.00), thereby showing a saving of \$565.25.

This saving pleased me so well that when I contemplated building the Collingswood Theatre, I decided that nothing but Johnson Equipment would be used, and up to the present time it has given the same complete satisfaction.

I am now of the opinion that Johnson Oil Burners are the best and will be glad to recommend them to anyone who desires the best efficiency that can be had in oil burning equipment.

Yours very truly,
Wm. Lessy

One of the many letters in our files endorsing the efficient, economical, trouble-free performance of Johnson Oil Burners. "It was the Johnson Burner that was awarded the Gold Medal at the Sesqui-centennial Exposition, Philadelphia, for 'Excellence of workmanship and completeness of design.'"

know they will give enduring satisfaction for years to come.

This preference for Johnson Oil Burners equipment has been earned by Johnson engineers. For more than 23 years the S. T. Johnson Co., has been engaged in the exclusive manufacture of oil burning equipment.

Our long experience in this field is available to you. Our Engineering Department will be glad to help you in the solution of any heating or power problem.

Oil Burning Equipment for Every Heating and Power Purpose

Johnson Rotary Burners, with either manual, semi-automatic or full automatic control, are made in three styles and six sizes—giving a range of from 250 to 27,800 square feet of steam radiation or the equivalent. We also manufacture natural draft, whirlwind, low pressure air and steam atomizing oil burners; also electric and steam driven oil pumping and preheating equipment.

JOHNSON OIL BURNERS

Listed as Standard by the Underwriters' Laboratories

S. T. JOHNSON CO.

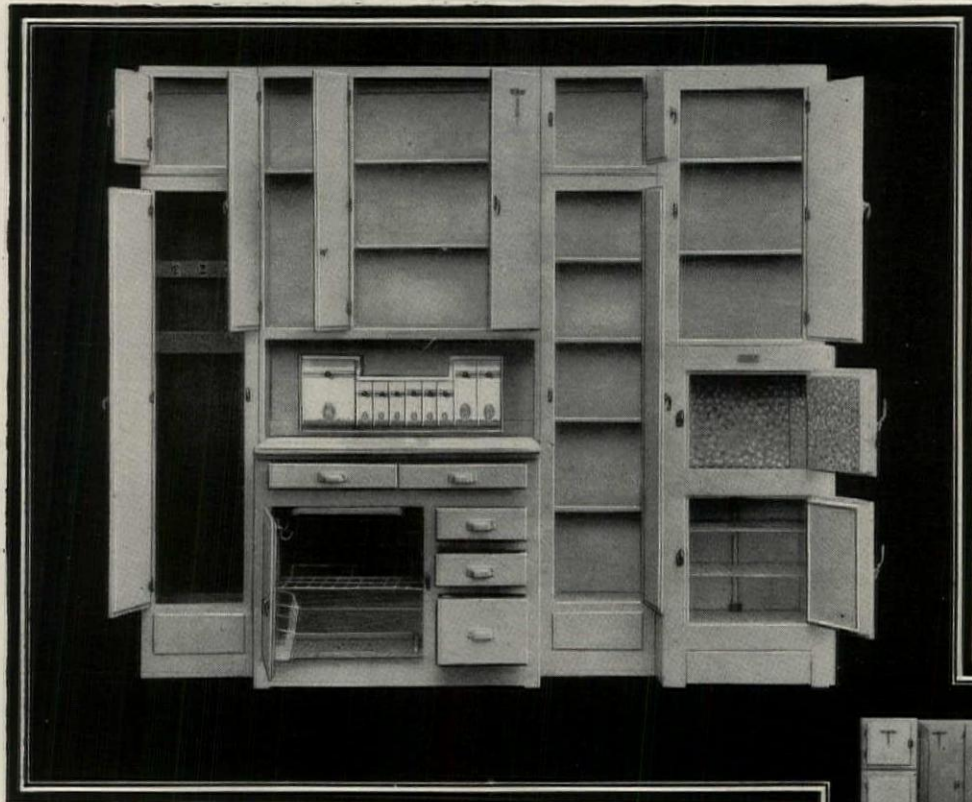
Main Office and Factory, 940-950 Arlington Street, Oakland, California

Factory Branches

SAN FRANCISCO, SACRAMENTO, STOCKTON, PHILADELPHIA

KITCHEN MAID

S T A N D A R D K I T C H E N U N I T S



Available in:
 CACTUS GREEN
 LAMA TAN
 DOVE GREY
 TRAVERTINE IVORY
 SHASTA WHITE

Left: 740 X Combination—
 consisting of seven distinct units.

Below: The Butlery, for service
 halls and large kitchens.

SUCH FLEXIBILITY *has never before been known*

With utter confidence, the modern architect turns to the Kitchen Maid line for equipment to fit into his kitchen plans. So varied, so flexible are these units that there is virtually no planning problem they will not meet.

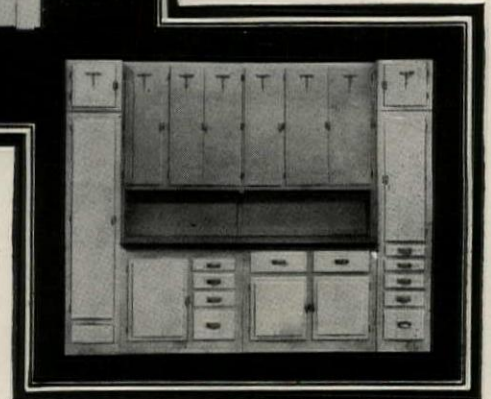
Kitchen Maid Units include kitchen cabinets, broom closets, dish cupboards, divider cupboards, refrigerators, butlery units, Dinofold breakfast nooks, complete kitchenette assemblages—units filling every kitchen need. They are the product of America's largest exclusive makers of built-in equipment for the kitchen.

Each Kitchen Maid unit is complete in itself—may be used alone or in a unit combination, installed in recess or set against the wall. Kitchen Maid standard finishes offer a choice of *Cactus Green, Lama Tan, Dove Grey, Travertine Ivory or Shasta White.*

Kitchen Maid Units, moreover, provide many important practical advantages found in no other equipment—such as sanitary rounded inside corners, smooth doors, concealed hinges.

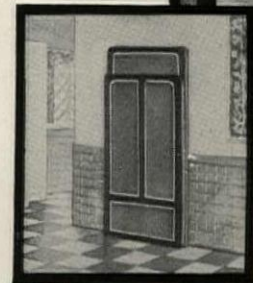
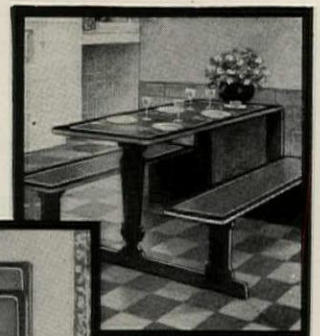
Let us send you the Kitchen Maid catalogue, dimensional drawings and prices. Write.

WASMUTH-ENDICOTT COMPANY
 1891 Snowden Street, Andrews, Indiana



THE DINFOLD

Charming folding "breakfast nook." Seats four people. Folds up as a unit—on wall, door, or in wall recess.



Lacquered in Olive Green or Mandarin Red with gold striping and antique shading or in Early American Maple, antique shading with green trimming. Also available unfinished.

"Let the Kitchen Maid Be Your Kitchen Aid"

Representatives
 in all
 Principal Cities

KITCHEN MAID
 STANDARD UNIT
 SYSTEMS

If in Canada, address
 Branch office
 Waterloo, Ontario

AUTOMATIC OIL HEAT —AT ITS BEST

Made Possible by the Positive Automatic Electric Ignition of Electrol

POSITIVE automatic electric ignition has always been a vital feature of the Electrol Automatic Oil Burner.

The oil is broken up into a fine mist-like spray and ignited by an electric spark, similar to the method used in the automobile engine. In the latter, however, the gas is compressed and exploded, whereas in Electrol the oil is mixed with air and burned in suspension, producing the maximum amount of heat.

The thousands who enjoy the comfort and convenience of Electrol doubly appreciate the certainty of its electric ignition—an advanced principle which makes Electrol entirely self-acting and automatic. Here, truly, is oil heat at its best.

Electrol employs electricity throughout. There is no gas pilot light; no need for one. A small electric motor



KNOW ELECTROL BY THE HOMES IT HEATS
Residence of Mr. E. S. Burke, Jr., Cleveland, Ohio

furnishes the power. An electric thermostat keeps the temperature uniform. And over all, *The Master Control* stands watch, timing the ignition, regulating the flow of oil, governing combustion and providing a never-failing, entirely automatic check on every operation.

Quiet . . . Economical . . . and Entirely Automatic, Electrol will give you a new conception of how dependable an oil burner can be.

Correct Installation is Part of the Purchase

When you specify Electrol Automatic Oil Heat you can do so with every assurance that the burner will be correctly installed. The Electrol dealer first makes an intelligent and conscientious survey of the heating

requirements and advises candidly regarding the possibilities with Electrol. Then, all installations are made by factory-trained men who are thoroughly familiar with the correct methods of fitting Electrol to each type of heating plant.

Complete Oil Heating Service

Wherever Electrol is sold you will find a complete oil-heating service, backed by a sound, large and growing manufacturing organization. Purchase of Electrol can be financed along with the financing of the new building.

Write for the Electrol regulation A. I. A. Folder, or consult the Electrol Sales and Service Representative in your city.

ELECTROL INCORPORATED
179 Dorcas St., St. Louis, U. S. A.



ELECTROL

The OIL BURNER with The Master Control

The Dunham Differential Vacuum Heating System

Gulf Building

Houston, Texas

Architect: Alfred C. Finn.

Consulting Architects:

Kenneth Fransheim and

J. E. R. Carpenter, New York.

Consulting Engineer: R. F. Taylor.

Heating Contractor: C. Wallace.

THE tenants and owners of this towering example of modern architecture are assured heating comfort and maximum fuel economy by the Dunham Differential System which circulates Sub-atmospheric steam through the 46,024 square feet of radiation installed to heat the building.

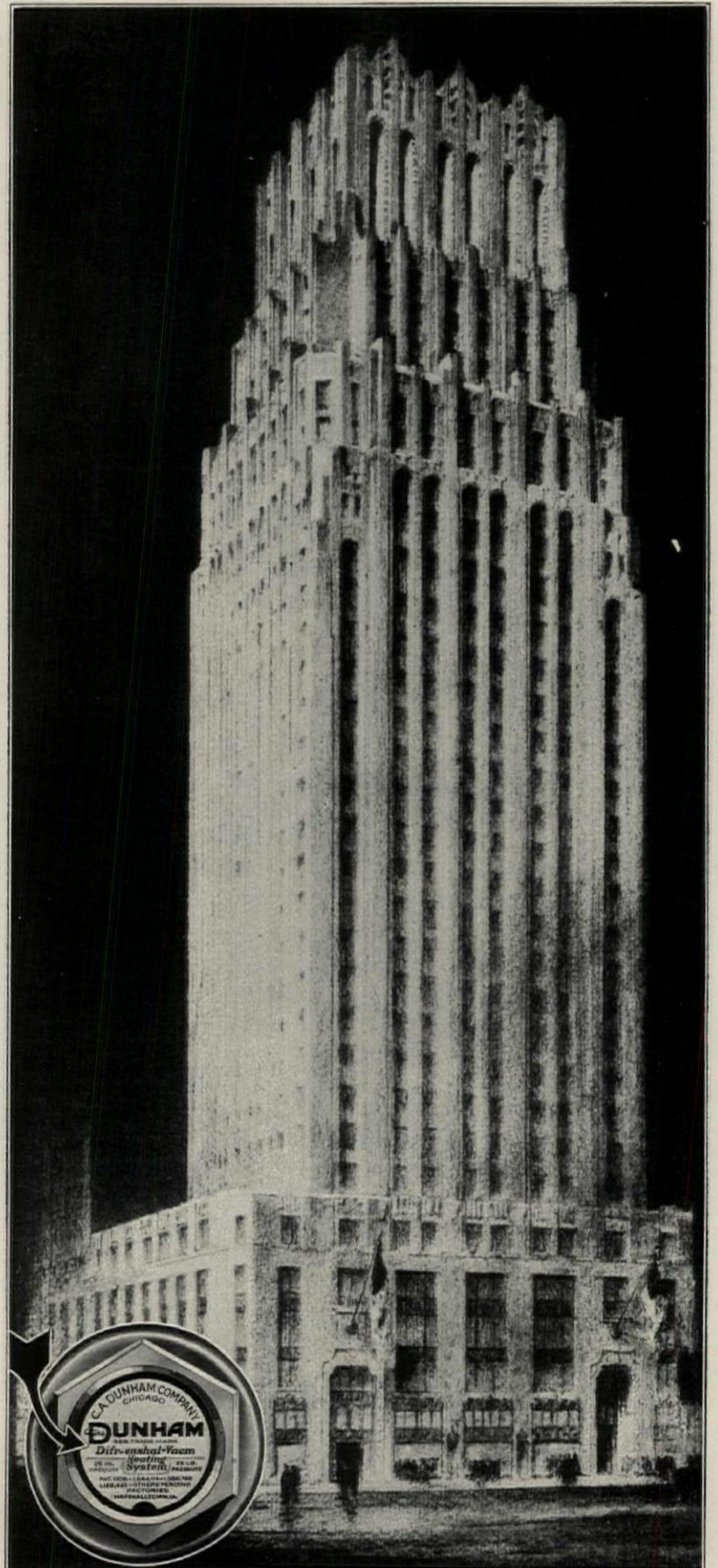
The boiler room with the Dunham Pumps and Control Valves are located in the basement. Steam from these control valves will flow to the main risers leading to pipe spaces above the ceilings of the 5th and 34th floors. Separate mains are provided in the 5th floor space for feeding downward to all floors below and upward to all floors including the 19th floor. The mains in the 34th floor space feed downward to all floors including the 20th floor.

All main risers, steam and return risers are well anchored and expansion is cared for by expansion loops so located as to insure proper grading of all piping under all conditions of temperature.

U. S. Patent No. 1644114. Additional patents in the United States, Canada and Foreign Countries now pending.

Over eighty branch and local sales offices in the United States and Canada and the United Kingdom bring Dunham Heating Service as close to you as your telephone. Consult your telephone directory for the address of our office in your city. An engineer will counsel with you on any project.

C. A. DUNHAM CO.
DUNHAM BUILDING
450 East Ohio Street, Chicago



How science proves

by 32 years' practice that
half your clients' fuel bills
are waste

Thirty-two years of practical use have proved the correctness of the Spencer principle of burning solid fuels. Ever since Mr. George F. Spencer invented the sloping grates and magazine of the first magazine feed heater, the Spencer Heater has been saving the waste in fuel costs for thousands of owners.

The Spencer was invented for one reason—to provide a better and more scientific way of burning solid fuels at a lower cost. For anthracite users alone its total savings amount to millions every year. Its thin fire-bed makes it possible to burn No. 1 Buckwheat anthracite for home heating, and that saves as much as half the former annual cost of fuel by the sole virtue of the difference in price between large size and small size fuels. With other solid fuels, savings are not so great, but Spencer efficiency in consuming all solid fuels enables it to pay for itself.

Thousands of users

Thousands upon thousands of users have proved the saving and efficiency of the Spencer by practical use. Constant improvements have been made in Spencer Heaters. New designs are more efficient than ever. Their growing sales have made it possible to reduce Spencer prices still further for the coming year.

Capacity guaranteed

The Spencer is different not only in design, but in manufacture. It is precision-made. Every contact surface is face ground and meets metal to metal in a tight joint. The heating capacity is guaranteed. Arbitrary ratings have been abolished for Spencer Heaters. Instead their capacity on square feet of radiation is guaranteed.

Almost unlimited resources and facilities are behind the Spencer Heater—a company that for years has been the only one making a complete line of magazine feed heaters both in cast iron sectional and steel tubular types. Write for illustrations and guaranteed capacities of all Spencer Heaters. Spencer Heater Company, Williamsport, Pa.



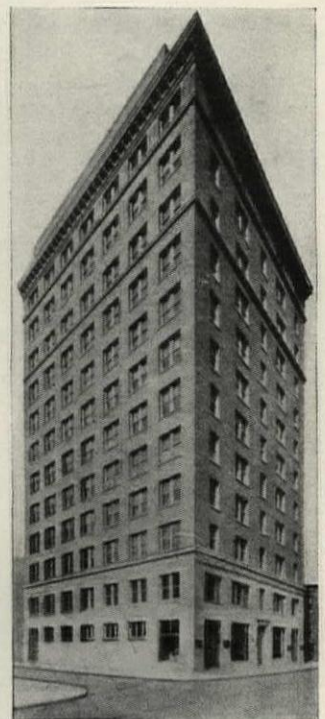
This is a cross-section view of a Spencer Heater. Fuel—coke, anthracite, graded bituminous or semi-bituminous coal—is put into the empty magazine (A). From the magazine it rolls down to fill the sloping Gable-Grates up to the level of the magazine mouth (B). The fire-bed always stays at this same level, for as fast as fuel burns away, more must roll down to keep the fire-bed uniform and the heat even. When fresh fuel rolls down upon the fire as shown at (C), it is in small particles that ignite readily. You do not “choke” or “damp” your fire with huge quantities of fuel. It is kept burning at its most efficient point. When fuel burns to ash it loses more than 80% of its weight. As it burns embers and ash shrink and settle on the grate as shown at (D). This makes room on top of the fire for more fuel, and more must roll down automatically. At (E) you see the sloping Gable-Grates of the Spencer, the grates that make fire burn up-hill, the way it burns easiest and best.

For business buildings

Illustrated is the Otis Building in Philadelphia. McIlvain and Roberts, architects, write: “Ten years ago we installed four Spencer Tubular Steam Heaters in our apartment house. Spencer Heaters are also installed in our Otis Building, as well as in three apartment houses we designed and operate at Haverford, Pa. Our new 15-story apartment house, not yet completed, will be heated by Spencer Heaters, as they assure us of maximum heating capacity at lowest cost.”

An architect's home

Below is illustrated the home of Mr. G. Edwin Brumbaugh, noted Philadelphia architect. Mr. Brumbaugh says: “As a result of my own satisfactory experience, it is a pleasure to recommend the Spencer Heater to my clients.” Mr. Brumbaugh has heated his home with a Spencer for more than eleven years.



SPENCER
steam, vapor
or hot water
HEATERS



REVIEWS OF MANUFACTURERS' PUBLICATIONS

THE ARMCO INTERNATIONAL CORPORATION, Middletown, O. "Handbook on Galvanized Iron."

Architects and builders are fully aware of the great usefulness of galvanized iron for countless purposes. Its adaptability and the ease with which it is worked render it serviceable for many details of buildings, ranging from the wholly structural and utilitarian, such as skylights and louvers, to such decorative and ornamental details as cornices or the facades of shop buildings. Galvanized iron possesses, among many other useful qualities, lightness of weight and a low coefficient of expansion; it is proof against fire and lightning; it is readily worked into the most intricate of designs, which gives it that sharpness of line necessary for bringing out the full design value of cornices and other decorative adjuncts of buildings. This brochure deals *in extenso* with these excellent qualities and presents the merits of the galvanized iron supplied by the Armco International Corporation. It deals with galvanized iron cornices, mar-ques and skylights of several different types, giving carefully drawn details of many varieties, and illustrations of buildings upon which they are used. The booklet also contains much useful information of a miscellaneous nature.

HAZARD INSULATED WIRE WORKS, Wilkes-Barre, Pa. "The Question of Quality in Building Wire."

There are apparently many writers of specifications who do not fully understand the importance of using good qualities of wiring for electrical installations. In many buildings there are incorporated excellent grades of piping, for example, for carrying throughout the structure the steam, water, air and gas which are needed for many purposes, and yet the same structure may be equipped with poor qualities of wire, regardless of the fact that many forms of mechanism depend on electricity for their functioning. "Wiring furnishes, in other words, not simply light and power but is a vital factor in the safety of the structure as a whole and in the convenience and efficiency of its occupants. It runs the water pumps that protect the building against fire. It lights and ventilates, refrigerates and heats. It operates machine tools in the factory and furnishes power for the many labor-saving devices which are now in such general use in both the office and the home." This folder, one of a series, deals with the excellent grades of wiring supplied by the Hazard Insulated Wire Works. It abounds in data highly useful to a specification writer, and on one page it presents the plan for a one-story, six-room house, showing the most economical method of wiring it.

AMERICAN BLOWER CO., Detroit. "Collecting Fly Ash and Coal Dust." A valuable work on an important subject.

The problem of disposing of dust and cinders from boilers and coal preparation plants is becoming increasingly important. These particles are discharged into the air in such quantities from smoke stacks in industrial cities, and even in non-industrial districts where there are steam-generating plants, that it has ceased to be merely a nuisance and has become a serious menace. Legislation is being formulated to remedy this condition, and health authorities are keenly interested in the solution of this serious problem. The American Blower Company, specializing in air-handling and conditioning equipment, after thorough investigation and much research, is offering to the power-generating industry the "Sirocco Collector" as a satisfactory solution. This operates by means of a volute-shaped chamber into which the gas and dust from the furnaces are forced, giving them a whirling motion. Below this chamber is a vertical pipe consisting of a series of truncated cones into which the smoke and dust descend, still with a whirling spiral motion, so that as the dust descends, due to its weight, it is forced outward, leaving the clear air and gas in the vortex which, due to their light weight, pass out at the top, while the dust and cinders are collected at the bottom. This apparatus has been tested under all conditions and found to be very effective, and it has been installed in a large number of plants where it is giving very satisfactory service.

DAVID LUPTON'S SONS CO., Philadelphia. "The Windows for Your Home." A useful brochure on casements.

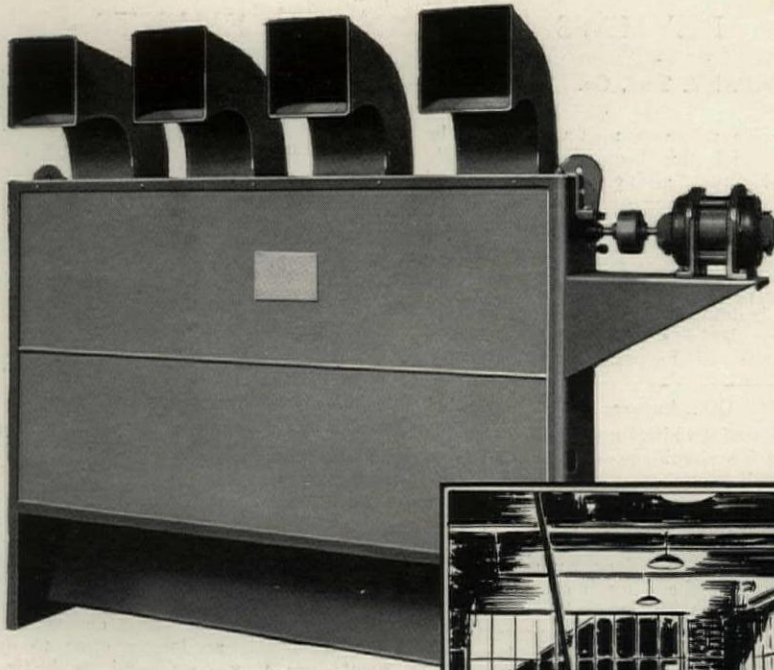
Architects who urge upon their clients the use of casement windows, generally for buildings of a residence nature, are sometimes puzzled as to just how to meet the objections which clients bring forward. To an architect, trained as he usually is in the niceties of design, it is likely to seem unreasonable that anyone should object to using what is obviously so desirable and appropriate,—and withal so practical. But the objections are made, none the less. This little brochure might be called a sort of catechism on the subject of casements, since it is written, as catechisms are, in the form of questions and answers. The foreword says: "There are many things about windows that up to now have seldom been considered, but with the development of the modern steel casement, new possibilities have arisen for making the window more useful, as well as a new source of pleasure. To afford a better understanding of this modern development in residence architecture, this little book presents a few questions and their simple answers. It is hoped that these questions and answers will open up a new line of thought that will favorably influence arrangement of homes."

TRENTON POTTERIES CO., Trenton, N. J. "The Blue Book of Plumbing, Catalog T."

One need not be of greatly advanced age to remember the time when plumbing,—in its present-day sense at least,—was either unknown or so rare it was regarded as a surpassing luxury. It was the day of tin or zinc bathtubs, boxed in, as were also the "stationary washstands" and the more or less primitive water closets. Even the smallest house or the tiniest apartment now has what would have been undreamed of at that time, but the full extent of what has been done is not likely to be realized until one examines a volume such as this,—the general catalog of a large firm manufacturing such fittings. In its almost 200 pages the volume illustrates and describes what "constitute the achievement of an experience of 35 years. Each detail is as close to perfection as it is humanly possible to make it. Each gives silent yet unmistakable testimony to the truth of the statement that 'American people enjoy the benefit of better plumbing and better plumbing fixtures than those of any other nation in the world.'" The fixtures listed and illustrated include those for hospitals, residence structures and hotels of many types, business or manufacturing buildings of various sorts, and in fact fixtures appropriate for use anywhere where plumbing of any character is required.

OIL HEATING INSTITUTE, 420 Madison Avenue, New York. "What About the Supply of Oil Fuel?"

The continually increasing use of oil as fuel and the installation of oil-burning apparatus in residence structures, buildings of all kinds, industrial plants and steamships and navy vessels is founded, quite logically, upon the belief that the supply is adequate for all needs for at least a long time to come. Just how great is the world's supply of oil? No one knows; it is one of Nature's secrets, and Nature guards her secrets well. But some estimate may be had, and a survey of the situation is given in this brochure, one of several issued by the Oil Heating Institute. The outlook is encouraging, for it is being found that oil deposits in one or two sources of supply alone are vastly greater than was dreamed of only a few years ago when an earlier survey estimated the reserve supply, and improved methods of marketing and a better system of conservation are making for economy in the use of oil. Speaking of conservation, the brochure says: "The word 'conservation' has not the same meaning as 'hoarding.' The true meaning of conservation as applied to natural products is the use of a product for purposes which most completely utilize its unique properties in adding to human welfare. The use of fuel oil for heating is true conservation. So used, it brings a new freedom and a new standard of living. It is estimated that 100,000 oil-heating installations were put into American homes during 1927." The booklet is full of useful data.



HEAT WITH
UNIT HEATERS



*Proper heating
and ventilating*

need not be uncertain or expensive

"It's too cold to work in here," remarks a shivering workman.

"I can't work with that window open," adds another.

"I won't work with the windows all closed," chimes a third.

And so it goes — in plants where heating or ventilating equipment are lacking or inadequate for the particular job.

It is necessary to be warm—also to breathe. Sirocco Unit Heaters are built to order for

heating and ventilating large industrial areas. They are made in 28 sizes and capacities for high or low pressures, floor or ceiling applications. Before you specify heating equipment for any industrial building we ask that you see the Sirocco Unit in action—inquire of any user—or compare it with any other heating method or unit.

American Blower
VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT
 MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881

AMERICAN BLOWER CORPORATION, DETROIT, MICHIGAN
 CANADIAN SIROCCO COMPANY, LIMITED, WINDSOR, ONT.
 BRANCH OFFICES IN ALL PRINCIPAL CITIES

(833)

C O U P O N

Please send me your 32-page book on Industrial Heating and Ventilating.

Name _____

Firm _____

Full Address _____

REVIEWS AND ANNOUNCEMENTS

GEORGIA MARBLE COMPANY, Tate, Ga. "Illustrations Showing Use of Marble."

Probably to show the wide range of uses which may be made of its excellent material, this large firm of marble workers issues occasional plates giving illustrations and details of buildings and other structures for which its marble has been used. Quite lately there have been issued Plates 27 and 28 which illustrate a monument at Mundelein, Ill., and the library of Emory University, Atlanta. The latter plate gives the names of the different kinds of marble used for this fine building. In the entrance feature Georgia Dark Creole marble was used, while Georgia Mezzotint marble was employed for ashlar and pilasters.

RICHARDS-WILCOX MFG. CO., Aurora, Ill. "Doorways."

The remarkable examples of architectural design found in Mexico and Central America should be a source of great interest and inspiration to all architects, and it is this timely and interesting subject that is treated in the March, 1928, issue of *Doorways*, a publication of the Richards-Wilcox Manufacturing Company. The cover design consists of a reproduction of a photograph of the doorway and famous bronze doors of the convent at the Church of Santa Inez, Mexico City. There is also a center spread consisting of four illustrations of Mexican architecture as presented in An Old Spanish Colonial Church Doorway, Copala; Residence of Former President Diaz, Mexico City; and the Patio of a Private House in Guadalajara. Ecuador is also represented by an elaborate church façade. Another interesting and instructive article in this issue discusses removable gymnasium partitions by means of which gymnasiums may be subdivided or used in connection with the stage of an auditorium for holding tournaments and to provide an unusually large stage for dramatic presentations. This style of gymnasium is particularly suitable for high schools, and the article is illustrated with several views of schools where this arrangement has been used and been found practical.

STEEL FRAME HOUSE COMPANY, Pittsburgh. "Steel Frame Standard Gasolene Service Stations."

It can be easily understood that among all buildings which may be exposed to destruction by fire, those chiefly exposed to such hazards are the gasolene service stations which now with growth of motor traffic are many along country roads and extremely numerous in thickly settled localities. In erecting these buildings it is necessary that economy be practiced if the financial success of the gasolene stations is not to be handicapped at the very outset by high construction costs, and yet unless fireproof or fire-resisting qualities are secured, the structures are likely to be ready victims of fire as well as a menace to surrounding buildings. With use of such materials as stone, brick, concrete, etc., the materials which are susceptible to burning are chiefly wood, which is generally employed in constructing roofs and floors and sometimes used in walls. This brochure deals with the use, in building gasolene stations, of steel framing. The booklet, in its description of the system of building, says: "The entire structure is framed of standard units of 'steel framing.' This framing includes the exterior walls, interior partitions, columns, girders, roof rafters, ceiling beams and lintels for all brick openings. The exterior walls, whether of brick or stucco, consist of a welded steel fabric with waterproofed paper backing attached to the 'Steel Framing' the brickwork being attached to this fabric by steel ties and the space between filled solid with mortar, and the stucco applied directly to the steel fabric. The interior plastering is applied to similar welded steel fabric with paper backing, the fabric being attached directly to the inside of the 'Steel Framing.' Doors are set in sheet metal door bucks, having hanging jambs of wood. Windows are steel casement windows with wood jamb linings and sheet metal beads at corners. The metal door bucks and window beads form plaster openings on which no finished trim is required." The brochure contains views and plans of a number of gasolene stations of various sizes and of attractive design, for which drawings, specifications and all the necessary details are easily had.

Three New York architects practicing separately have moved from 10 East 47th Street to 25 West 45th Street. They are Harold W. Vassar, Lewis E. Welsh, and William Dewey Foster.

Donaldson & Meier announce their change of address from 1928 Penobscot Building to 1188 First National Bank Building, Detroit.

Walter P. Marshall announces his removal from the Realty Building to 1001 Savannah Bank & Trust Building, Savannah, Ga.

THE FULTON COMPANY, Knoxville, Tenn. "Automatically and Accurately Regulating Temperatures."

It is of great advantage to have in a building of any kind apparatus which so controls heat that it may be kept at a desired point. This applies chiefly to temperatures in places of residence, but it also concerns the heating of "service water,"— water supplied to kitchens, pantries, and bathrooms; in connection with room temperatures it also has to do with control of the heating of places in which manufacturing processes are carried on, since it is often necessary that workrooms be controlled at definite temperatures. "The advisability of using dependable temperature controlling devices is no longer open to question. Such instruments are now considered as being absolutely necessary where heating or cooling media are employed. A selection of the type of controller should be carefully made. Simplicity and accuracy are the all-important factors, but the maintenance is, in many cases, much more so. "The self-contained temperature controllers, under which class fall Syphon Temperature Regulators, described and illustrated in this booklet, have all the desirable features of those that are operated by outside forces, and are not complicated.

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Architects who would care to avail themselves of the services of these photographers are requested to communicate with them before Feb. 15, 1929, that a careful planning of their itinerary may be made. Studio address
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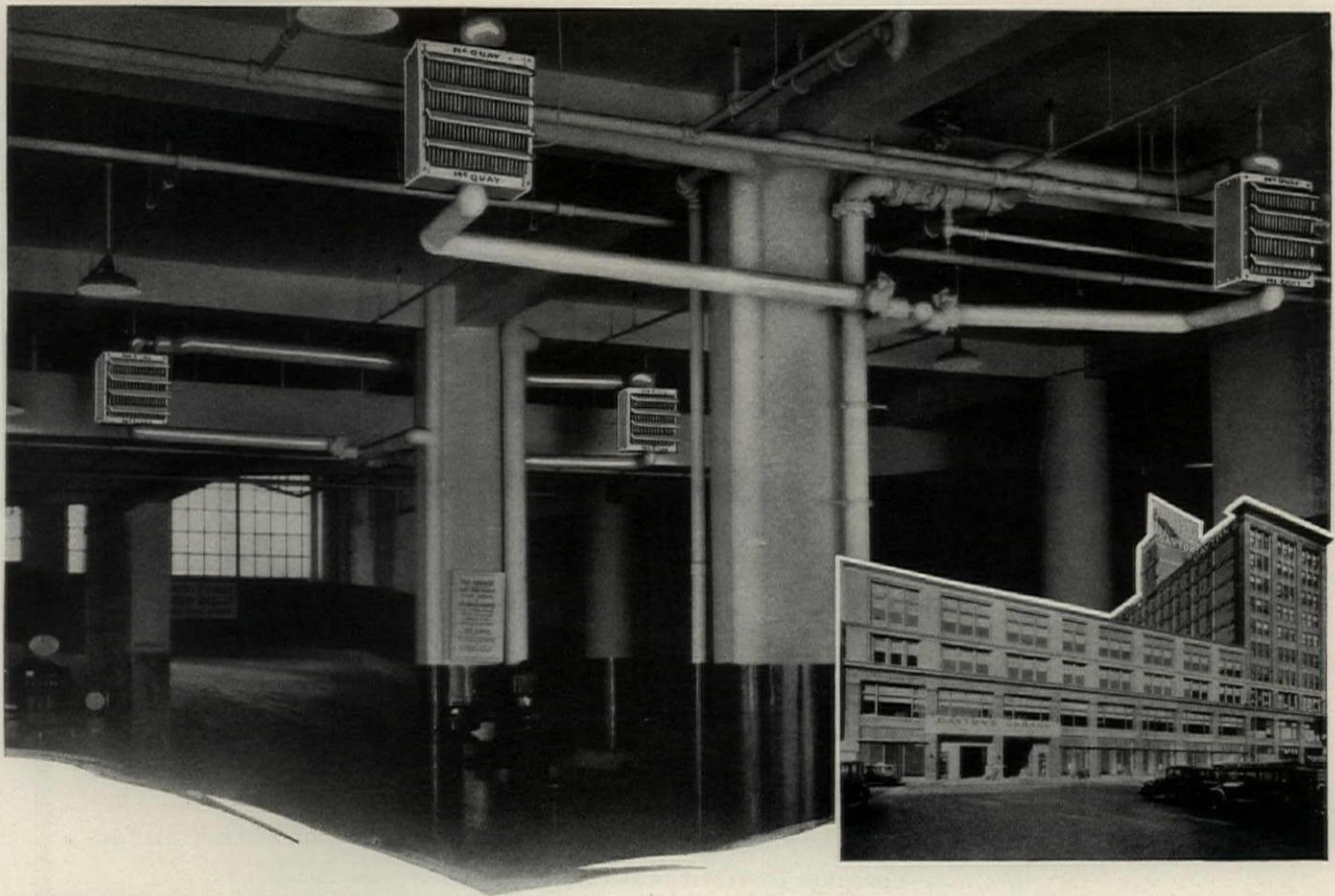
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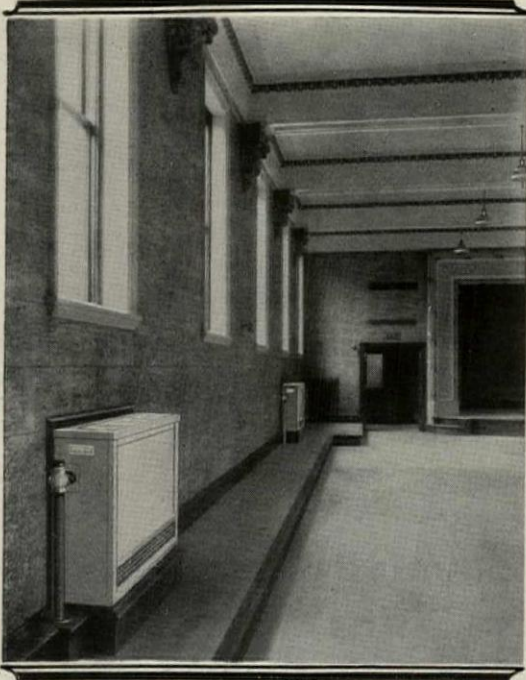
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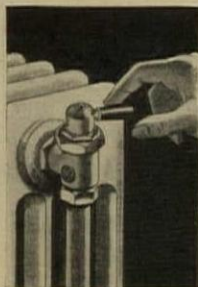
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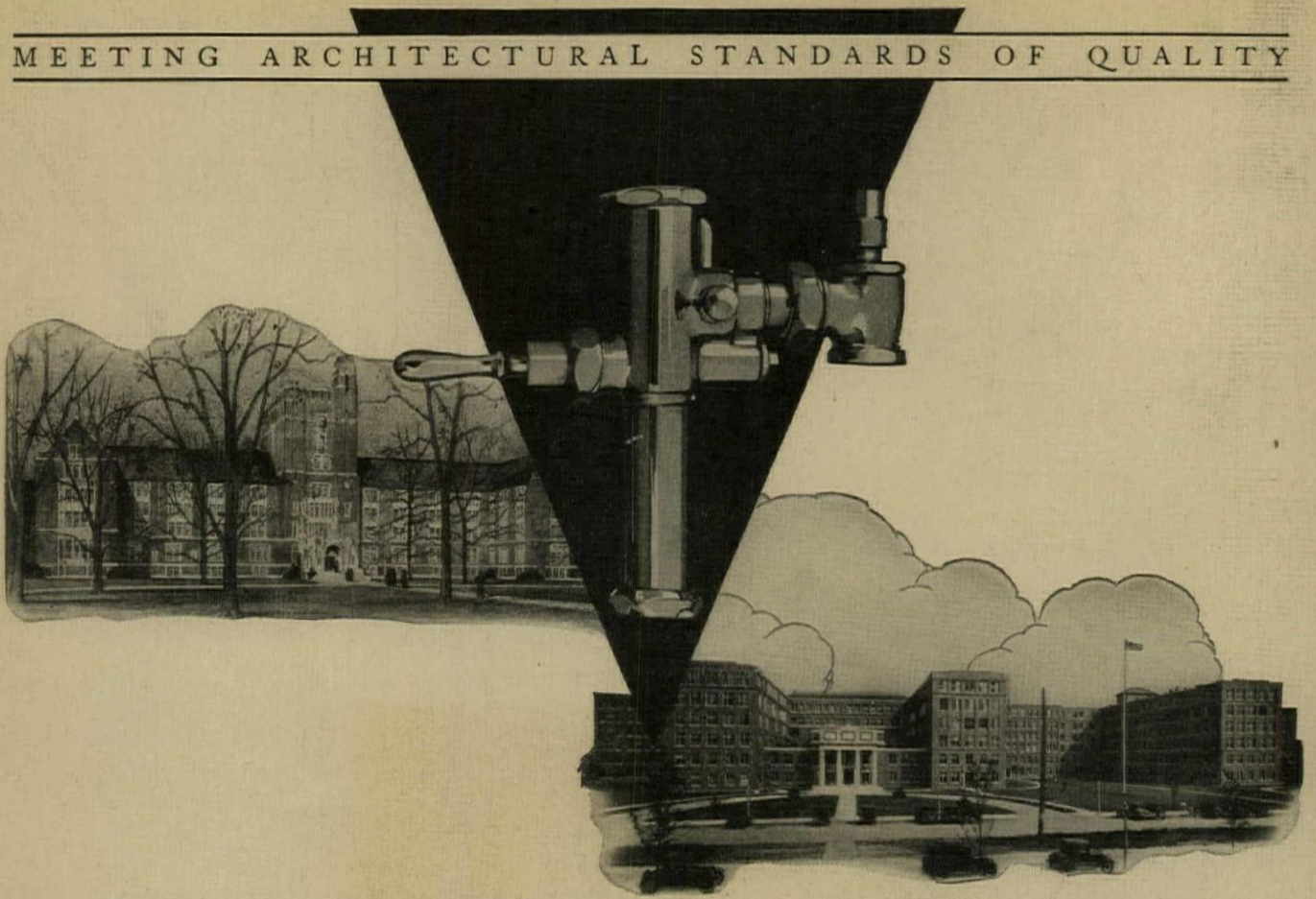
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