

THE
ARCHITECTURAL
FORUM
IN TWO PARTS

ARCHITECTURAL ENGINEERING
&
BUSINESS

PART TWO

FEBRUARY

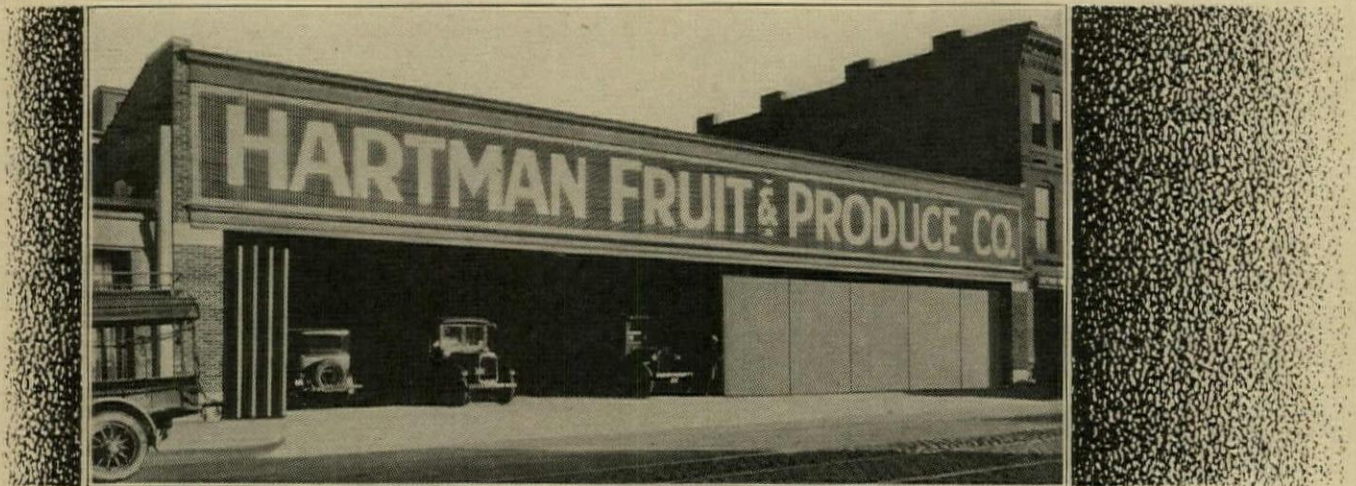
1929

Here's a 100 foot doorway without center posts!!!

Hartman Fruit & Produce Co., St. Louis, wanted an indoor loading platform which could accommodate as many as 12 motor trucks at a time. They wanted an opening to the street 100 ft. wide, without posts or other obstruction to hinder the movements of trucks.

They put it up to their architect, Laurence O. Schoop, who designed the splendid modern building they now occupy. Mr. Schoop called in a Richards-Wilcox engineer. So far as the architect knew, this was the widest opening in the world calling for doors without any posts.

R-W engineers designed equipment for the doorway—ten wood doors with steel frames save weight without sacrificing rigidity, making it easy for one

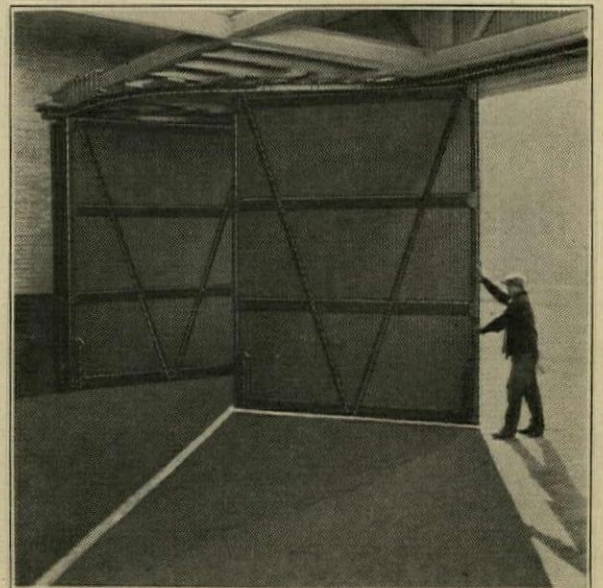


man to open or close them. A cleverly devised arrangement of R-W track makes it possible to open five doors to each side, occupying less than 4 ft. of space when opened.

An opening large enough for one truck can be made at any point in the entire 100 ft. span without throwing the whole doorway open. The doors move smoothly and easily, but stay where they are put. They cannot be moved by the wind, and have not given the slightest trouble.

The tenant enjoys the convenience of loading trucks indoors, protected from inclement weather, and of having a wide doorway for trucks, free from posts or other obstructions.

Perhaps you have doors which give trouble, or an opening where scientifically designed, smoothly operating doors would be an asset? Don't say, "It can't be done!" Call in a Richard-Wilcox engineer.



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

HAVE YOU USED NATCO VITRITILE?

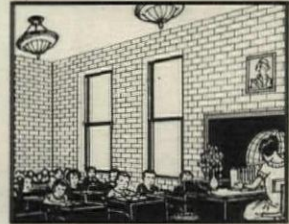
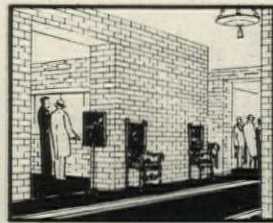
IT'S THE VOGUE

Month by month, in ever-increasing numbers, people are discovering the many virtues of Natco Vitritile. Recognizing the possibilities it possesses of contributing new and striking effects. Welcoming the opportunities it affords for outstanding economies in construction, and permanent freedom from high maintenance.

Combinations of the various shade blends, which range from light cream buffs through yellow and orange buffs to a rich brown, are particularly harmonious, practical, and pleasing. All units are true to shape, without warpage or surface imperfections. Corrugated wrappings protect from damage in transit.

Natco Vitritile is a structural unit, for use in both exterior and interior load-bearing and non-structural walls and partitions. It is furnished in a multiplicity of shapes and sizes, with one or both faces glazed, and kerfed or split for furring.

If you haven't already used Vitritile, investigate its possibilities; *it's the vogue.*



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
THE COMPLETE LINE
OF STRUCTURAL
CLAY TILE



PAGE
A383
A416

TURN TO
"SWEET'S"

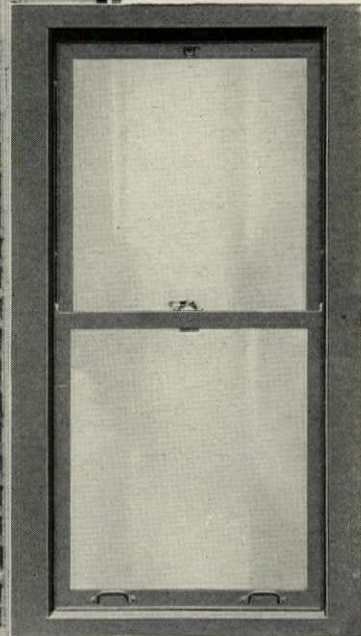
Steel Windows

*that Typify
and Reflect*

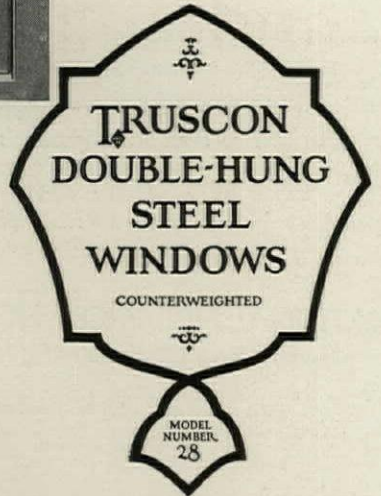
QUALITY Construction



*Steuben Club Building,
Chicago, Illinois
K. M. Vitzthum & Co.,
Architects
Paschen Bros.,
Contractors*



*Medical Arts Building, Cleveland, Ohio
Graham, Anderson, Probst and White,
Architects
The Lundoff Bicknell Company, Contractors*



THE high quality of Truscon Double-Hung Steel Windows Model No. 28 results from the use of flawless material and improved methods in the manufacture. Standardization and quantity production add the factor of economy. These windows are built of solid galvanized steel and have a weight of metal which insures long life and trouble-free service. Their many outstanding advantages have made them the choice of leading architects for many of America's finest buildings.

We will be pleased to mail our new Double-Hung Window Catalog and the complete book of Drafting Room Standards for all types of Steel Windows and Doors.

TRUSCON STEEL COMPANY, YOUNGSTOWN, O.
STEEL WINDOW DIVISION
ENGINEERING AND SALES OFFICES IN ALL PRINCIPAL CITIES



The actual driving of Raymond Concrete Piles.

—and ask about “OUR METHOD”

of placing standard, tapering, cast-in-place piles. Ask us WHY we first drive a tapering shell of spirally reinforced steel, then leave it open in the ground for inspection, then pour concrete into it and then LEAVE EACH SHELL IN THE GROUND. Ask us. There are so many good engineering reasons. *Ask us.* The answer means a lot to your sense of certainty and . . . economy. ASK US.

CAST IN PLACE PILES
COMPOSITE PILES
PRECAST PILES
PIPE PILES
*A form for every pile
A pile for every purpose*
BUILDING FOUNDATIONS
BULKHEADS AND DOCKS
UNDERPINNING ETC.
BRIDGES

RAYMOND CONCRETE PILE COMPANY

NEW YORK: 140 Cedar St.

CHICAGO: 111 West Monroe St.

Raymond Concrete Pile Co., Ltd., Montreal, Canada

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HOUSTON, TEX.

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RAYMOND

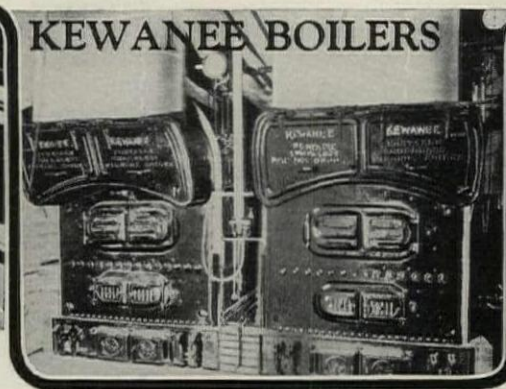
KEWANEE

in the banks

Davenport has the
 first First National
 Bank chartered in
 U. S. New York
 City has the largest.
 Both are
 Kewanee heated.

In the largest and in the very first

KEWANEE BOILERS



NATIONAL CITY BANK BUILDING. NEW YORK CITY. Architects, McKim, Mead and White. Heating Contractors, Baker, Smith & Co. Builders, Geo. A. Fuller Company. Five No. 322 Kewanee Portable Smokeless Boilers; one No. 313 Kewanee Portable Smokeless Boiler. 106,000 square feet total rated capacity.

FIRST NATIONAL BANK OF DAVENPORT. Architects, Childs & Smith. Heating Contractors, Ryan Plumbing & Heating Company. Two No. 317 Kewanee Portable Smokeless Boilers. 1,100,000 cubic feet contents; 12,598 square feet direct radiation; 645 square feet blast. Fan, 10,000 cubic feet per minute.

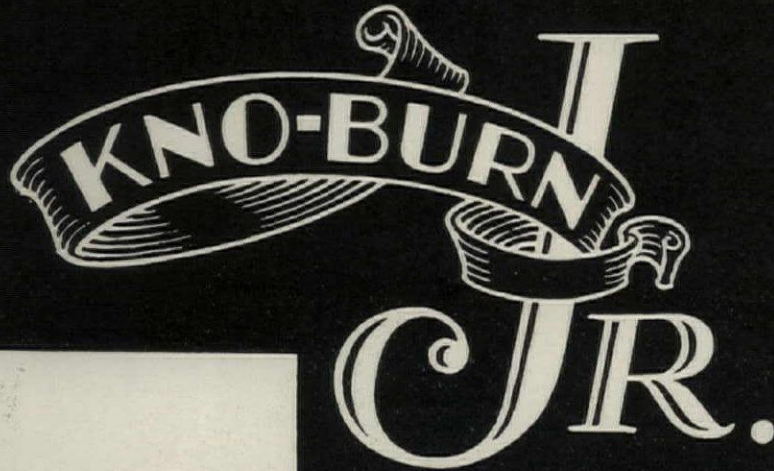
Kewanee is in hundreds of banks

A Kewanee Boiler in your building means money in your bank

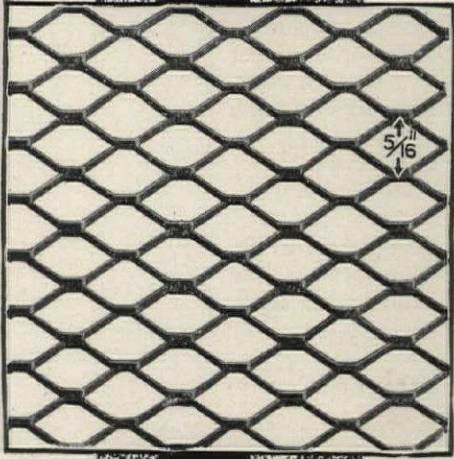
KEWANEE BOILER CORPORATION *Kewanee, Illinois*



HISTORICAL NOTE: President Lincoln approved the National Bank Act February 25, 1863, and on the next day an application for a charter for the First National Bank of Davenport reached the Treasury Department in Washington. It was well along in the month of May before the articles of association, prepared in the Comptroller's office, were received in Davenport. On May 25 the subscription books for the new institution were opened, and in three days the capital stock of \$100,000 had been subscribed. The bank began business June 29, 1863.



The Secret Of Its Success, Is Its SMALL MESH



*KNO-BURN, JR. Metal Lath—the *smallest meshed* diamond lath ever placed on the market—has 3200 more “diamonds” to the square yard than next smallest meshed flat lath.

The significance of this lies in the fact that this gives thousands of additional “locking keys”—a better mechanical bond. Because these keys are *smaller*, no plaster sloughs off to go to waste—*Economy*. It means, too, that there is a more even distribution of steel. That the smaller mesh can be properly embedded in the scratch coat.

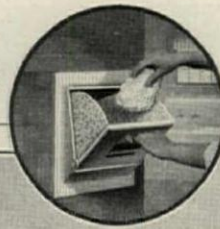
* A sample of this important KNO-BURN, JR., lath is ready for you. Please instruct us to send it.

Architects will be quick to recognize in these facts the attributes of the perfect plastering base. And they will find their judgment confirmed by that of the plastering and lathing contractors who pronounce KNO-BURN, JR. a most satisfactory as well as *economical* plastering base.

NORTH WESTERN EXPANDED METAL CO.

1234 OLD COLONY BLDG. • CHICAGO

DROP ALL WASTE HERE



THEN FORGET IT



89 "Insurance Policies"

that bring you *Guaranteed Incineration*

TO over 2500 of America's leading architects and builders, the word "Kernerator" stands for "guaranteed incineration for the life of the building."

The Kernerator itself is only part of our contract to insure this guarantee.

Even more important, if that be possible, are the eighty-nine Kernerator agencies throughout the world—each in charge of a highly trained incineration engineer possessing a knowledge of garbage and waste disposal which really makes incineration a science. Some of the well known ways in which these men cooperate are:

- 1 Planning service.
- 2 Installation supervision by an expert incineration engineer.
- 3 Personal attention and help if operating instructions are lost or not followed.
- 4 Service stocks, for immediate shipment, at several strategic points.

We have prepared twelve brief messages on the subject "Is Incineration So Simple, After All." May we send them? Kernerator residence models as low as \$95, and the masonry adds but little more when regular chimney is used.

For details see Sweet's, or write for ready-to-file copies of Kernerator catalogs in A. I. A. folder.

KERNER INCINERATOR COMPANY, 715 East Water St., Milwaukee, Wis.

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Dallas, Texas
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Detroit, Mich.
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Duluth, Minn.
El Paso, Texas
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Gary, Ind.
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Offices in these 89 cities

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New Haven, Conn.
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Richmond, Va.
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Rochester, N. Y.
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St. Paul, Minn.
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San Antonio, Texas
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Syracuse, N. Y.
Sydney, Australia
Tampa, Fla.
Tokio, Japan
Toledo, Ohio
Topeka, Kansas
Toronto, Ont., Canada
Tulsa, Okla.
West Orange, N. J.
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KERNERATOR

REG. U.S. PAT. OFF.

INCINERATION

*Garbage and Waste Disposal
for New and Existing Buildings*

Down through the Ages on BLOX-ON-END FLOORING



BLOXONEND—the flooring chosen for this Drill Room and Auditorium is comparable in durability, beauty and practicability with the structure itself.

Down through the ages, Bloxonend will remain smooth, providing an ideal surface for games, dancing, drilling and for varied functions of a military and civic nature.

This Flooring is especially adapted for use in Municipal, Commercial and Industrial Buildings of the finer type. Its durable end grain surface cannot splinter. Extensively specified for gymnasiums and shops by prominent school architects.

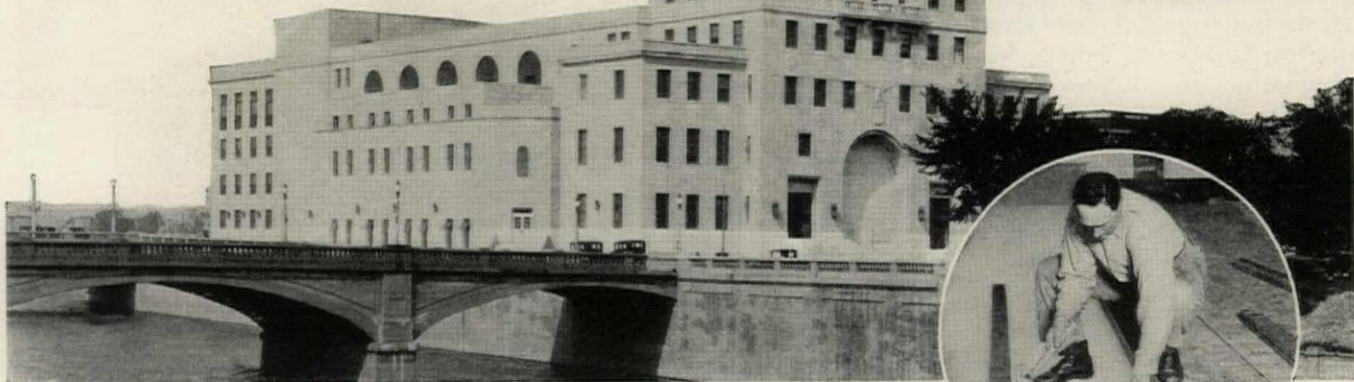
Write for sample and specifications.

CARTER BLOXONEND FLOORING CO.
KANSAS CITY, MO.

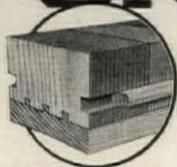
Representatives in Leading Cities—See Sweet's.



TO those who made the Supreme Sacrifice, Cedar Rapids, Iowa, dedicates this beautiful Memorial Building and City Hall. W. J. Brown and H. E. Hunter, Associated Architects. Harry Hornbostel, Consulting Architect. O. F. Paulson Construction Company, General Contractors.



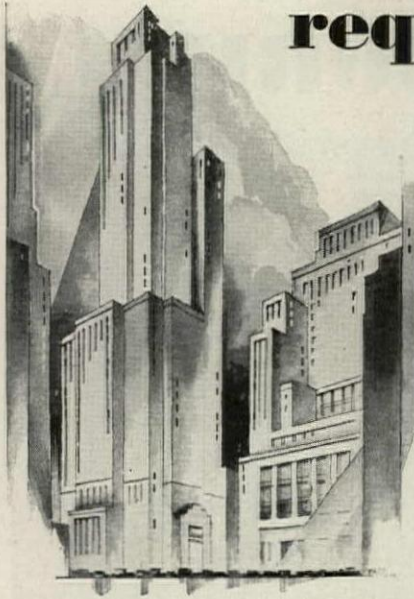
BLOX-ON-END FLOORING



*Lay's Smooth
Stays Smooth*

BLOXONEND comes in 8 ft. lengths with the blocks dovetailed endwise onto baseboards. The tough end grain forms the wearing surface.

Modern Buildings require Centralized RADIO EQUIPMENT



IN planning new apartment houses, hotels and other multiple residence buildings, provision for proper radio reception is becoming a necessity. New buildings not equipped in the beginning with adequate radio facilities will soon have to be rewired at a greater expense.

To meet the rapidly growing demand for high quality radio distributing systems for use in large residence buildings, the Radio Corporation of America, in conjunction with the General Electric and Westinghouse companies, has designed special apparatus for apartment houses, hotels, hospitals, sanitariums, schools, passenger ships and private residences.

The Radio Corporation of America has perfected two principal methods of wiring buildings for multiple radio reception:

1 A single antenna connected with a distribution system to radio receivers in rooms throughout the building. As many as 80 radio sets of different makes can be independently operated from this common antenna, by plugging into wall

outlets—and far more satisfactorily than by the use of individual antennae. Additional central antennae may be installed, if required, for additional groups of 80 receivers.

2 Centralized radio receiving equipment to distribute broadcast programs to as many as 3000 rooms throughout a building. Equipment may be installed to transmit a single program, or to make available the choice of programs from two, three or four broadcasting stations.

The first method is ideally adapted for apartment houses, dormitories, office buildings, etc., where tenants desire to have their own receiving sets. It does away with the unsightly multiplicity of individual aerials, and the inconvenience of connecting them with distant rooms.

The second method is particularly designed for hotels, hospitals, sanitariums, schools, passenger ships, etc., where transient occupants of rooms may enjoy radio programs from loudspeakers or headsets, all operated from a central receiving instrument.

Descriptive pamphlets of these two systems, and of the special apparatus designed for them, are available to architects, builders and building owners.

The Engineering Products Division, Radio Corporation of America, at any District Office named below, will answer inquiries, and prepare plans and estimates for installations of any size.



RADIO CORPORATION OF AMERICA

100 West Monroe Street
Chicago, Illinois

233 Broadway, New York City

235 Montgomery Street
San Francisco, California

Santa Fe Bldg., Unit No. 1, Dallas, Texas
101 Marietta Street, Atlanta, Georgia



This year the American Radiator Company is spending over a million dollars advertising its products.

The Red Flash Boiler in a clean modern cellar . . . an efficient and beautiful Corto Radiator in every room . . . these insure a uniform temperature of 70° and give an extra room in the well arranged modern house.

Friend of warmth . . . Enemy of cold . . . Guardian of health . . . Custodian of economy . . . American Radiator Heating . . . Priceless to possess . . . Economical to install.

AMERICAN RADIATOR COMPANY

40 WEST 40TH STREET, NEW YORK
AND ALL PRINCIPAL CITIES

My Name Is _____

My Address Is _____

City _____ State _____

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I am interested in receiving

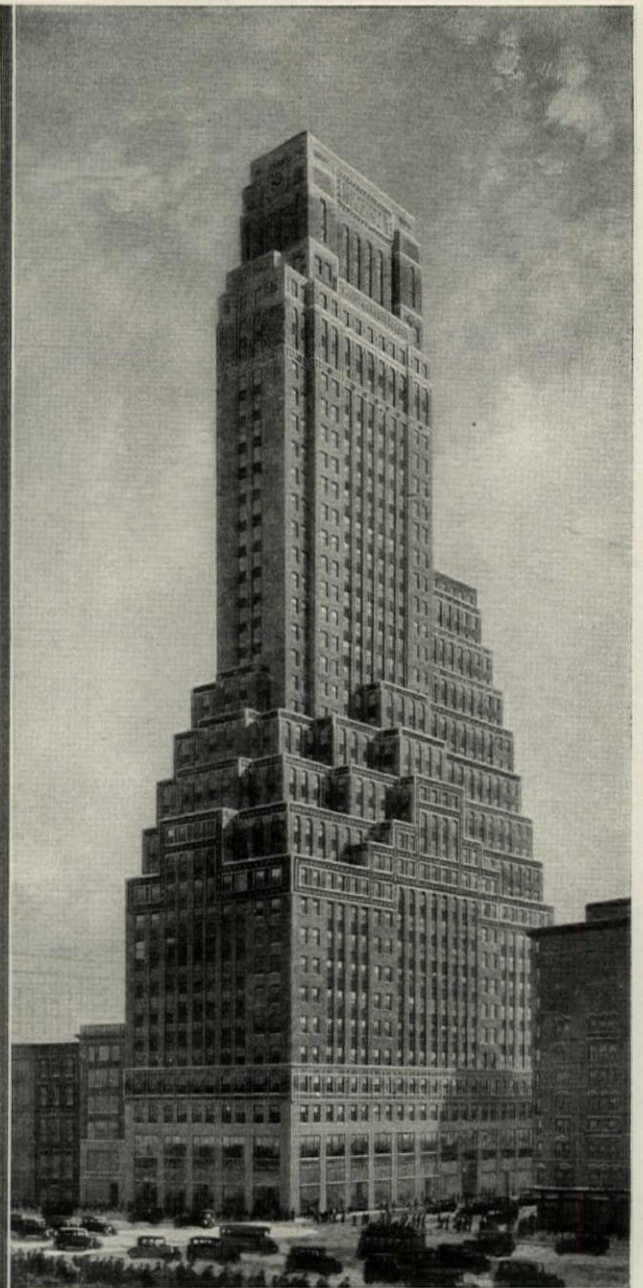
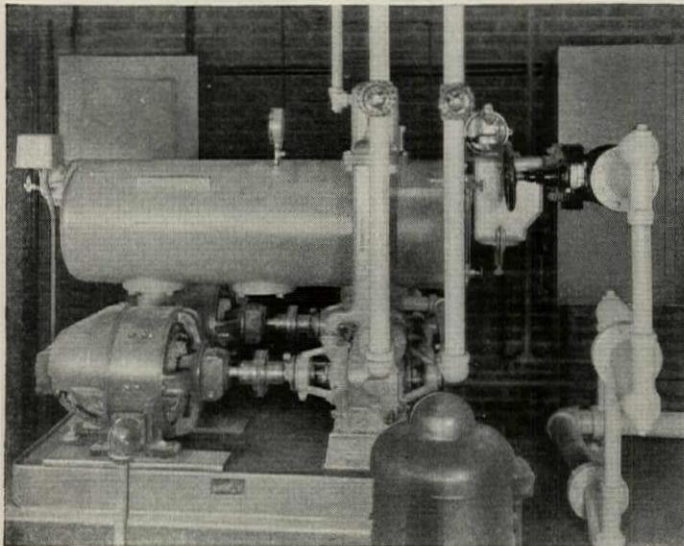
- particulars of your convenient payment plan by which my home may be heated for less than \$75 a room.*
- particulars of the Building and Loan Association financing plan.*

◦ ◦ PLEASE SEND TO ME AN ILLUSTRATED COPY OF . . . "HEAT AND THE SPAN OF LIFE" ◦ ◦

When the ~
Fred F. French
Companies
built their own home

WHEN the Fred F. French Companies built the Fred F. French Building at 551 Fifth Avenue, New York, a Jennings Vacuum Heating Pump was specified on the return line of the heating system.

The size E duplex unit was installed, suitable for 65,000 sq. ft. equivalent direct radiation. Since only one separating tank for the wet returns is needed, the space occupied by the Jennings duplex equipment is hardly more than that required for a single unit.



Fred F. French Building, 551 Fifth Ave., New York, N.Y. Financed, designed, constructed and managed by the Fred F. French Companies. Clyde R. Place, consulting heating engineer; Baker-Smith & Co., heating contractor.



Jennings Return Line Vacuum Steam Heating Pump, duplex type, size E serving the Fred F. French Building.



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

This Detail

makes your

LIGHTING PLANS COMPLETE

*Read how dependable
Exide Emergency Lighting
Batteries protect the building
against sudden power failure*



THE hospital . . . the school . . . the auditorium . . . should never suffer sudden darkness. And today the architect guards places where the public assembles, against current interruption. He completes his lighting plans by specifying emergency lighting protection.

Such protection must be reliable to be real protection . . . must be flexible to suit varying building needs.

These are the reasons why so many architects choose Exide Emergency Lighting Batteries. These batteries are available in a wide range of sizes that make them adaptable to any building plan. The forty-one years' experience behind their construction insures their unfailing reliability. And the devices necessary to control and keep them charged are *simple and automatic*.

You may be sure of these qualities when you specify Exide Emergency Lighting Batteries: absolute power dependability, long life, freedom from trouble, low first cost and low operating cost.

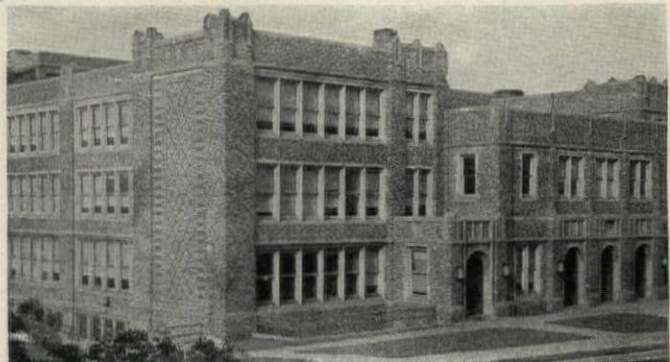
An experienced Exide Representative will gladly consult with you. This entails no obligation to you and may prove very helpful. A letter brings him promptly.

Exide

EMERGENCY LIGHTING BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia

Exide Batteries of Canada Limited, Toronto



CL CIRCUIT BREAKERS —

Designed for **MODERN BUILDINGS**

WHEN specifying carbon circuit-breakers for new buildings, the surest method of obtaining a breaker having characteristics that conform to modern building specifications is to specify CL breakers.

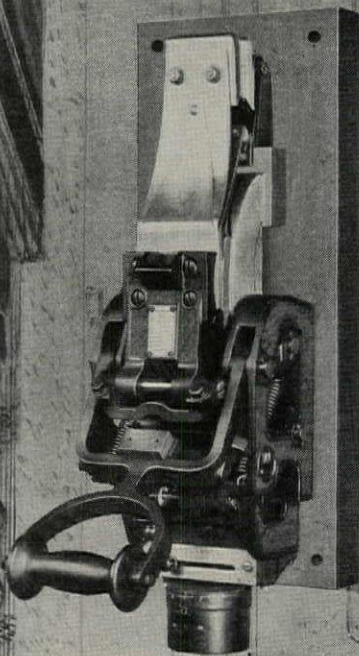
You need a breaker with proper mechanical and electrical elements to assure satisfactory operation, simplicity in construction, accessibility of parts and a pleasing, permanent appearance.

Past performances of Westinghouse CL breakers assure satisfactory operation. Simplicity of construction has been obtained through the elimination of all unsightly rods and levers, and the reduction of framework to the simplest, neatest form consistent with strength. An examination of the breaker will show its ease of accessibility. Permanence of appearance is assured by giving all copper parts a satin finish which retains its lustre without polishing.

Circular 1705, completely describing this breaker, can be obtained from our nearest office.

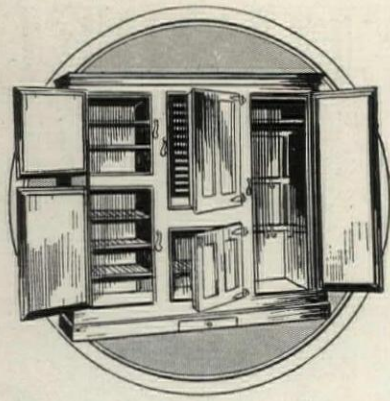
Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of
the United States and Foreign Countries T 30245



A 2000-Ampere, Single-Pole, CL Breaker
with Inverse-Time-Limit Overload Device.

Westinghouse



Over 250,000 SATISFIED Users

ARCHITECTS especially appreciate the broad scope of McCRAY service — refrigerators to meet every need, from single units to complete installation for the largest institution

PIONEER in modern sanitary refrigerator construction, for 38 years McCray has held to an unyielding ideal of quality which is reflected in the remarkable service records of McCray installations.

McCray users have always been our best advertisements. This army of over 250,000 satisfied customers is striking evidence of that leadership which is further revealed in the fact that McCray is the world's largest manufacturer of refrigerators for all purposes.

In single stock units and complete built-to-order installations for the largest institution, McCray quality is held to this single high standard.

All McCray models may be used with electric or mechanical refrigeration of any type, or ice. Pure corkboard, sealed with hydrolene by a distinctive process, provides perfectly air-tight insulation.

Send for latest catalogs and further information about refrigerators to meet your specific need. No obligation, of course.

McCRAY REFRIGERATOR SALES CORPORATION

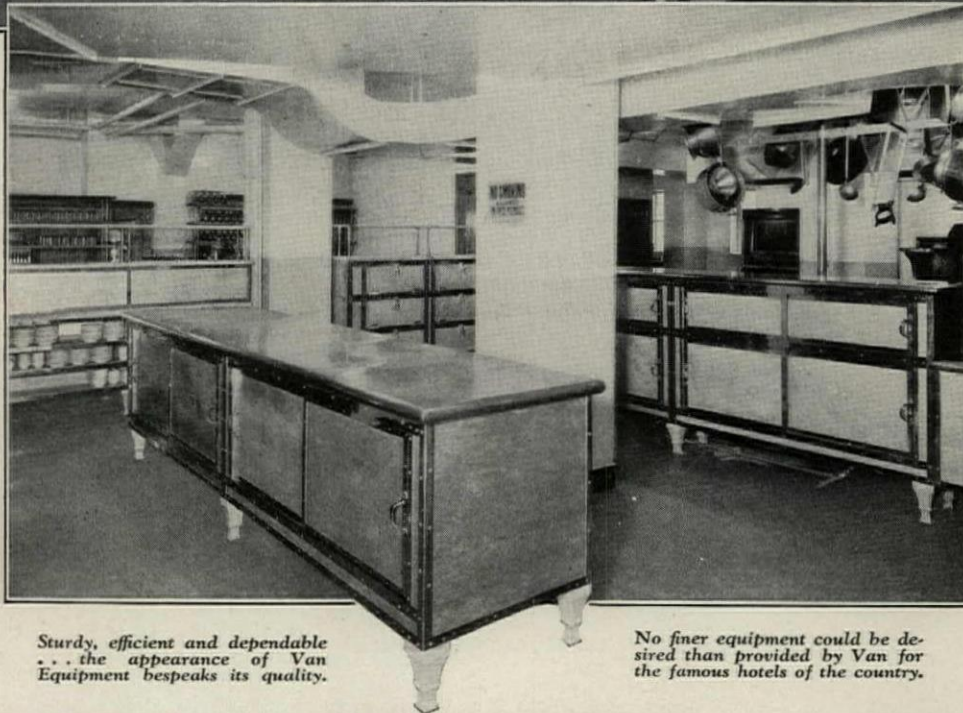
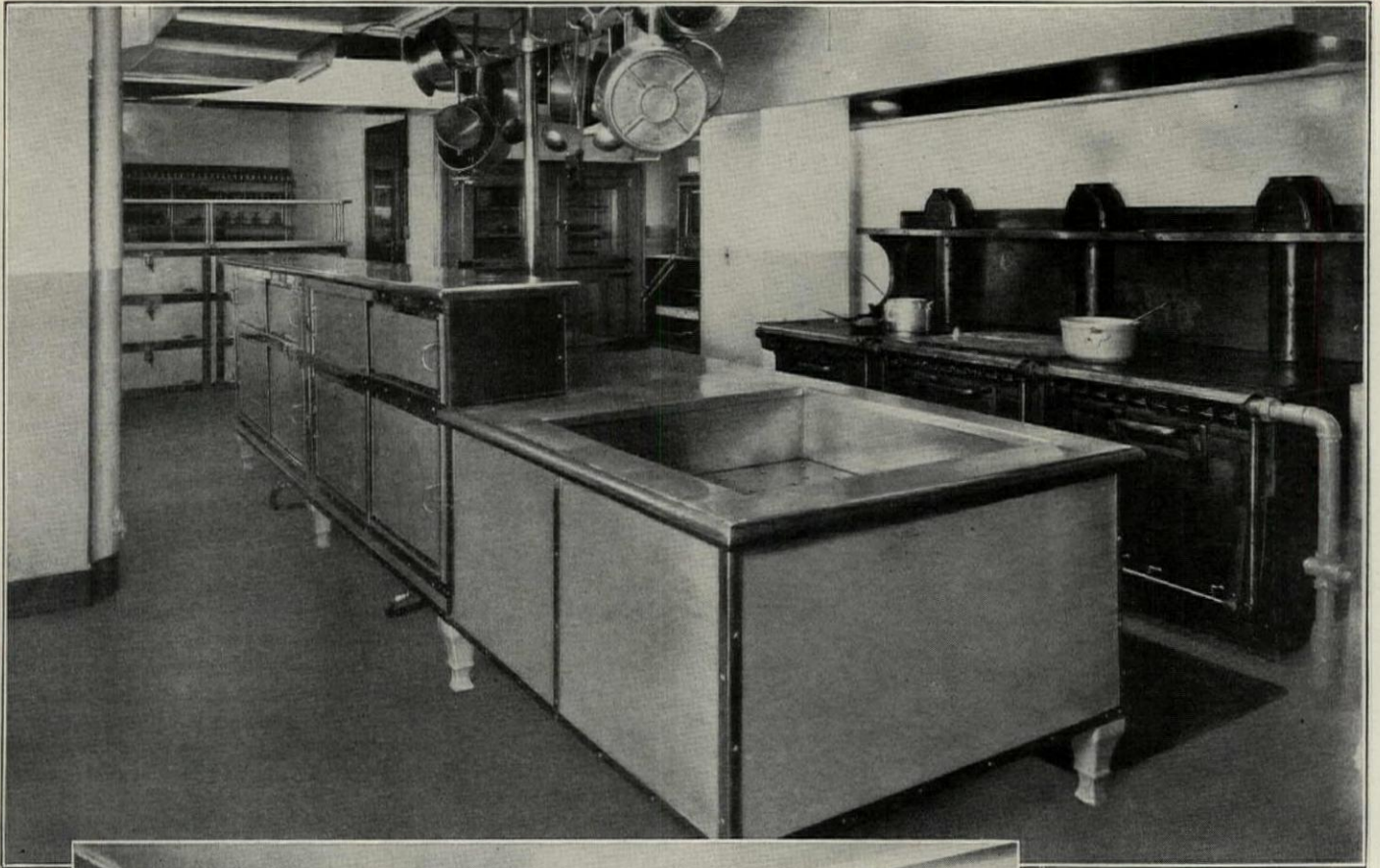
964 Lake St., Kendallville, Indiana

SALESROOMS IN ALL PRINCIPAL CITIES {See Telephone Directory}

McCRAY REFRIGERATORS

VAN KITCHEN EQUIPMENT

in Economy



Sturdy, efficient and dependable . . . the appearance of Van Equipment bespeaks its quality.

No finer equipment could be desired than provided by Van for the famous hotels of the country.

Van Kitchen in the Edgewater Beach Apartments, Chicago. This companion building to the famous Edgewater Beach Hotel uses Van Equipment throughout.

Benjamin H. Marshall,
Architect

VAN Equipment is manufactured in the largest, most modern kitchen equipment factory in the world — by a company famous for its products for more than 70 years. Van representatives are located in many cities and are always available for consultation. Write for particulars.

VAN FOOD SERVICE EQUIPMENT IS THE NATION'S

Leads the Field and Reliability

IF it's economy you want . . . economy in first cost, economy of operation, economy of your time and attention . . . you really should specify Van Equipment. You will, as all users do, find it matchless in its day-after-day reliability, its remarkable saving, and its ability to give constant, uninterrupted service. We think you will not find its equal at any price . . . and none better has yet been made.

Van Equipment costs no more to install . . . and vastly less to maintain! Simple in design and rugged in construction, it does its work year after year with an orderly precision . . . a practical economy . . . that will meet with your unqualified approval. Kitchens installed by Van fifteen and twenty years ago are still young!

Van craftsmen know what you expect of Van Equipment. They make it their business to see that you get it . . . with unfailing regularity . . . from every piece . . . large and small. Whether you need a single urn or a complete kitchen . . . you will find Van Equipment to be the most satisfactory in every respect.

The John Van Range Co.

EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD
Cincinnati

DIVISION OF THE ALBERT PICK-BARTH COMPANIES

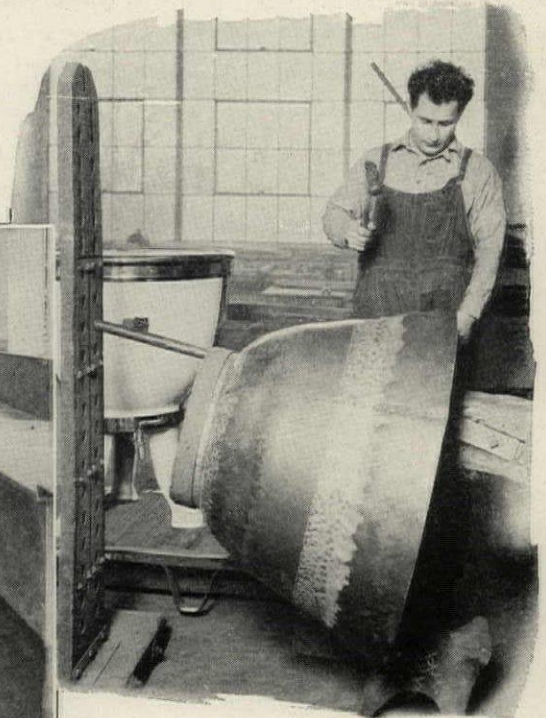
Chicago Sales Office
1200 West 35th St.

Detroit Sales Office
180 East Larned Street

New York Sales Office
38 Cooper Square

Below, the vegetable and soup preparation room of the Edgewater Beach Apartments, Chicago. In the background is an efficient bake shop that supplies the bakery needs of the hotel. Mixing machine, bake oven and pan rack may be seen.

Right, a Van Craftsman who performs by hand those processes which no machinery can do so well. He is hand hammering a kettle which when completed will be a duplicate of the one in the background.



STANDARD FOR ECONOMY—DEPENDABILITY—LONG LIFE

MINWAX PRODUCTS SEAL • PROTECT • BEAUTIFY

Membrane Waterproofing
 Foundation Dampproofing
 Caulking Compounds
 Plasterbond Dampproofing
 Asphalt Products
 Brick and Cement Coating
 Transparent Waterproofing
 Concrete and Terrazzo Floor
 Finish
 Concrete Floor Paint
 Wood Finishes and Waxes

Literature on any of these products will be sent upon request

A COMPLETE SERVICE *for Waterproofing, Dampproofing, Preserving and Beautifying Wood, Stone, Masonry*

By complete we mean as complete as our 25 years of intensive study and practice in this field can achieve. There are still problems to be solved, but in the main we are immediately ready to answer for the building industry, many of the vexing questions caused by water, moisture, wear and staining both in the exterior and interior of buildings.

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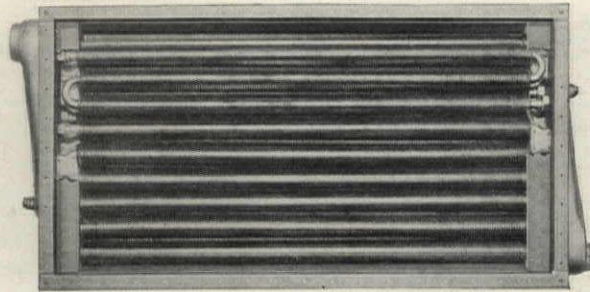
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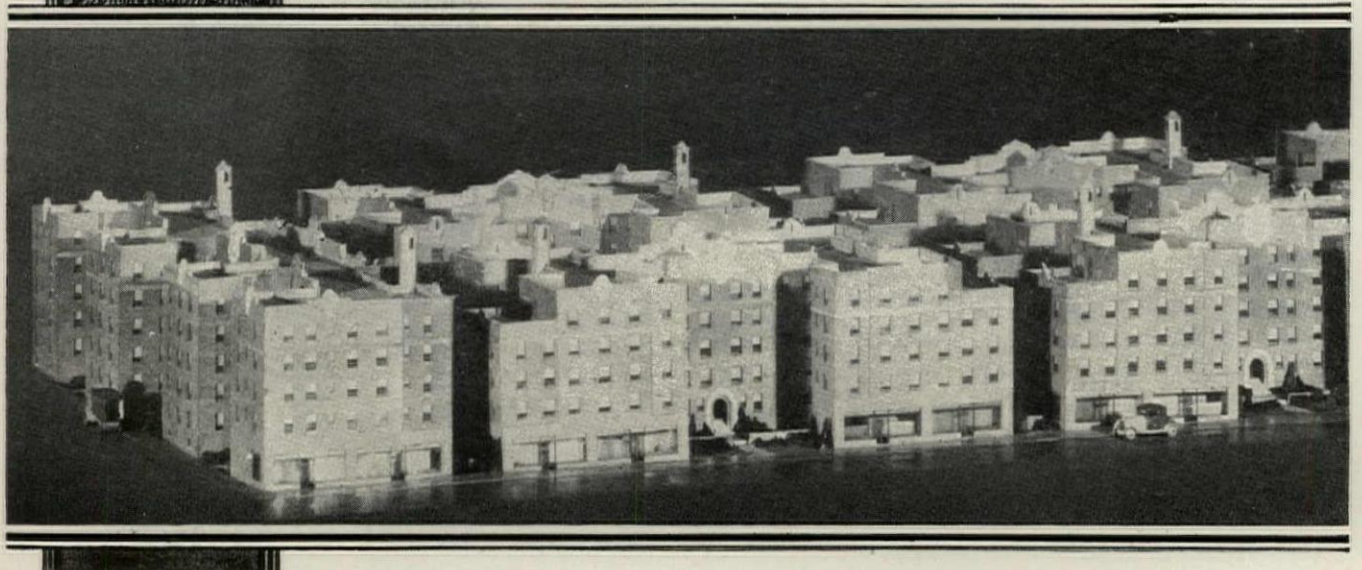
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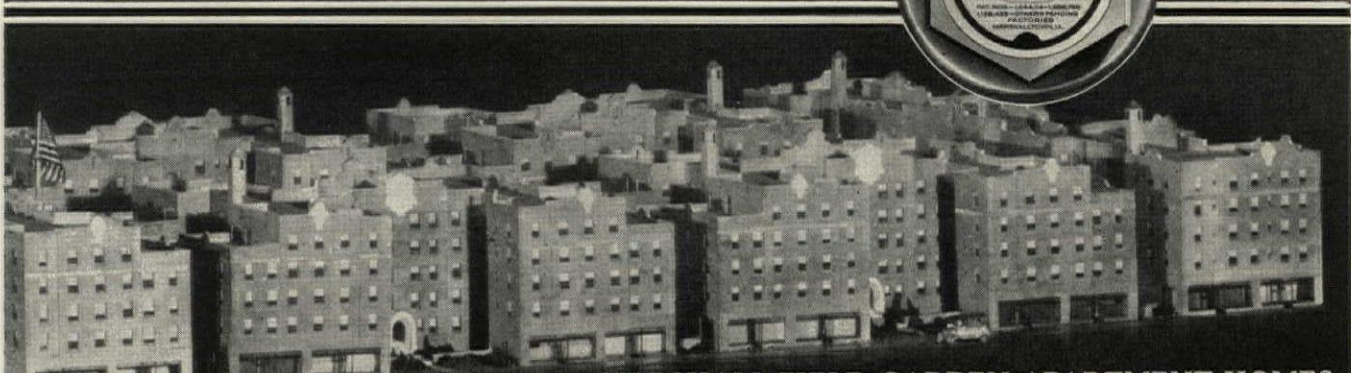
It will not only provide a maximum of healthful, comforting heat, but will effectively prevent the overheating of any room or building, and greatly reduce the ills due to excessively high temperatures, too-dry air which has been robbed of its proper humidity, and chill drafts caused by windows opened to cool off overheated living quarters.

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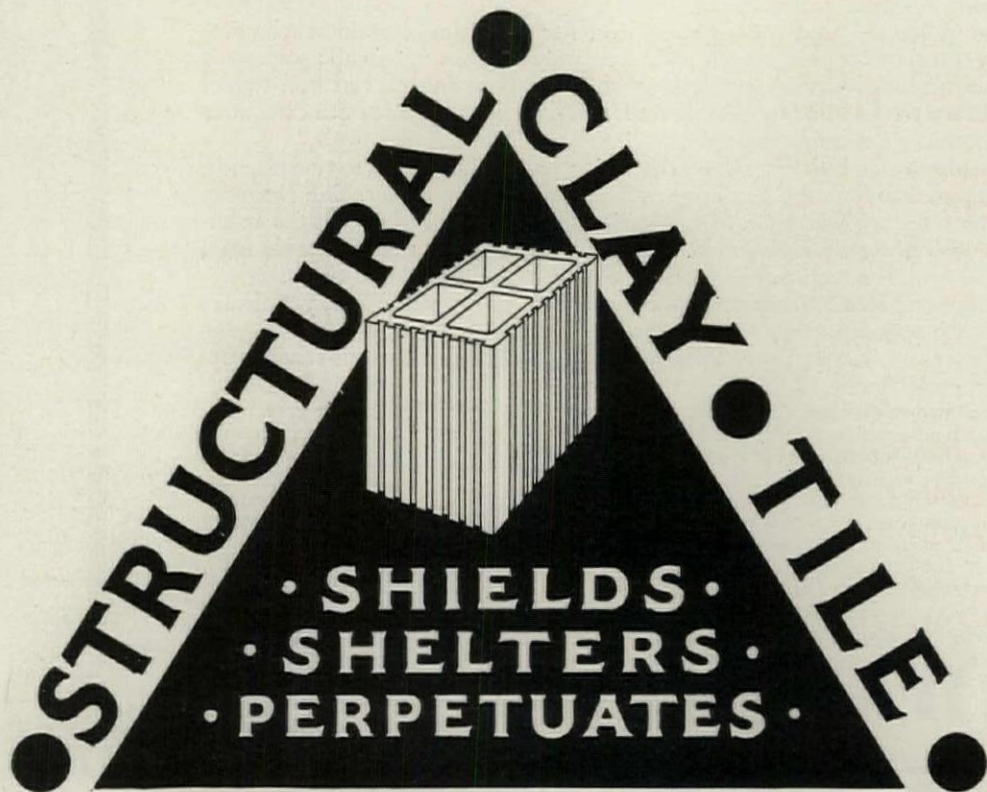
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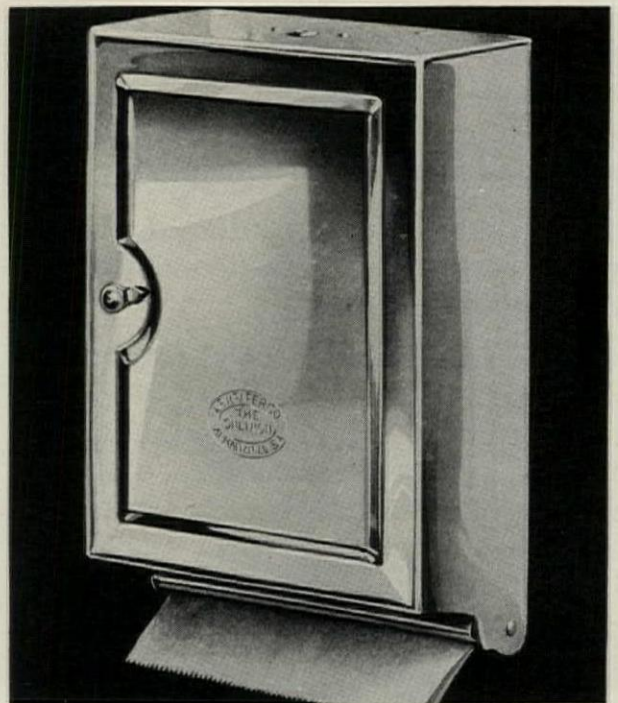
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BOOK DEPARTMENT

THE PRACTICE OF THE DRAFTING ROOM DESCRIBED

A REVIEW BY
CLIFFORD WAYNE SPENCER

THE operations that take place in that part of an architect's premises known as the drafting room are so diversified under the conditions of modern building that the subject of drafting room practice is worthy of much consideration. If one were to attempt to become familiar with all these operations by means of experience gained through working in one organization after another, it would require a lifetime of going about from office to office, and even then much of the knowledge would be out of date, due to use of new methods and to the improved practices which are being introduced.

An excellent textbook and guide on the subject has been compiled by Eugene Clute, former editor of *The Architectural Review* and later of *Pencil Points*, and author of several works on architectural subjects. This book is dedicated to effectiveness in drafting room work and presents a clear and comprehensive view of present-day drafting room practice as it is carried on in the offices of some of the most successful architects of the day. The term "drafting room" is here used in its broader sense and is made to refer to many operations that are not ordinarily carried on within the physical confines of

the drafting room itself. These processes which commonly occur outside but which are here said to come into the work of the drafting room include the making of rough preliminary sketches and *partis* as well as the ascertaining of the governing conditions under which the work is to be done. The text matter in this work is comprehensive and describes in clear, concise terms the various problems that may arise in connection with drafting room practice and the best methods of solving them. This text discussion is made immensely more valuable by the use of illustrations chosen from the best examples of the practical work of many of our best designers, renderers and other workmen,—the type of work for which they are best known.

Although each chapter is treated as a unit complete in itself and may be read and easily understood without reference to the rest of the book, the whole is organized along the lines on which a particular commission would naturally be carried out, from the earliest to the final stage of the work. The methods of procedure and the best ways of ascertaining the requirements and governing factors are first considered, including some hints on

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The editors have been assisted in the preparation of the work by widely known hotel architects and interior decorators and by actual operators of hotels,—practical men, experienced in the management of the "back" as well as the "front" of a hotel. The volume's treatment of hotel furnishing and equipping constitutes the final word on this important subject. There are included views of hotel restaurants, cafeterias, kitchens, pantries, "serving pantries," refrigerating plants and all the departments which are necessary in a modern hotel of any type. *The work is of inestimable value to architects, builders and engineers, as well as to practical hotel men.*

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a most important subject,—that having to do with the financing of the building and doing the work in such a way as to satisfy the requirements of those who will furnish the financial backing. Next we turn to the design features of modern building and consider the preliminary steps, such as the use of documents and the making of sketches and preliminary studies. These chapters are of especial interest, due to the way in which they are illustrated by the work of such men as Otto R. Eggers and Charles Z. Klauder, as well as by some very striking charcoal studies by Schell Lewis. Recently there has been a great increase in the use of scale models as a means of studying the design of a building and submitting it in an easily understood form for the approval of the owner. This being such an important and little understood subject, a comparatively large amount of space is devoted to describing the actual making of such models and their use. One interesting use of these models, which is described and illustrated here, is the use of "composite photographs" made up of photographs of models of proposed buildings so cleverly combined with photographs of the actual site and surroundings that it is impossible to tell which are the present buildings and which are the models. Full-sized models of detail study are also discussed in this chapter on the making and use of models. The chapter on rendered drawings is very complete, especially in illustrations, which include examples in all mediums by such masters as Bertram Grosvenor Goodhue, H. Van Buren Magonigle, Otto R. Eggers, Hugh Ferriss and many others.

The subject of draftsmanship by its very nature can be better presented by illustration than by text, and in this work it is so treated, there being a large number of full-page reproductions of well chosen examples of all classes of drawings that make up the working drawings of a building project. They include all the variations, starting with the preliminary plans and going through to the full-sized detail drawings. The text description, though comparatively brief, brings out some very interesting life studies by H. Fenner Behmer and George Bellows and adds considerably to the volume's value.

Another important subject to be considered by the architect in many instances is that of planning the surrounding planting and landscaping. Although this is often handled by the landscape architect, the architect himself should be familiar with this sort of work in order that he may be competent to cooperate in the matter. The chapter entitled "Topographical Maps" does not confine itself to maps exclusively, but treats of other phases of landscaping as well. The final chapter on "Drafting Room Records" covers a subject of very definite importance to the profitable and efficient operation of an architectural organization. It presents the printed forms that are used in the offices of leading architects, giving many useful suggestions on the proper handling and filing of drawings, and the keeping of necessary records relating to drawings, revisions, issuing of prints, and the time records of the drafting room. To one who is not familiar with the usual procedure in drafting rooms this book will be invaluable, while to the more experienced members of the profession it will serve as a useful and dependable source of information and reference.

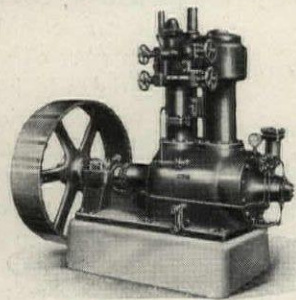
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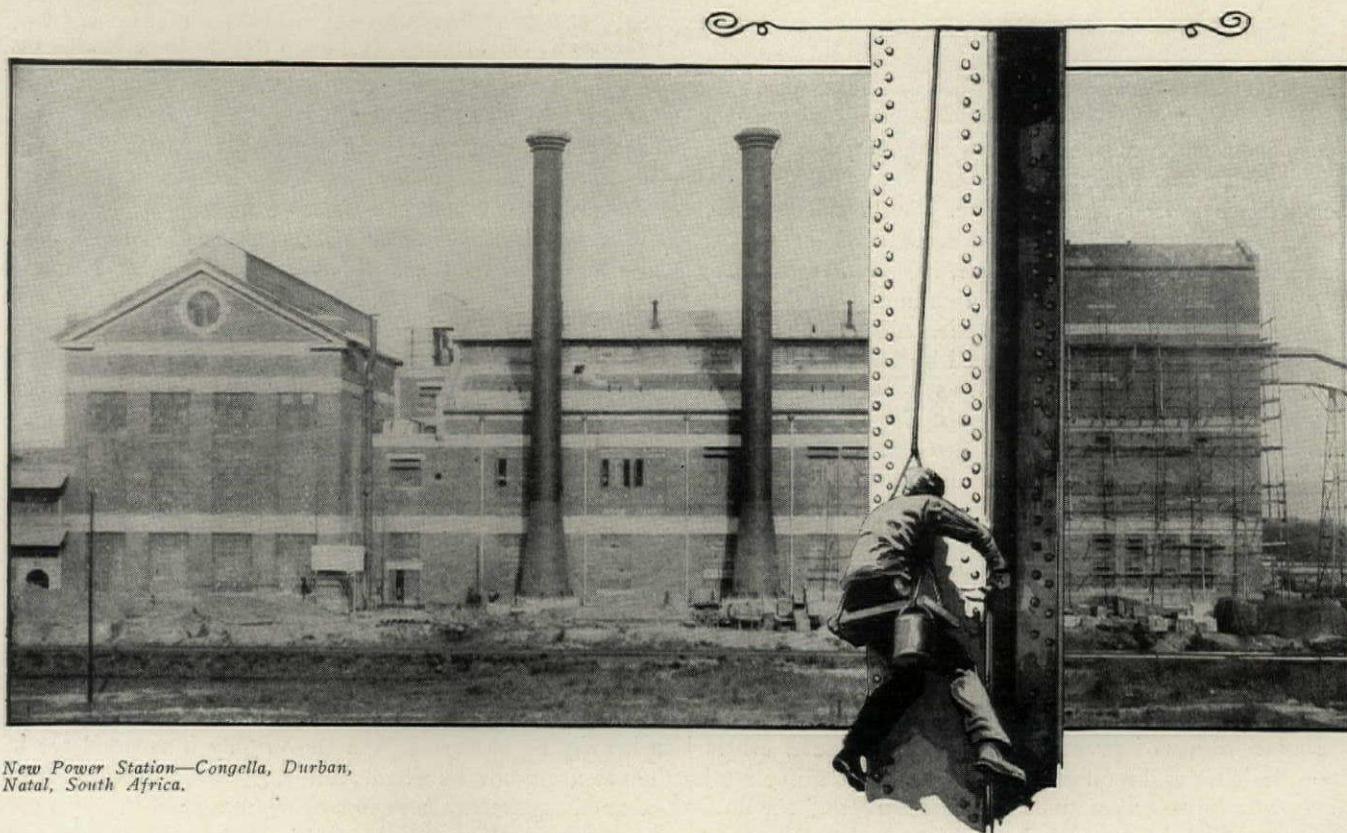
New York

STYLES OF ORNAMENT. By Alexander Speltz. Translated by David O'Connor. 647 pp., 6 x 9 ins. Price \$6. Regan Publishing Corporation, Chicago.

ARCHITECTURE and decoration, as well as manufacturing in countless forms, are dependent upon design to a much greater extent than is generally realized. For this reason there exist many schools of design wherein students are trained to exert their skill in designing not only ornament to be used in connection with architecture and interior decoration but likewise for the use of the weavers of textiles of every sort, for the carvers of wood, the workers of metal in countless forms, for the makers of jewelry and workers in other fields; and there exists what might be regarded as an entirely separate department of the subject as it applies to costume. Wholly apart from the training given in classrooms there are, for the help of students, the masterpieces of the past, for even today after all the wars and other catastrophes which have afflicted the world, there are the records, vast in extent, of what the designers of every age actually wrought. Added to the not inconsiderable remains of what still exists from prehistoric ages, there is the great wealth which was bequeathed to later ages by the classical countries,—Greece and Rome,—and the legacy from later periods becomes bewildering, since every race developed design in ways differing greatly from those which characterized the design of other races. To examine in person even a tiny portion of this rich store,—and notwithstanding the great help afforded by the collections in museums,—would require traveling for years over the greater part of the inhabited globe, and the student must perforce rely for aid upon design available in illustration. For this reason the scholars who study design and who publish works dealing with the subject deserve well at the hands of students present and future.

In his preface to this excellent work, R. Phene Spiers says: "The first German edition of this work was published in 1904 and met with such signal success that its author, Herr Alexander Speltz, was called upon to bring out a second edition two years later. In this edition the number of plates was increased from three to four hundred, which enabled the author to give a more complete representation of ornament as developed in England and America than had been at first contemplated. The original work was undertaken with the object of representing the entire range of ornament in all its different styles from prehistoric times till the middle of the nineteenth century and to illustrate the different uses to which it had been applied. The whole of the illustrations, which were taken from the best authorities on each subject and period, were drawn specially for the work and evince the remarkable industry and knowledge of the author and his artistic power in representing ornament. In fact it is only necessary to glance through the several plates to see how closely the author has caught the style and character of each period. Acknowledgments of the sources are made throughout the work, and in addition a special list of books of reference, including those which have been drawn upon for illustrations, has been inserted at the end of the volume.

"An English edition was published in America in 1906 for sale in that country only, but the historical accounts were not in accordance with the latest research, and many of the descriptions to the plates had suffered so much in translation that very considerable revision was neces-



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sary in preparing the present issue. Three new plates of English Ornament have been added to this edition, taking the place of others which it was found necessary to delete. Various changes have also been made in the headings to some of the chapters and in the terms employed, more particularly in the section devoted to the Renaissance period; for instance, the term 'Barocco,' which, although well known and recognized throughout Germany, is but seldom used here, has been replaced by 'Later Renaissance' which is more familiar to the English student and includes that which used to be known as the pure Italian style introduced by Inigo Jones. The term 'Rococo' has been retained, as it would have been difficult to find any other to suggest the vagaries of the Louis XV style which spread through Italy, France, Spain, Germany and Flanders, and in England led to Chippendale's work; the terms adopted to distinguish the later periods are adhered to as in the original edition.

"The 400 plates in which the several styles of ornament are illustrated contain a larger and much more varied series than in any work hitherto published; indeed the volume forms a veritable encyclopædia of the evolution, development and application of ornament in architecture and the decorative arts throughout the ages, and it should prove of great value to the architect, craftsman, designer and student." The work bears every mark of thoughtful selection and careful editing, and the illustrations, which because of their great number are necessarily of small or at most of moderate size, are sufficiently large to be of value. The volume seems to be destined for a wide circulation among architects and interior decorators and students in many lines of effort.

THE PERIOD FURNITURE HANDBOOK. By Mr. and Mrs. G. Glen Gould. 271 pp. 5 x 7¼ ins. Price \$3. Dodd, Mead & Co.

ON a subject as richly annotated, illustrated, monographed and catalogued as the history of period furniture, it is a relief and a pleasure, particularly for the non-specialist, to discover a concise and to-the-point handbook on the subject. Such a book is "The Period Furniture Handbook," by Mr. and Mrs. G. Glen Gould. The approach of the authors to their subject is made from that calm and sane viewpoint which marks the true student of æsthetic styles,—the true student as opposed to the ardent connoisseur. To quote them, "the critic who knows everything there is to be known about every one of the period styles is not always as wise a guide as one who has that God-given ability to select unerringly what is best in each. There is not a single one of the period styles which has not some excellent examples of furniture design and craftsmanship to its credit. To discredit the Baroque or the Rococo, the Empire or the Victorian in order to exalt the Gothic or the Renaissance is silly. Each has its own value."

This is a volume which, because of its low cost and the comprehensiveness of its subject, will undoubtedly have wide circulation. It should be noted that it is not a heavily or in any sense a thoroughly illustrated work. There are some excellent full-page half-tones, casually selected apparently, and numerous marginal notes in the form of line drawings by George Brettell and Clotilda Embree which the decorator and student will value. Like all the work of these writers the present work bears every mark of careful and discriminating selection. It is a valuable addition to the subject matter on its topic.

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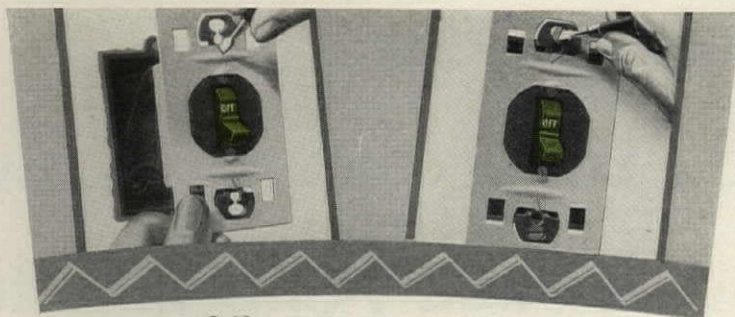
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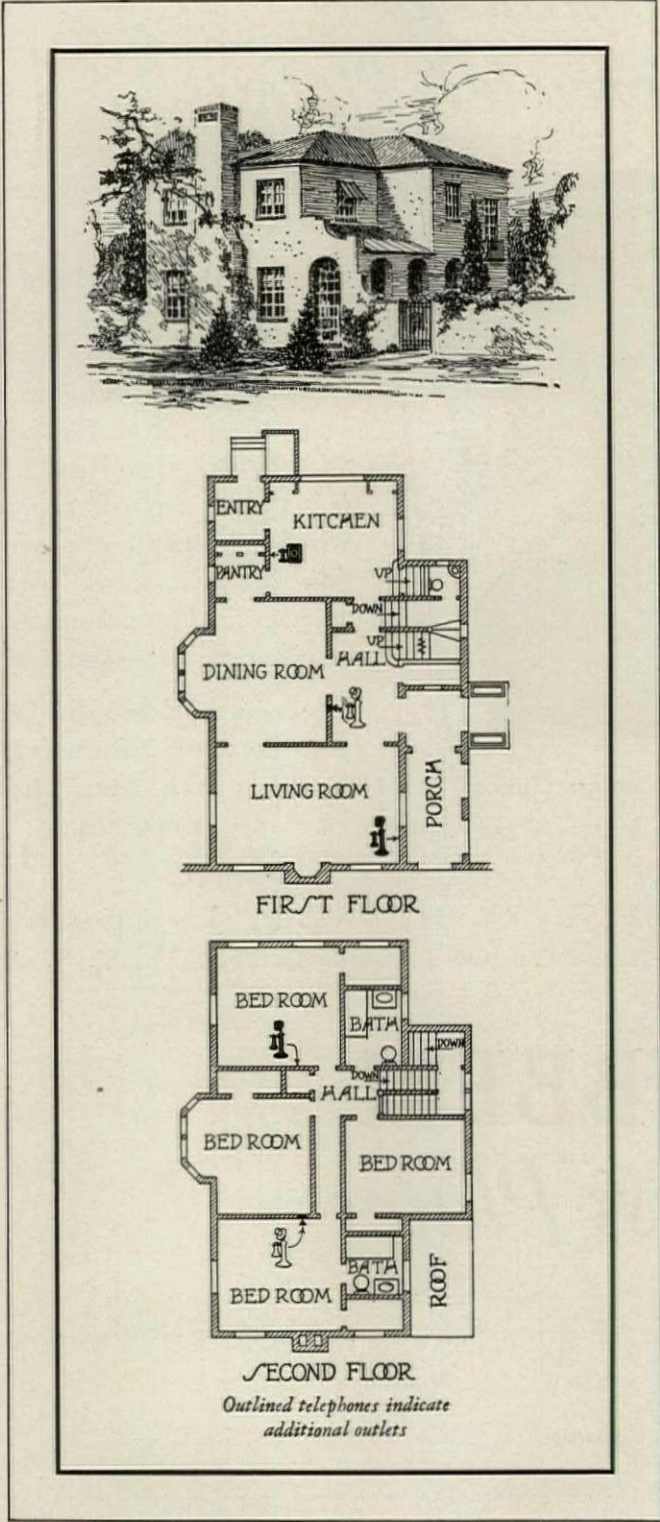
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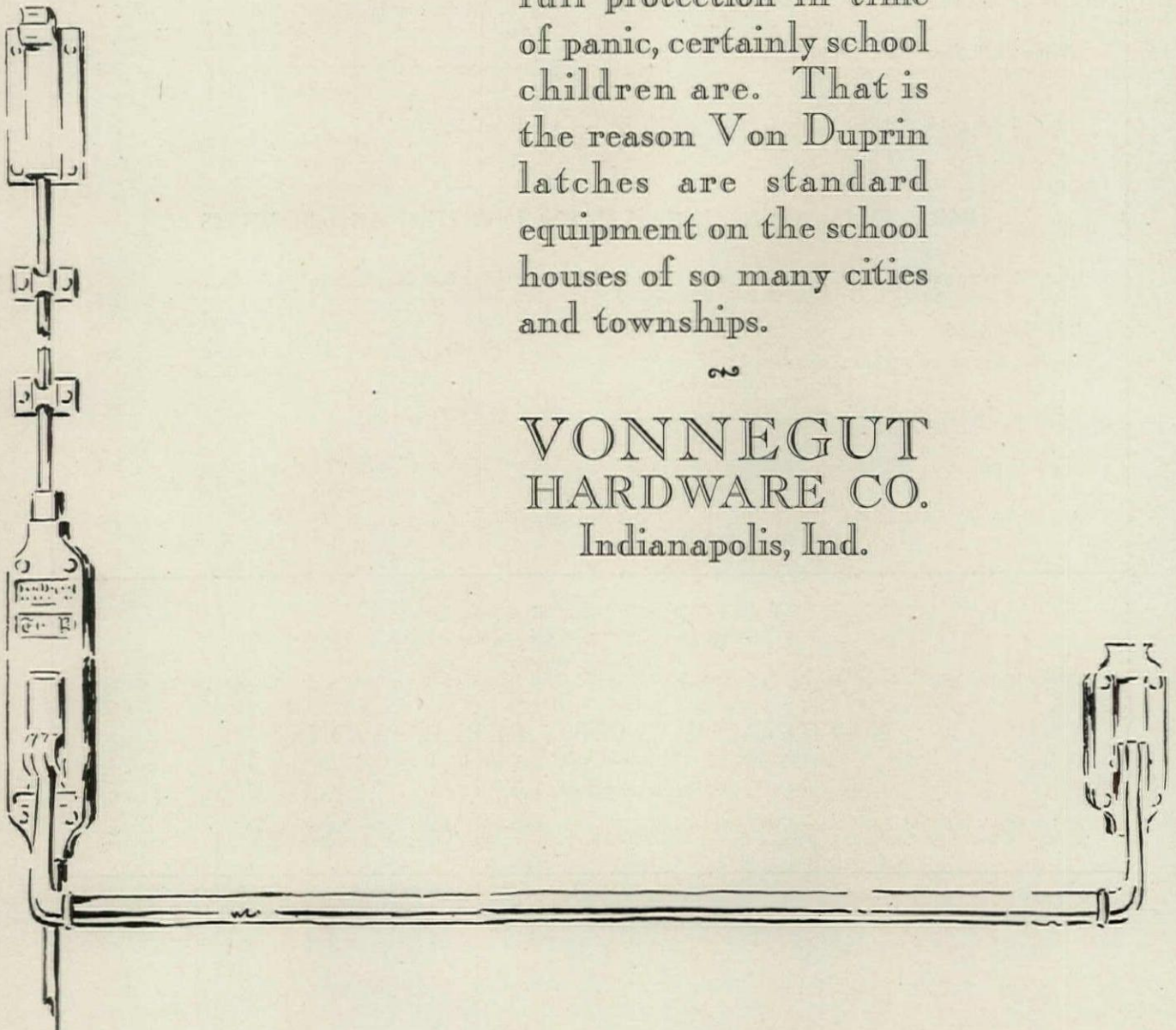
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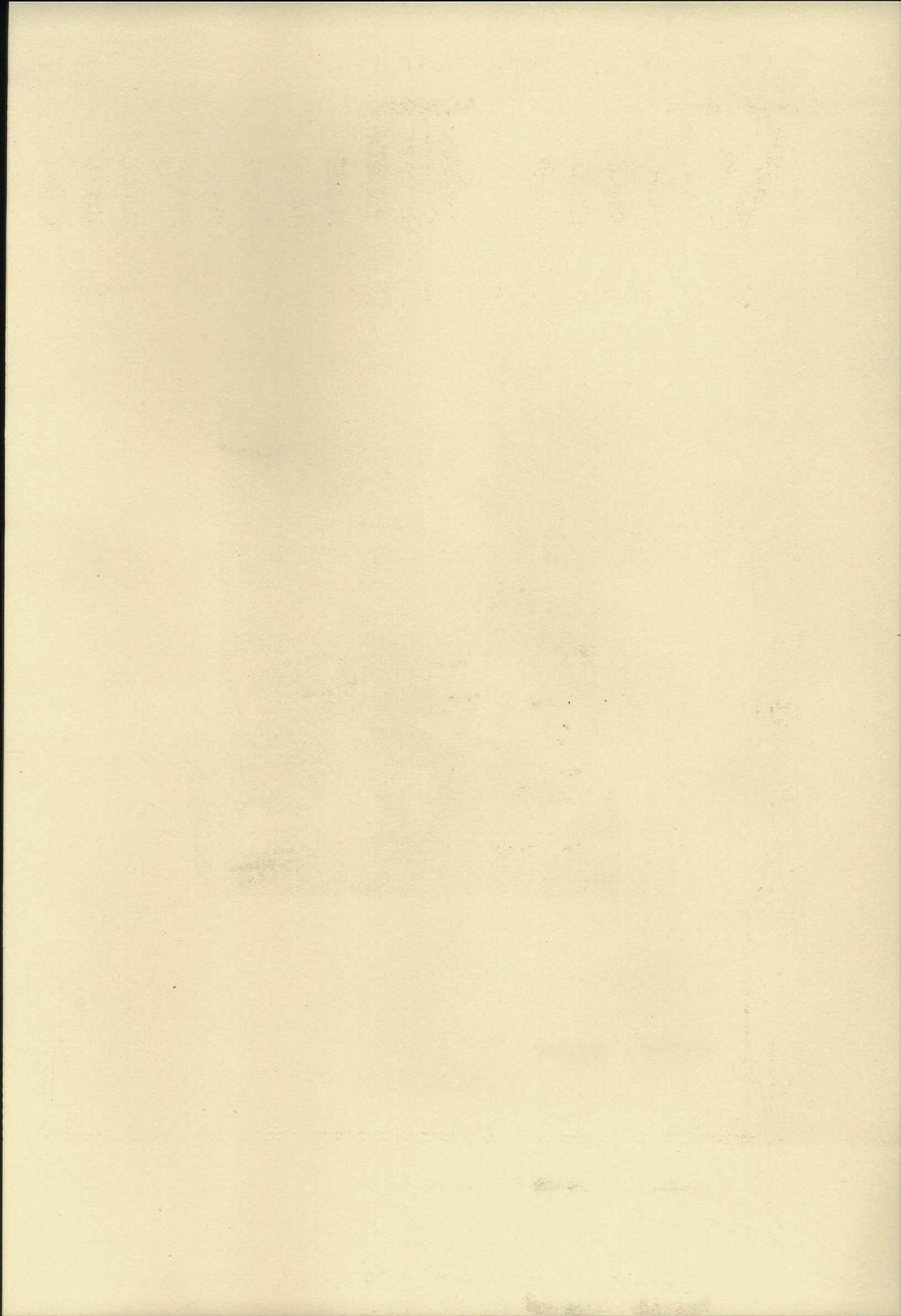
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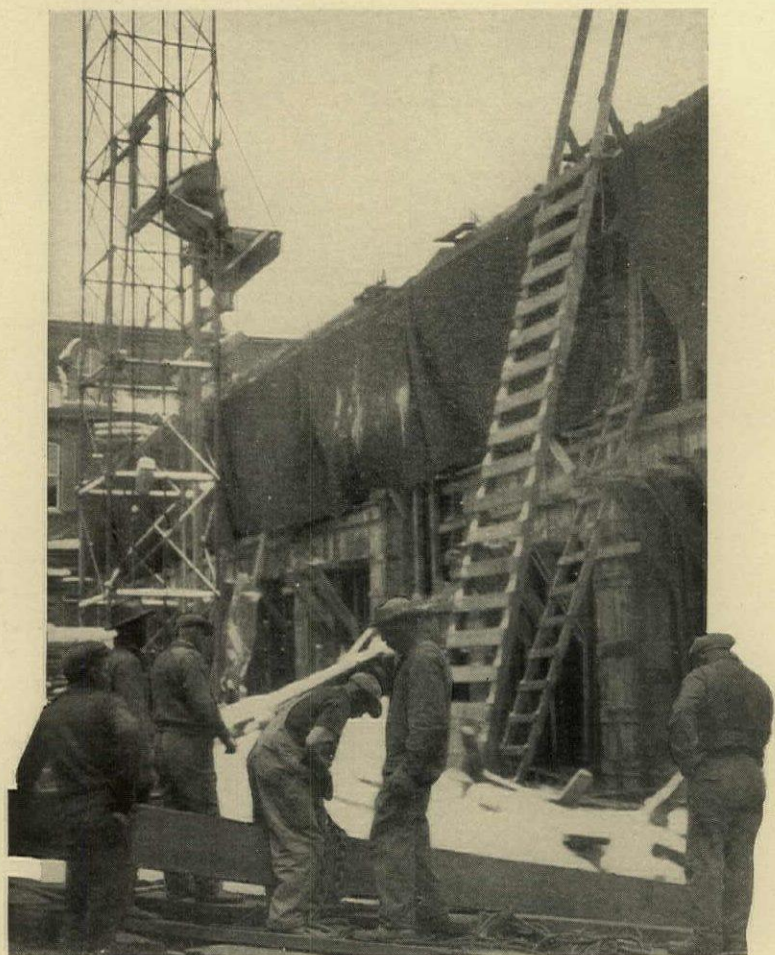
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WINTER CONSTRUCTION

From a Photograph by Leicester K. Davis

The Architectural Forum

THE ARCHITECTURAL FORUM

VOLUME L

FEBRUARY 1929

NUMBER TWO



THE ARCHITECT'S PART IN WINTER CONSTRUCTION

BY

LEICESTER K. DAVIS

UNTIL within recent years the architectural profession has not had to be greatly concerned with the difficulties of winter construction. In the past such things were mostly handled "on the job," and when beyond control, they commanded the situation until activities might be resumed in accordance with the specifications.

When, for example, a February blizzard howled or "the bottom dropped out of the thermometer," contractors and craftsmen grumbled, did what was reasonably within their powers, or "quit cold." Even though graphs of winter progress produced the peaks and valleys of a typhoid fever chart, hardship and setback were accepted as necessary evils of the season. Laborers, skilled workers, and makers of building supplies alike made the best of prolonged periods of idleness and reduced or glutted output. It was a state of affairs that easily might have continued indefinitely had not the coming of present-day building programs demanded that such limitation cease. Year-round, winter-through, construction suddenly became imperative, with progress to be unhindered by so much as a day's lost time. The problem of beating the weather at its game, of carrying on from fall to spring, has brought forth the best in architectural, engineering and financial thought.

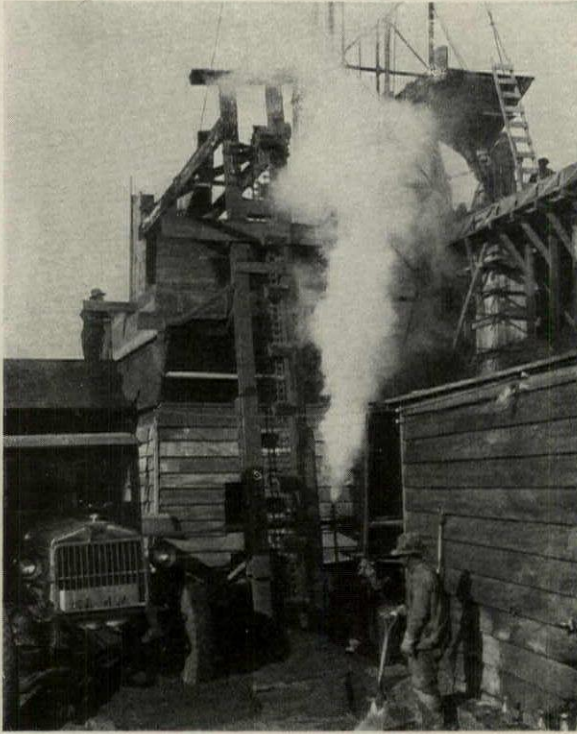
The extent to which he shall play his part in aiding winter construction schedules is something that every architect wishes to have well settled. It may be safely assumed that an architect appreciates the need of being adequately informed and fortified by data concerning all conditions, actual and potential, to be faced in the execution of his designs during the winter period. It is also taken for granted that the facts he obtains shall be complete and authoritative, of the kind prepared for dissemination by building congresses and other coöperative agencies in many of our cities lying within the "frost belt." This material is inval-

uable for use in preliminary conferences with owners and investors, to support the claims that winter work need not be retarded, and that the extra costs of taking precautionary methods are in most cases more than offset by reductions which contractors figure in their estimates at a time of year when there is risk of having to drop skilled craftsmen from the payrolls and pare down inactive organizations.

Experienced architects do not have to be reminded of the things that may follow on the heels of winter unpreparedness. There are the material faults induced by freezing temperatures, snow, ice and sleet. There is the likelihood of there being work that must come down, or be done over, or be partially replaced. There is the interest that must be charged against spoiling material, and costs chargeable to delayed schedules. And, finally, there is the inevitable result of all these things, strain of the relations between the owner, the architect, and the contractor.

Responsibility in Winter Construction

Causes and their effects are not, however, the sole concern of the architect dealing with winter problems. What he desires most is assurance of there being the proper preventives of winter ills and the effectiveness resulting from their employment. How, he asks, can he and his specifications aid best in keeping the winter program unbroken and at high level . . . how far should he and his specifications go? Logically, the question divides itself into several considerations. Theoretically at least, architectural specifications must be complete in their coverage of materials, means, methods, and results. The specifications are most emphatic as to results and the standards by which they are to be judged. But as to exactness in method and procedure, it has been held that such are without the province of strict architectural



Winter Equipment on this Construction Includes Pre-warming Stations. Material is Sifted by Gravity over Perforated Steam Coils which Give it Correct Temperature Before Going to the Mixers

preference and requirement, things with which experienced contractors, and they alone, should deal. And it is this viewpoint, as regards precautionary methods for winter work, that the architect is considering while plotting his position.

Investigation indicates that there is pretty general agreement between architects and contractors on essential points. Summed up they seem to be:

First: All specifications should include clauses obligating employment of the newest and most approved methods designed to insure correct performance under winter conditions surrounding particular phases of work in hand. Even though the construction schedule be planned to avoid winter work, this is a most advisable provision. Any one of several unforeseen delays may carry completion dates into the winter season, a possibility which, no matter how remote, should be prepared for in an adequate manner.

Second: Only contractors of known ability in handling work of the type required by the design should be considered as bidders.

Third: There should be a thorough understanding on the part of the architect or his representative of all problems likely to be encountered by winter construction within the locality where erection is to take place, as well as of methods best



Anti-freezing Compounds and Adequate Cold Weather Precautions Required by the Specifications Permit the Maintenance of High Standards of Craftsmanship and Unchecked Progress

sued to local conditions in meeting the problems.

Fourth: There should be thorough and frequent architectural contacts with all stages of winter construction.

Fifth: There should be complete coördination, particularly on large-sized projects, between the architect or his representative and the contractor, in handling unforeseen exigencies.

Sixth: Separate contractual provisions should be attached to, or made a part of, the general contract, permitting immediate use of whatever temporary or auxiliary apparatus and material may be necessary for the control of winter emergencies.

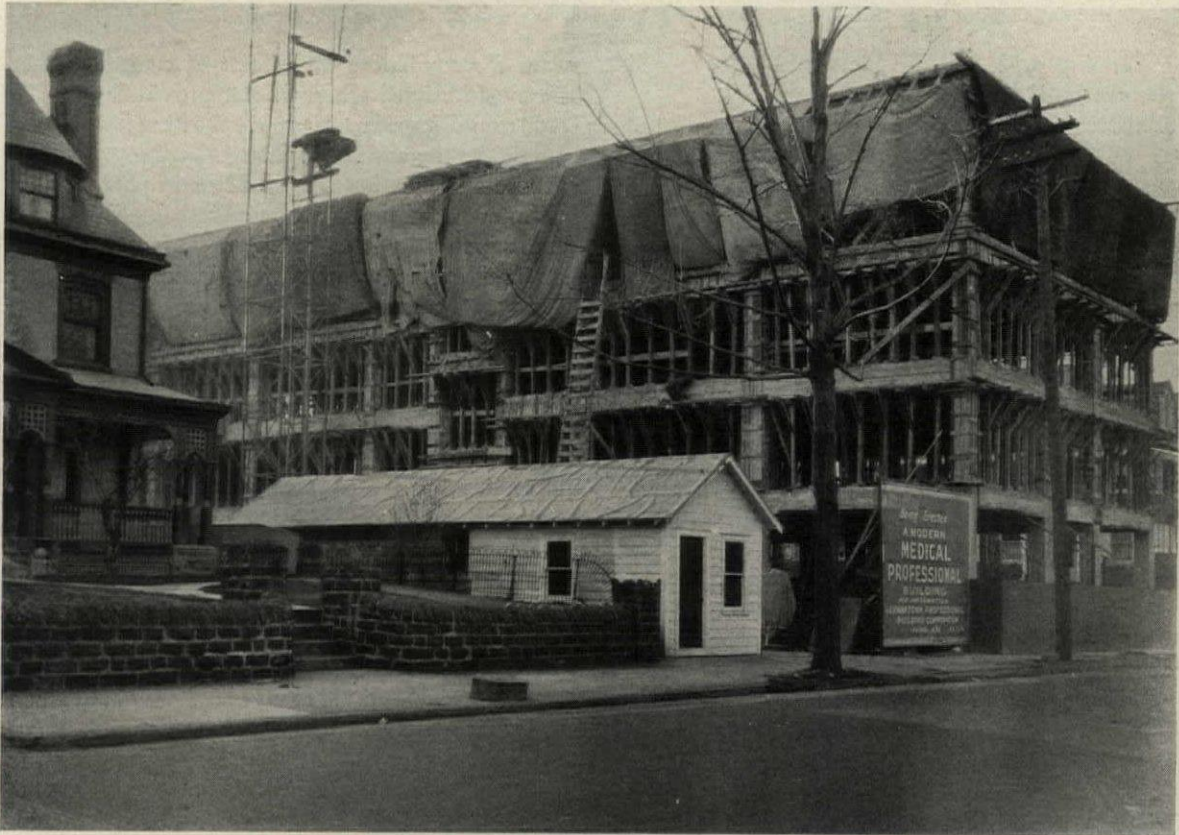
Seventh: Sub-contractors should be informed as to winter conditions likely to be encountered, in order to provide safeguards and figure them within their estimates.

Eighth: Progress reports and conferences should be made requirements of the specifications by special clauses describing their purpose, at what stages of the work they shall be submitted or held, and the type of information they shall present for discussion, approval, or criticism.

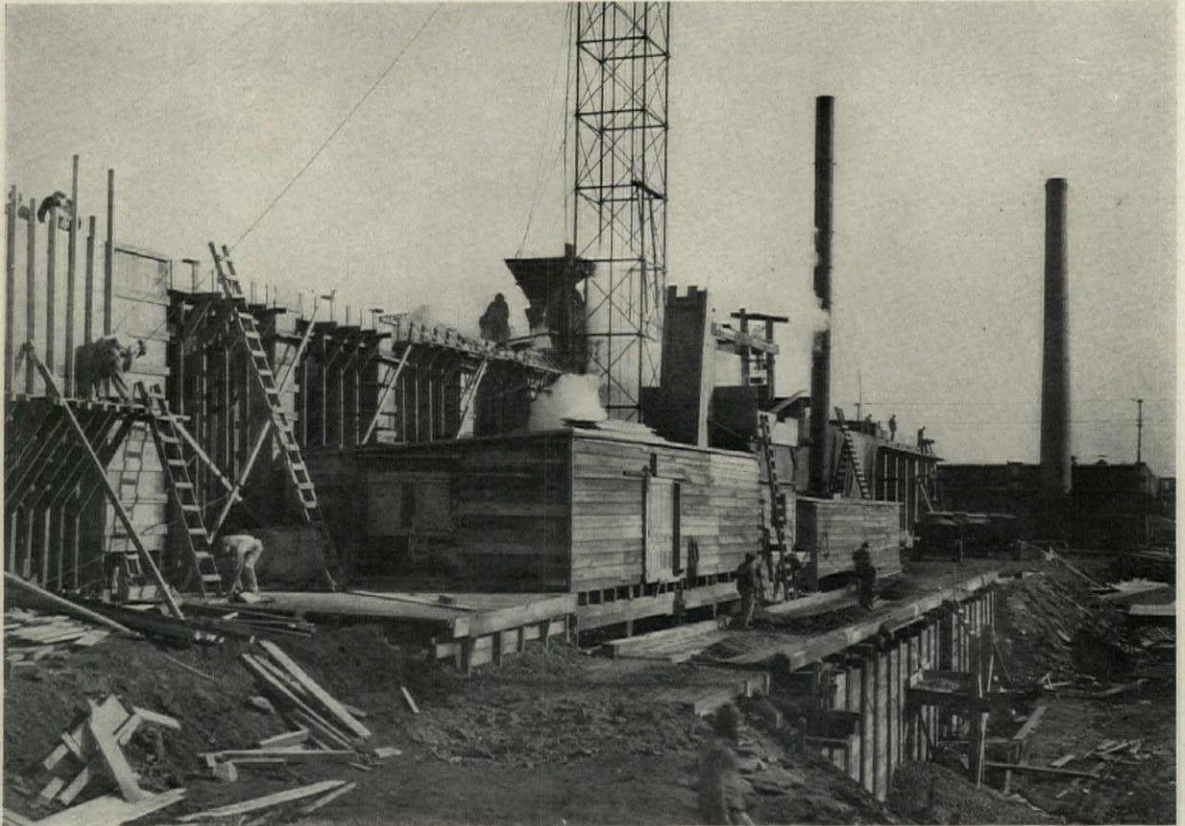
Ninth: There should be effective use of established and current data available through building congresses, associations, and other reliable agencies which act as clearing houses of informa-



Tarpaulin Coverage for Openings and for Freshly Poured Concrete Wall and Floor Forms is Essential Until the "Set of the Mix" Has Passed all Danger from Freezing Temperatures



Behind Tarpaulin Barricades with Correct Temperature Maintained by Salamanders and Emergency Steam Lines, the Workers Inside Carry on Unretarded by Cold or Snow



December Construction Scheduled for May Completion. Material Pre-warming Station, with Form-builders Keeping Ahead of the Mixers. At extreme Right Tarpaulins are Going up on Freshly Poured Forms

tion dealing with specific phases of winter construction under local conditions.

This list would seem to run the gamut of factors essential to successful construction at any time of year, but particularly so during the cold weather portion. Perhaps the architectural profession might amplify it to a set of rules for embodiment in all specifications for construction that must go on through the winter.

Specification Clauses for Winter Work

Regarding actual specification clauses covering methods to be employed on winter work, most architects feel that there should be avoidance of the "ultra-specific." They reason, and quite justly, that these as well as other phases of construction should be capably cared for by any reliable contractor.

A "blanket clause" suggested by Lawrence Vischer Boyd, who has designed for suburban developments in the East many homes that have gone forward to completion during trying winter periods, has worked out satisfactorily. This clause, under the heading, "Winter Work," reads in part: "The contractor shall include in his estimate all facilities, such as appliances, known standard waterproofing, anti-freezing compounds and similar materials, as well as the employment of the latest and most approved methods and

means for combating the effects of cold and other winter conditions, which if not provided nor utilized, would impede the progress of craftsmanship essential to the results stipulated by the provisions of these specifications in whole or in part."

Winter conditions are covered in much the same manner by the Ballinger Company, architects and engineers, of Philadelphia. Under the heading, "Freezing Weather," the specifications read: "Materials used in concrete, brick or stone masonry, plastering or other work subject to freezing, shall be properly heated by approved methods when the temperature is below 33° Fahr. Any work damaged by freezing shall be torn out and replaced at the contractor's expense, and new work shall not be placed in contact with such damaged portions. The proper precautions shall be taken, however, to enable the work to proceed without interruption, if possible." Further, under the heading, "Temporary Heat," the specifications read: "The building contractor shall provide all temporary heat and make all other provision, such as temporary covering for door, window and other openings, which may be required for the performance, completion and protection of his work against cold until the building is completed, all subject to the approval of the architects."

Stating more definitely the precautions which must be observed in the handling of materials



Laborers "Mopping Up" an Overnight Snow Before the Day's Work Starts. Lines of Steam and Shovel and Broom Soon Clear Away an Otherwise Unworkable Area

most likely to be affected by winter temperatures, the body of the same specifications contains a clause headed "Cold Weather," which thus refers to concrete: "Reinforced concrete shall not be laid when the temperature is below 33° Fahr., unless special permission is obtained from the architects. In such cases the concrete ingredients shall be properly heated by suitable means immediately before being mixed. Should the temperature drop below freezing or when the U. S. Weather Bureau predicts such weather, fresh concrete shall be protected above and salamanders or other heat provided below. Canvas shall be placed some distance above the slabs and temporary openings be provided through slabs to allow the heat to circulate. Canvas curtains shall also be hung around the outside of the story concreted to retain the heat, and the temperature of the concrete must be kept above 40° for five days after concreting. Concrete that becomes frozen while fresh, and found to be injured, if it cannot be reclaimed by additional water or otherwise, shall be removed at the contractor's expense. Forms shall be left in place during cold weather until the concrete has obtained a hard, natural set."

So far as the specifications go, the matter of winter protection appears to be adequately settled by clauses such as those just quoted. They definitely require ample protection, and while concen-

trating responsibility where it properly belongs, they leave the contractor free to exercise his judgment, skill and ingenuity. It would be neither fair nor wise for the architect to establish inflexible rules and methods whereby the materials must be kept at correct working temperature or temperature maintained for all kinds of interior work. The contractor of standing is quite alive to the necessity of progressing with speed and efficiency, and is usually fully informed as to the best methods to fall back upon in any cold weather emergency. He does appreciate, however, the coöperation of the architect on these matters when it is given from a thoroughly practical and structural point of view.

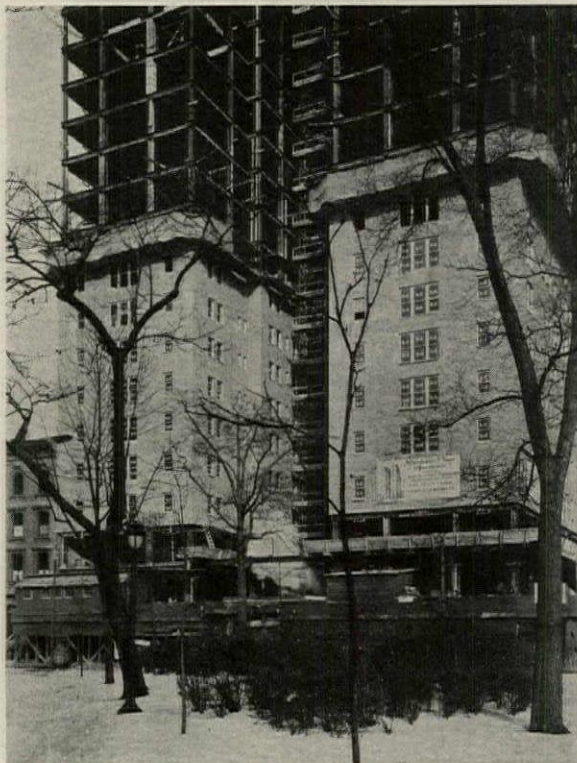
Costs of Winter Construction

Provisions for extra winter costs and their distribution should be discussed frankly and completely, and be settled to the satisfaction of all concerned by agreement, before the need for expenditure arises. Architects whose practice is carried on in cold-weather latitudes know how great are the variables in additions and offsets of this character. It would require supernatural skill to incorporate them in an estimate on the basis of accurate forecasts, but an average can be struck that permits a safe approximate to be figured for contingencies.

It would seem best that this should be cared for by separate contractual instruments or clauses of the contract, so worded that the contractor may feel free to exercise his discretion in the utilization of ways and means required by unforeseen conditions. No matter how great may be his reliance on a contractor, the present-day architect is coming more and more to realize the importance of thorough familiarity upon his part with those details of construction that are most affected by winter influence. While not attempting to enter too far within the sphere of purely structural activities, he has found it well to be more than passingly conversant with the solution of numerous winter problems. Increasing understanding of these things is contributing the coöperation and coördination which few contractors and their crafts fail to appreciate.

Supervision of Winter Construction

Architectural field activities in the year-round building of today call for more than checking the details of design or superintendence that merely sees that the specifications are adhered to. Whether the plans require only occasional visits to the scene of operations, or are those for which the construction superintendent's office also becomes an architectural field headquarters with a clerk-of-the-works or architectural supervisor following



Simple Forms of Temperature Control Suffice for Open Steel Work. Tarpaulins and Scaffold Salamanders Protect and Warm Exterior Bricklayers, but Inside there Must be Steam Lines and Portable Radiators for Plastering, Tile and Marble Setting, and Other Types of Interior Work

the progress of workers in a score of complicated crafts, the viewpoint of the architect should be closely akin to that of the men who produce the finished structure.

But a few days before this article was written, I visited an enormous piece of winter erection which by this May will probably be housing the equipment and personnel of a nationally known concern whose factory capacity and area must keep pace with tremendously increasing production. Stretching away on all sides, over acres and acres which a couple of months before were without a trace of building, and already at second-floor level, was developing one of the great architectural-structural creations of the present century. I was taken on a tour of inspection by the supervisor detailed to the work and the superintendent of the firm of contractors constructing this enduring expression of masterful design. Behind them I went into every part of that unbelievably complex thing of rivet-spating steel and snarling concrete mixers sending slushing cargoes to millions of feet of wall and floor and column forms. I watched hundreds of men, division upon division of craftsmen and laborers, working in perfect coördination and control,—carpenters, bricklayers, masons, equipment men, drivers of an unending stream of motor trucks delivering the tonnage upon which this giant fed and was growing so swiftly to maturity.

Progress,—unbroken, hitch-free, smoothly flowing construction everywhere! Above us, to the right, the left, and below, great tarpaulins flapped and strained across openings and surfaces which could be affected by the biting winter wind. Strategically placed salamanders glowed from within. Clouds of steam plumed the boiler sheds from which there radiated a web of temporary lines carrying required temperature control. "Weather Bureau report just in," said the construction superintendent, shoving up the sheepskin collar of his coat, "says it'll be hitting the low spots for a record cold snap,—29 this noon."

Their aides came and went,—assistant division superintendents, field engineers, foremen,—checking in, reporting, taking fresh orders, each with a definite responsibility and part to play. It was inspiring and made me realize just how definitely architecture has got down to brass tacks in standing shoulder to shoulder with the constructors in eliminating winter delays.

By playing a more coöperative part in aiding year-round structural progress, the designer is getting just far enough away from the ordered atmosphere and environment of his drafting room and conference chamber. His is a closer-knit alliance with the active elements of modern building. And, as a result, there are passing the restraint and reserve that have marked the craftsman's attitude toward architectural relations.

PAINT ON CONCRETE SURFACES

BY

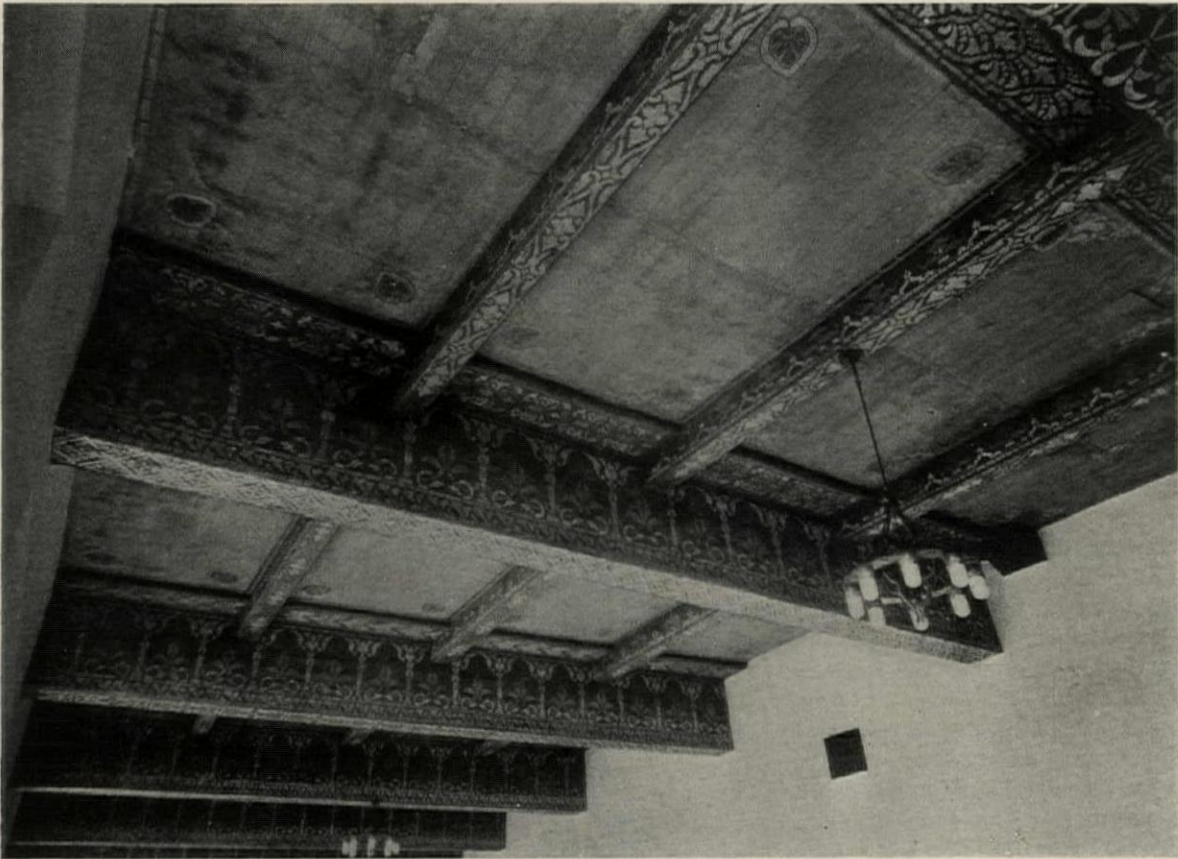
E. L. CALDWELL AND JAMES E. FOSTER

THE present-day tendency in architecture is toward making structure and decoration an organic whole. The modernists insist that there is a certain vigorous beauty in any design that is structurally sound. They point to the beauty of the Brooklyn Bridge, which is, from beginning to end, the work of engineers. While their more conservative colleagues will not follow this reasoning to its logical conclusion, they admit that structure and the decoration can be successfully fused without making a sacrifice of the traditional principles of good architecture. In architecture, at least, the modernist and the fundamentalist can meet on a common ground.

Reinforced concrete construction has adapted itself to this tendency. The reasons are obvious. The structural members require no treatment to make them firesafe. They are in themselves self-sufficient. Why, then, should interior members be covered? The texture of concrete has a distinct rugged beauty. Its somber gray, however, is not in harmony with the present demand for color,

—a demand that has extended to alarm clocks, to typewriters, to kitchen ranges, and even to refrigerators. The cry for color is being met by the application of paint and stains to concrete surfaces. This method of treatment has been used under many varying conditions and is definitely past the experimental era. A practical technique for applying paints to such surfaces has been in use for several years, and if it is followed by competent craftsmen, a pleasing and permanent effect will be produced.

Two major classes of paints are used on concrete,—oil and water paints. Oil paints may be further divided into lead and oil paints and cement and oil paints. A lead and oil paint is based upon the principle of grinding a pigment such as white lead in a vehicle such as linseed oil. These two materials,—white lead and linseed oil,—are the bases of most oil paints, irrespective of color. While pigments besides white lead are frequently employed, this material is usually present. In general it may be said that lead and oil paints in-



Detail of Monolithic Concrete Ceiling and Panels Decorated with Paint. The Form Marks Are Distinctly Visible and Form a Part of the Design



Intricate Stenciling has been Used Effectively on the Monolithic Concrete in the Los Angeles Public Library
Bertram Grosvenor Goodhue and Carleton Monroe Winslow, Associated, Architects

clude flat finish paints for interior decoration, mill whites, floor paints, and general purpose paints. Cement and oil paints are made by grinding Portland cement and other pigments in an oil vehicle. The vehicle is usually linseed oil or a mixture of linseed oil with Chinawood oils. White Portland cement is generally used for whites and light shades, and gray Portland cement is employed when the darker shades are produced. These paints dry to a hard, flat finish that may be rough to the touch.

The application of oil paints on concrete should not be started until the entire surface is thoroughly dry. From eight to ten weeks should elapse between the completion of the moist curing period and the painting. This time will ordinarily be taken up by the common cycles of construction. If there is any doubt at the end of this time as to the dryness of the concrete, sprinkle water from a wet brush over different sections of the surface. If this water is readily absorbed, the surface may be considered dry enough to serve as a satisfactory base for the paint. After new cement surfaces have dried sufficiently, a solution consisting of two or three pounds of zinc sulphate crystals mixed in a gallon of water is applied to the entire area. This treatment is used

as a precaution against saponification of oil paints on fresh cement surfaces, which injures them.

The zinc sulphate solution is allowed to dry for at least 48 hours. At the end of this period all protruding crystals are brushed off, and the surface is ready for priming. When lead and oil paints are used, the surface is given a binding and suction-killing treatment. This consists of one or more coats of oil or varnish carrying some pigment. This binder can be made to the formula:

Oil paint	4 parts
Chinawood oil spar varnish	2 parts
Oil, turpentine, or some similar thinner	1 part

Chinawood oil is specified because it is more resistant to alkali than is linseed oil. Several manufacturers market special Chinawood oil priming paints for use on concrete.

This treatment is to kill the suction and is applied to both old and new concrete surfaces, and follows use of the zinc sulphate wash which is used on new concrete. When the binding and suction coats have become dry, the finish coat is applied to the surface. This is usually a stain made of boiled linseed and Chinawood oils, thinned with turpentine or naphtha, and colored with mineral pigments. Exterior lead and oil



The Concrete Ribbed Ceiling in Al Malaikah Temple, Los Angeles, is Effectively Painted
John C. Austin, Architect

paints may, however, be used, since they dry to elastic, water-resisting films, which fill up the pores of the surface. Flat, egg shell, and gloss interior oil paints, as well as finishing lacquer may also be applied, choice depending on circumstances.

From the standpoint of beauty, probably the best work has been done by staining the entire surface and then applying brilliantly colored paints to small areas by means of stencils. When this treatment is employed, the texture of the concrete in the stained area becomes an integral part of the decoration. When this technique is employed, the stenciled decorations are applied after the paints have dried. Various combinations of white lead, lithopone, zinc oxide, titanium oxide and inert pigments mixed with either linseed oil or heavy bodied enamel liquids have been used successfully for this work.

When stains are being applied, an elastic technique can be developed by using thin stains of low color value. Light areas can be built up to dark by the application of several coats. Ragging, smearing, and other reliefs from a solid surface can be secured. For any given color the number of coats will control the density. The final coat may be clear varnish, shellac, or lacquer, provided that it is applied after the underlying films have thoroughly dried. This is of course quite necessary.

Concrete floors can be finished with lead and oil paints containing abrasion-resisting pigments. Most manufacturers produce paints for this type of work. Their successful use depends upon application to a dry floor slab. The films they produce will give good service if the traffic is moderate and evenly distributed. Trucking, the dragging of heavy boxes, and the shuffling of feet are destructive of floor paints. If a floor will be subjected to such abrasive action, color should be provided by using mineral coloring pigments in the floor topping. General rules cannot be given for the application of cement and oil paints, since each manufacturer prepares directions applicable to his own product. As these directions vary somewhat, the technique of application is not uniform. The surface should, however, be prepared in the manner described for oil paints. Cement and water paints are made by mixing a dry powder, consisting of Portland cement and other pigments, with water. This mixing is done on the site. These paints usually dry to a flat finish. The concrete surface is wet down with water before the paint is applied. As the cement in these paints ought to be hydrated, they should be allowed to dry slowly.

The method of application is dependent upon the brand being used. For this reason, the manufacturer's directions should be closely followed.

As there are several techniques whereby paint can be applied to concrete surfaces, the architect of today can produce distinct effects by decorating exposed structural members. The architect who regards modern design as a significant matter and the architect who is wedded to traditional forms can make the exposed members of their structures form inherent parts of their decorative

schemes without compromising their professional principles. The elasticity with which paint may be applied to concrete offers new opportunities for artistic treatment. The fact that the various techniques are in accord with sound construction principles assures the architect that he can specify this method of treatment with certainty that the resulting finishes will be permanent in character.



Painted Concrete Ceiling Beams Give This Reading Room Its Distinctive Character

SCHOOL CONSTRUCTION AND MODERN EDUCATION

BY

J. CAYCE MORRISON

ASSISTANT COMMISSIONER FOR ELEMENTARY EDUCATION, STATE OF NEW YORK

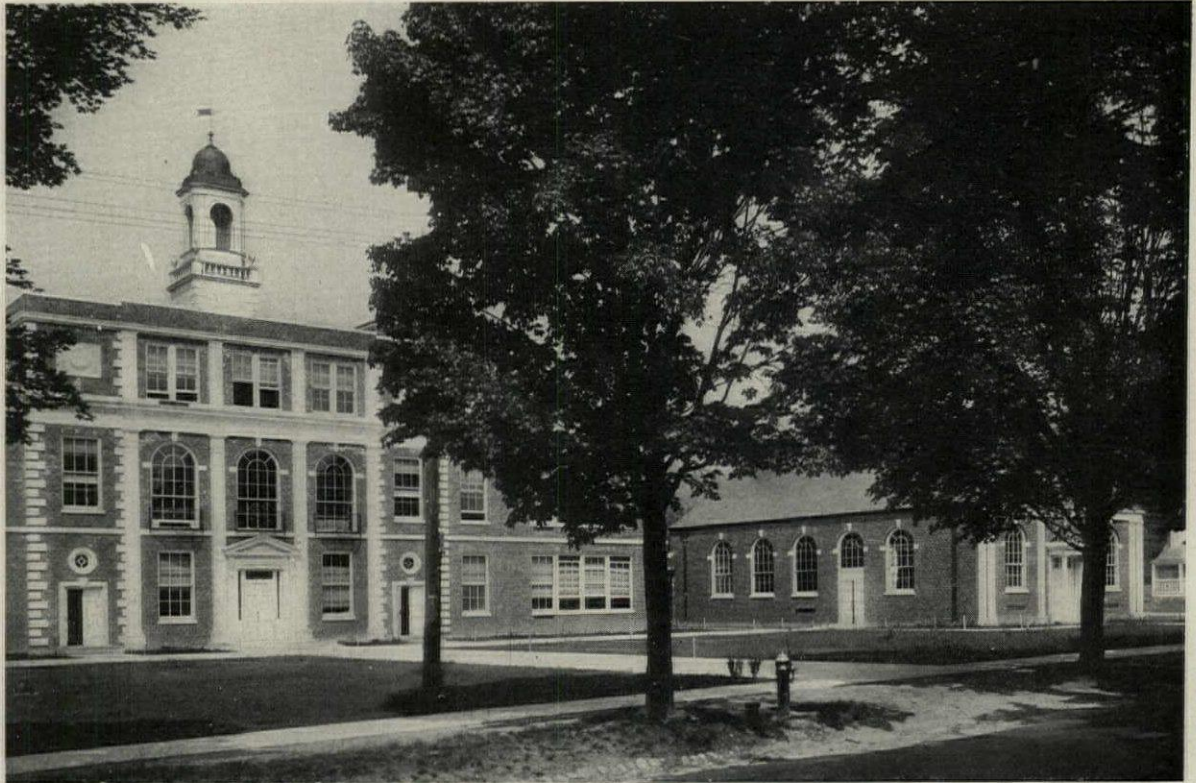
BEFORE me is the west wing of a beautiful building devoted to the preparation of teachers for the public schools. It stands four stories, on broad grounds, overlooking a magnificent cluster of forest trees, facing the setting sun. As one looks toward it from the distance, one takes in simple vertical lines—an effect secured in large measure by windows, arranged in rows, alternating groups and single windows—from basement to roof. Outwardly, the effect is all the most critical artist could ask. Entering, one walks down the corridor past the open doors of six executive offices. These offices measured in floor area are approximately the same size; each is to accommodate three professors. Alternately, they have one single window, then a bank of three windows, a single window, again three, and so on. Half these office rooms are flooded with light, cheery even on relatively dark days; half are dark and dreary. The man who draws the strategic position next to the window fares reasonably well; the other two are doomed to strain their eyes in comparative twilight on bright days and to resort to electric light the remaining time. For what purpose, windows? To serve as exterior ornamentation or to supply light to those who work inside? This one incident, typically legion, illustrates the great conflict going on between the older school of architecture, which looked only to outward design, and the new which dictates that all architectural detail shall be subordinate to purposes the building serves.

Not so many years ago, a school building was an aggregate of classrooms, a collection under one roof of a number of one-teacher schools. A world war drove home to the public consciousness the value of physical training as a means of education. Physical education requires a gymnasium. Boys and girls need different exercises. Therefore, two gymnasiums in large schools, and one in every school. Gradually, there evolves a philosophy of education, which formulates the doctrine that to properly prepare children for citizenship they should have 12 years' practice in the exercising of citizenship. But practice in citizenship requires a public forum—therefore, the auditorium. The "little theater" idea grows. "The play's the thing." Why not teach the drama through developing the dramatic instincts inherent in children? The auditorium becomes a little theater, and lends itself as readily as would the Metropolitan to the budding musicians and artists of the school population,—to genius developing.

Here and there, ever more frequently, from the voice of the people comes the thought that music and painting—the fine arts—constitute a part of the fundamental need in the training of children, quite as much as do the three R's of the olden times. And so the architect must find a way to include a studio that will inspire children to strive for the artistic; and a music room that will have its orchestra pit, its stage, its separate exit, its comfortable provisions for a small audience—yet be soundproofed from the remainder of a building. A generous community authorizes its authorities to add swimming to the school curriculum. Where shall the architect place the pool—in the basement as a companion piece to coal bins and ash scuttles, or in a wing under a skylight, with borders of ferns and palms, with theater chairs for the spectators, where an hour in the pool becomes a joy and delight, where swimming adds to grace and muscle and becomes an exhilarating experience in a dignified setting? The teachers of household arts demonstrate the necessity for a laboratory. Their laboratory is a home—at least an apartment. Can the architect build an apartment that would kindle the eyes of a bride yet build it in a public school building? Many architects have tried; few have succeeded.

The public school must serve those who will labor with their hands as well as those who will work with their brains. Carpentry, plumbing, electric wiring, blacksmithing, automobile repairing, and a score of other trades must be provided for in the instructional program of the school. It is a long cry from the aggregate of classrooms constituting the old school to the new building that includes shops for these various trades. What kind of an arrangement of space and light will best serve the interests of the commercial department? Is there to be a history room? A geography room? A mathematics room? An English room? A Latin room, and so on? Each has its own special needs, requiring a special adaptation of all the elements out of which architects weave their magical effects.

Without carrying this analysis further, it is evident that the men and women who are using public school buildings have found an articulate voice, and that architects must plan their work primarily in terms of the services the several parts of the building are to render, and that only after this end is attained may they consider the outward architectural effect. Nor is the matter as easy as even the foregoing would imply. Our

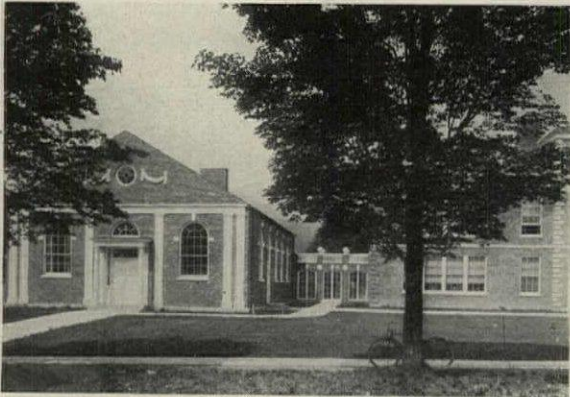


There is Educational Value in Good Design and Construction of Schools
Main Building and Auditorium Wing, Public School, Lake George, N. Y.
Edward S. Hewitt, Architect

conceptions of the services the school should render have undergone tremendous changes during the past 25 years. Schools erected near the close of the last century are now hopelessly out of date. Our new buildings of fireproof construction should be good for a half-century, at least. But who is wise enough to foresee all the uses that any community may want to make of its buildings 50 years or even 25 years hence? The room planned for biology now may be needed a year later for a school clinic, and the household arts laboratory apartment may take to itself the more prosaic function of recitation rooms. Even the

wings devoted to the ordinary classroom service of our elementary schools at the present time may a decade later be transformed into the special laboratory rooms of a new type of elementary school organization that throws into the discard our varied compartment type courses of study. We want our architects to give us flexibility. Partitions will come out, new partitions will go in, yet ventilation, light, exits and a dozen other details must fit the new arrangement.

A word further concerning the adaptation of school buildings to the hygienic, sanitary welfare of those who work in them. I accept a position in a great educational organization. I am assigned to a small office with a double window at one end, overshadowed by a monstrous building designed for religious worship. Three assistants share this office with me. Except on rare summer days the light from the window is insufficient. An electric light from overhead makes possible the accurate statistical work we are to do, cross lights on the paper, the glare of an electric light from improper fixtures. More trade for the oculist. As good a pair of eyes as man was ever given crippled for life. In thousands of American private and public school classrooms the same sin is being committed against little children who have not the right nor the understanding to protest, and this goes on continually.



Gymnasium Wing of the Public School,
Lake George, N. Y.



Rooms such as this Library and Study Hall exert an Influence of Themselves
Edward Lee McClain High School, Greenfield, O.
William B. Ittner, Architect

We have not yet solved all the questions of ventilation. Shall warm air enter on the level of or above children's heads, which should be relatively cool, or at their feet which should be relatively warm? Shall toilets be placed in comparatively dark, inaccessible corners of the basement, or shall they be so located as to derive all the natural sanitary benefits obtainable from the sun's rays? To be sure most of these questions of adaptation to hygienic and sanitary needs are answered in the Strayer-Engelhardt Score Cards for Elementary and High School Buildings—detailed specifications, built up over a period of years with the assistance of the best minds in the engineering and architectural professions. The tragedy is that throughout this country school buildings are being erected under the supervision of architects who make no effort to know or understand these issues and the remedies that are available.

But to plan a building that meets the best known tests as to hygiene and sanitation, that serves adequately all the educational functions to be carried on within its walls, and that is flexible enough for adjustment to all reasonable variations in school procedure—even the attainment of these ideals is not enough. The demand for standard classrooms, for adequate lighting, for economy of construction has brought about a

type of school architecture that readily lends itself to the criticism that it is factory-like, that it is a living expression of the spirit of people who think only in terms of unit production, and have no higher thought than the black smoke which is being poured from a factory furnace.

We have gone a long way toward attaining efficiency in plan, economy in construction. Can we attain beauty without extravagance? I have in mind two school buildings, designed to accommodate approximately the same number of pupils, opened for use during the past year, both dedicated within the present month. One is plain,



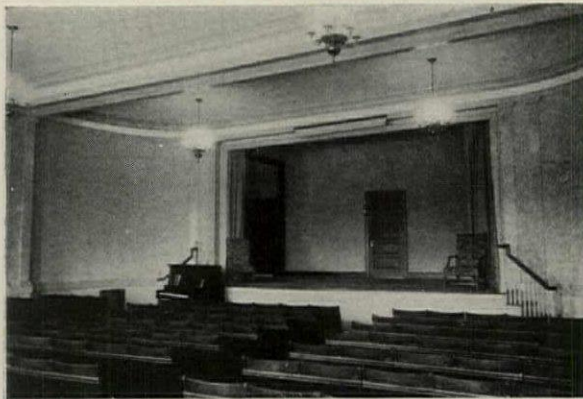
Swimming Pool of the McClain High School,
Greenfield, O.



Public School Building at Beaver Falls, N. Y.
Franklin P. Hammond, Architect

stern, forbidding, lacking in every quality which appeals to the eye appreciative of the beautiful in architecture. The other is simple in design, soft, mellow, with a touch of the Colonial, pleasing to the eye, inviting to the wayfarer who would seek a quiet place for repose. The first cost more than \$200,000, the latter less than \$100,000. Why the difference? I think the chief element in the difference was the architect. Another question! Which will prove the best educative influence in the lives of the generation of children that will pass through its portals?

I sat late one afternoon in the library room,—



Assembly Room of the Public School at
Beaver Falls, N. Y.

the most beautiful schoolroom I have ever seen,— with the principal and superintendent of the Edward Lee McClain High School, Greenfield, O. At one end was a beautiful mural depicting the harvest season of America, at the other was an equally attractive mural of the immigrant coming to America. Here and there were paintings and statuary. The tables were of oak in simple design. The chairs were Windsors. I noted the ferns with long hanging fronds against the paneled walls, and windows that furnished ample light yet melted into the general effect. The principal was saying, "We have been in this building eleven years, and last month we erased the first pencil mark. A new boy who had just come to us wrote his initials on an inkwell. He had been here only a week and had not yet caught the spirit of this school." And the superintendent added, "We are proud of that record," and, a little later: "We know here that this type of school building and furnishings has an educative influence on the minds of children."

I go before one school assembly. Dust-covered physical apparatus is in evidence. The odors of a poorly ventilated gymnasium are obvious. The walls are spotted from the prints of the basket ball and are lined with pencil marks. What impressions will these children take home? I go to another assembly. The walls are tinted a light

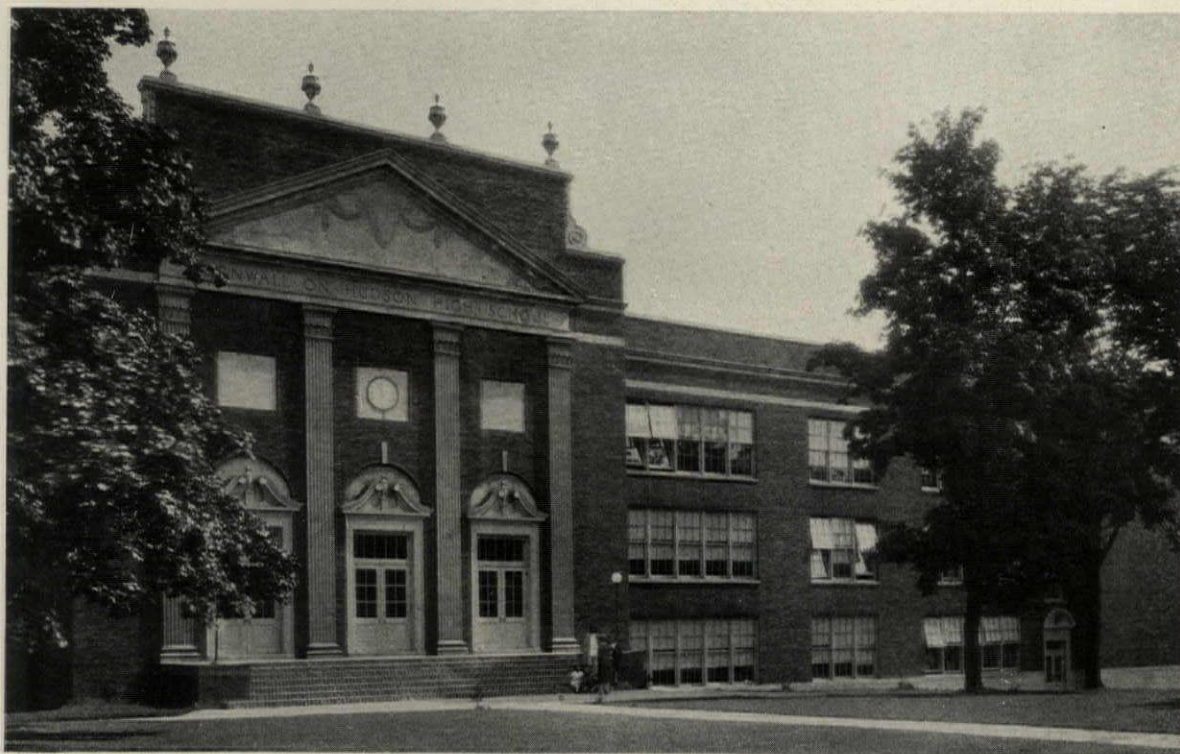


Photo. Richard Southall Grant

High School Building at Cornwall-on-Hudson, N. Y.

Tooker & Marsh, Architects

blue. The beams and columns are delicately lined. The chandeliers would grace the home of wealth and culture; they are simple in design and soft in effect. The curtains on the windows and on the stage blend into the harmony of the room. Back of me the paneling at the rear of the stage lends its grace of line. What will the children who sit here day after day unconsciously absorb into their impressionable natures to become an indelible part of themselves and all they meet? "If you get simple beauty and naught else, you get about the best thing God invents." Will not the children who spend five to eight hours daily, 200 days a year, for 12 years in a school building that expresses simplicity, harmony, beauty in its every detail come to feel in their inner consciousness a delight in beauty, a love for it, a feeling of need for it? And, conversely, will they not come to feel a certain repugnance for crudity, come almost to the point where they will be hurt by the clash of colors, the loss of symmetry, the ill proportioned? Will not the children who spend 12 years in a beautiful building consciously or unconsciously carry the effect of their sojourn into their own homes? And may we not, in a later generation, have a recrudescence of the beautiful in our homes and home furnishing that is now so sadly lacking in a great part of America's home building? The attainment of beauty demands more than wealth.

It is a reflection of an inner spirit, and it can find expression in the humblest dwelling as well as in the greatest mansion. Every touch of the architect's pencil, every line of his specifications mean beauty or the lack of it, not only in his building, but more so in the hearts of the children who use it and of the teachers who instruct.

But the public schools serve more than children. They may shape the feeling if not the thinking of the grown ups who enter occasionally but pass them daily. In the little village at the lower end of New York's most beautiful lake stands a new public school building. The main center building with a wing at either end—one for auditorium, the other for gymnasium—is beside the main highway. It stands on high ground, surrounded by a new growth of native forest, facing across the lake to the mountains beyond. In every detail there lives again the best Colonial of the Georgian period. It embodies the spirit of the forefathers, a fit expression of the Colonial period through which the village gained its first fame, a beauty spot in an attractive modern village, and a fit companion piece to the famous lake. It is a challenge to the passerby to stop and question why his community cannot build likewise. A view of Lake George's beautiful new school raises the hope that in time our public school buildings may come to express the true spirit of the communities in which they stand.



RECOGNITION OF CRAFTSMANSHIP

HOW IT IS PUT INTO EFFECT

BY

WM. O. LUDLOW

AN article in THE ARCHITECTURAL FORUM for January quoted some statements of representatives of many of the elements of the building industry,—owners, architects, contractors, and labor,—telling of the interesting results that have been accomplished in New York by the awarding of certificates and gold buttons to the most proficient mechanics on large buildings recently erected.

The remarkable popularity of this "Recognition of Good Craftsmanship" seems to be further indicated by the recent organization of committees to conduct this work in a number of large cities of the country. These committees have been formed generally by the chapters of the American Institute of Architects. In many more places other chapters have such a program under consideration, and it even seems quite possible that the Royal Institute of British Architects will set up in Great Britain work of similar character. The reasons for this popularity are not far to seek, but it may be well to review them.

First, and most important in my estimation, is the fact that there is an underlying consciousness in every man that there is really something more of interest in his life than merely getting the "almighty dollar." I know this is not always recognized, even by the man himself, but a careful examination of the real motives that actuate most of us discloses the fact that such sentiments as loyalty, good will and friendship are really the moving factors in what we do. Now this approval of the recognition of merit is primarily brought about by a sense of fair play, friendly feeling and an appreciation of the value of good work. Lincoln once said he tried to base every decision of his life on "what is right," and when he had accomplished that, he had invariably made the right decision. The recognition of a man's worth and the worth of fine accomplishment is inherently "what is right."

There are, of course, other elements which enter into the cause of the popularity of this movement. Nearly everybody wants good work, and this is surely an incentive to giving good work. Everybody in the building trades desires work done with the least possible friction and with the best possible understanding among those who produce the work. Recognition of Craftsmanship helps to this end by providing for the workmen an incentive beyond merely the pay envelope. Another reason for the popularity of the Recognition of Craftsmanship is rather more sordid,

but a reason yet to be recognized. It is the feeling of the owner that he not only gets a better building, but that he gets considerable advertising out of the fact that his building is constructed by men who are publicly recognized for superior workmanship.

Of course, the architect is glad to have his building recognized in this way, and perhaps too, if we may dare say it, he is glad of a certain amount of acclaim which will come to him as the architect of the building. But further than that he is the one, more than any other, who is interested and insistent on the good quality of the workmanship that goes into his building. Then, too, the contractor of the better class likes this method of recognition of good work, very much for the same reasons as have been accredited to the owner and architect, but he is particularly anxious that it shall be known that he is a builder of well built and notable structures.

As to the men themselves, little need be said as to why they appreciate this recognition. One simply has to imagine oneself in the place of one of these men to know how he is likely to feel when, in the presence of his fellow workmen, he is called to the platform to receive from the hands of the representative of an impartial body a handsomely framed certificate and gold button and told that he has "made good."

Further, it is not hard to understand why this work has appealed to such a number of chapters of the American Institute of Architects. First of all, the better class of architects, as a rule, are men who appreciate the higher motives of life, as well as a better quality of workmanship. Then, some of these chapters have felt that this kind of activity, with its attendant publicity, gives them a standing in the eyes of their community as a group of men interested not only in their fees, but interested likewise in quality work and the welfare of the men who produce it. Many chapters perhaps also feel that they need an activity that will command the interest and enthusiasm of their members if they are to hold their organizations together. Perhaps also the rather remarkable spread of this work is further due to the comparative simplicity of setting up the necessary machinery either by a Building Congress, where such exists, or by a chapter of the American Institute of Architects.

The question is often asked, "How do you start such a program?" I venture these suggestions:

1. The whole plan should be placed before the

Congress or chapter in such a way that the members will not only see its advantages but shall really become enthused. A committee should then be appointed to take charge of the work, and I should like to make emphatic at this point that the success of the work will depend on whether or not the head of the committee has outstanding ability and a real enthusiasm for the cause.

2. The step that the committee should first take is to get the whole-hearted interest of some of the best builders in the city, and also to get the interest of labor, for unless these two elements are brought in "on the ground floor," the processes of "selling" are more difficult. There should be a real feeling of partnership among the architects, builders and labor to obtain whole-hearted coöperation. This partnership is necessary also to prevent the feeling on the part of the workmen that they are being patronized; labor will not be patronized. Moreover, the workmen are likely, at first, to be suspicious of some ulterior motive,—suspicious particularly of an attempt to "speed up." Enlisting labor leaders on the partnership basis dispels this.

3. Awards are of two general types. (a) On large buildings, to the best mechanic in each trade, with appropriate ceremonies of presentation held in the building while under construction,—one ceremony about the time of enclosure, with awards to the structural trades, and another shortly before completion with awards to the finishing trades. (b) Individual awards, the honor men being selected irrespective of the building where employed. The (b) method is most useful where few large buildings are erected.

4. In type (a) awards, nominations are requested from the architects and contractors in coöperation with the superintendents and foremen.

In type (b) awards it is advisable that nominations be received only on solicitation by the committee from trusted individuals.

5. The awards are made to encourage workmen to better effort and are not made to foremen or to those in executive or supervisory capacities.

6. Nominations are of value only as coming from nominators who have been thoroughly informed as to the real purpose of the awards. In selecting the candidates for awards, favoritism or any appearance of favoritism must be carefully avoided.

7. When a building has been selected for award a special "Committee of Award" should be appointed, this committee to consist of the owner, the architect, the builder, a representative of labor and a representative of the awarding organization.

8. The best means of selecting the men to be

honored is to explain the idea very fully to the superintendent and to the foremen on any particular building which is of such character as to merit the awards. The foremen should be instructed to select with great care one or two of the best men working in each of their particular trades. These names are then passed on to the superintendent for approval and then should go to the Committee of Award for final determination. It is highly advisable to have some outstanding labor man on the Committee of Award in order that the names may be vided by labor, and in order that nothing may be inadvertently done which would be unfortunate from the labor angle.

9. Ceremonies of award should be made as impressive and as important as possible. Awards are public; all workmen on the operation, their wives, their friends, and the general public are invited.

10. Photographs of presentation ceremonies, news items, and articles on the value of craftsmanship featured in the public press, and the widest publicity possible for the awards and their purposes are essential.

11. It is quite possible for the entire work to be conducted without any expense to the organization which sponsors it. In New York practically the entire cost is borne by the owners of the buildings. A charge of about \$10 to cover the cost of each certificate, gold button and clerical work is borne by the owner of the building. It has been found that there is no difficulty in persuading owners to do this, as a matter of \$100 or so is a comparatively small item on a building enterprise involving hundreds of thousands of dollars. Moreover, the owners readily recognize the considerable advertising advantage which they get from awards being made on their buildings, even though they may not have a broader vision of the splendid ideals upon which the movement is founded.

In New York we have found it surprisingly easy to enlist the sympathy and coöperation of owners, architects, builders and labor, for all of these elements, if not interested principally from an altruistic motive, see at least a personal advantage of great possibilities. Of course it is most desirable, however, to put the whole matter where it deserves to be placed,—on the high plane of great and splendid service not only to the building industry but to every individual concerned,—for the stirring of ambition to do nothing but a high grade of work ennobles a man's whole life, brings him a contentment that he has not known before, makes him a man of finer ideals, and in a word does something to create a better citizenship as well as a far worthier nation.

DETERMINING FUEL REQUIREMENTS BY THE DEGREE-DAY METHOD

BY

P. E. FANSLER

ASSOCIATE EDITOR, HEATING AND VENTILATING MAGAZINE

LATE one afternoon, bound to Washington on the "Congressional," I fell to speculating on the possibility of developing a plan whereby fuel requirements could be pre-determined for any building in any part of the country by an engineer or architect located in any other part of the country. It was a problem at once difficult and fascinating. In the old days of the heating industry, the contractor, making up an estimate of radiation requirements, would enter a room, give it what was in those days the equivalent of the "once over," jerk his thumb at the ceiling and say: "This room needs about 35 feet." Perhaps this procedure was responsible for the phrase "rule of thumb!" Usually his "guesstimate" was pretty close to the amount of radiation that would be determined through the use of modern rules and tables, but such procedure was entirely localized; had this contractor been asked to estimate for a building located where the weather conditions were materially different, he would have been completely at sea. The rising tide of scientific achievement has evolved tables and methods whereby the heating engineer in New York can determine radiation requirements for a building in Minneapolis, Chicago, St. Louis or Seattle with equal ease and accuracy.

This was the thought foremost in my mind. Would it not be possible to evolve a method of evaluating *heating loads* in different cities so that graphs or similar devices could furnish accurate data upon which fuel determination and comparison could be based? Engineers of the American Gas Association, some years earlier, had determined that a "daily mean temperature" of 65°, as defined and reported by the U. S. Weather Bureau, was the dividing line below which the

average home owner required artificial heat and above which it was not necessary. This was a purely empirical determination, made over an extended period of time and covering a sufficient number of cases to insure accuracy. Some bright mind then coined the term "degree-day" to represent the product of a "difference of one degree below this datum point" and a "24-hour period." In other words, with a "weather bureau temperature of 65°, a condition of equilibrium exists, and no artificial heat is required. It might be thought that this is too low a temperature, but it must be remembered that, where the "daily mean" is 65°, the temperature during daylight hours will be 70° or above. If, now, the daily mean temperature is 64°, it is apparent that the heating requirements for this 24 hours can be measured by (65°-64°) 1° x 1 day, or 1 degree-day. Likewise, with a daily mean temperature of 60°, the heating load could be designated as 5 degree-days, and with a daily mean temperature of 37°, the quantity "28 degree-days" would be the measure. I have had quite an extensive correspondence trying to find out who first used the term "degree-day," seeking to place the credit where it is due, but without success. Certain it is that it was used as far back as six years, and perhaps farther. It is only for the last three years, however, that the value of this term has been appreciated, and it is largely through influence of the American Gas Association and *The Heating and Ventilating Magazine* that its use is spreading.

Having thus formulated a method for measuring and designating the heating load for any given day, based on the establishment of the point below which heat is required and of the factor representing the amount of heat demand, it is a

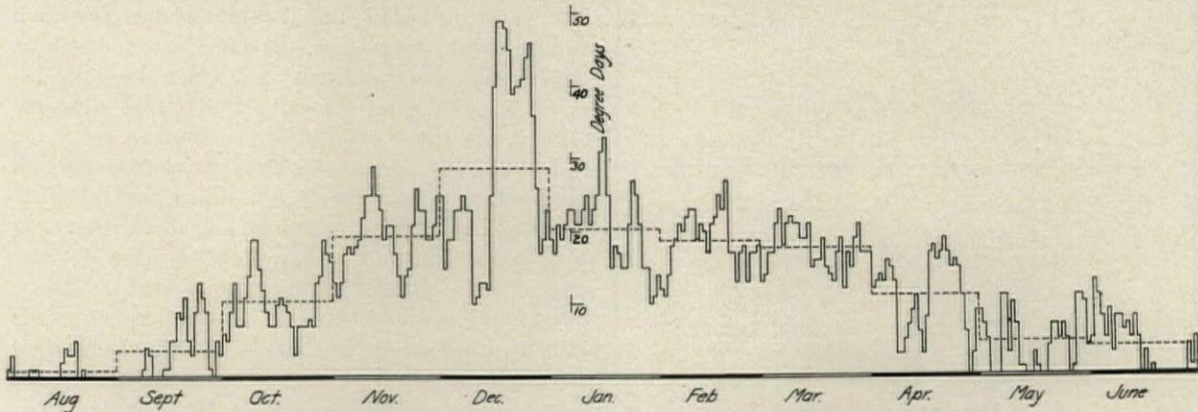


Fig. 1. How the Heating Load for Any Locality Can be Pictured in Degree-Days
Heating Requirements for Portland, Ore.

simple matter to find how much heat is required over a month or a heating season by adding together the heat demand for the several days involved. We then have an expression of the heating load for the month or the year. For the architect or engineer, trained to visualize from graphs and charts, it is a simple matter to plot the heating load for any given locality. For this purpose recourse is had to the records of the U. S. Weather Bureau, covering 50 years or more. To be of value, the heating load must be determined from average data, as a base; then supplementary computations can be made for current, or any other, requirements.

Heating loads in degree-days of four characteristic cities are shown here in Fig. 2. The contrast between the graph for Los Angeles and that for Minneapolis, and the similarity of the New York and Minneapolis profiles are evident. The Portland, Ore., graph shows a condition that is ideal for heating with gas. The maximum is only about half that for Minneapolis, yet the heating season lasts for ten months of the year.

The next procedure was to determine the heating loads for each month and to convert these into percentages of the annual load. This makes it possible to pre-determine the fuel consumption for any month in the heating season. Fig. 3 shows how these data can be plotted. This presentation has proved of no small value to the oil-burner salesman who makes a sale late in the

season. Soon after the completion of the first month of use, which might be December, the salesman has a telephone call or a letter from an irate customer. He is informed that he has grossly misrepresented the burner, and that, while it has operated in a satisfactory way, it has used an excessive amount of fuel. The customer, reading his tank gauge, has found that he has consumed nearly 500 gallons of oil. He figures that there are eight months in the heating season, and that therefore he will use 4,000 gallons for a complete season. The salesman had told him that he should use between 2,500 and 3,000. This looks as though he had been "stung." Then the salesman must take the time to call on the customer, show him the graph (for that particular city) and point out that in December a consumption of 20 per cent of the total for the season is correct. This would mean, for the whole season, 2,500 gallons. Such use of these graphs has been, and is, common. Another use is to show whether the heat demand for any given month is above or below the normal demand for that month. February, 1927, in New York, was an unusually warm month,—at least everyone commented on the weather from day to day. The graph, Fig. 7, presents the facts of the case. Only on six days of the month was the heat requirement up to normal. Fuel consumption during that month was far below normal.

Now we come back to the beginning of this story. I wanted to find some way of expanding the degree-day idea and to enlarge the scope of its usefulness. The idea was to compute degree-day heating loads for hundreds of towns where U. S. Weather Bureau Stations were maintained, and to mark down the degree-day figures on a large map of the United States. Then, by drawing flow lines through points where the heating loads were equal, I would have a chart possessing something of the nature of an iso-thermal chart, except that the "contour" lines should represent "heating load." Then any building located on any iso-degree-day line would require, for each square foot of radiation, the same amount of heat that would be required by any other building located anywhere on the same line. The idea was simple, but the computations arduous.

More than 12,000 computations were made and checked. Now, what does it mean, and of what practical use is it? A logical step toward making it practical was the production of three derived charts, an iso-coal consumption chart; an iso-oil consumption chart, and an iso-gas consumption chart. Each of these affords a direct method of finding how much of any specific fuel is required for a normal heating season to provide for 1 square foot of radiation, assuming always that the radiation has been properly placed and is ade-

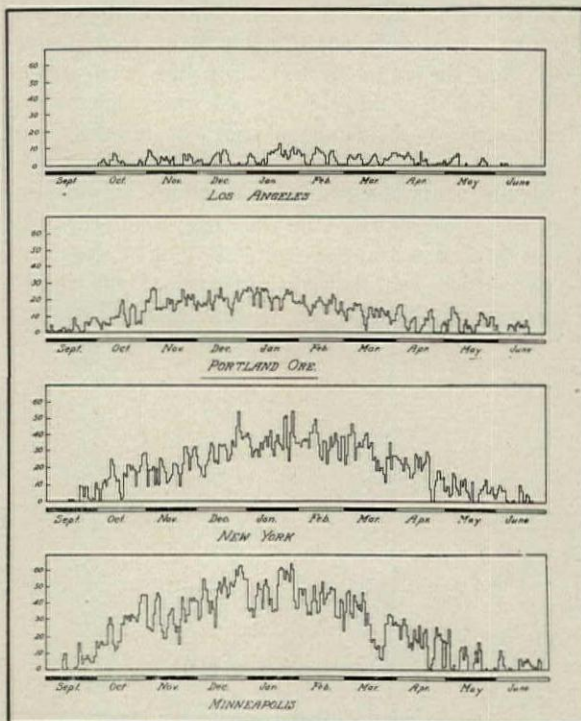


Fig. 2. Graphs of Heating Loads of Four Typical Cities. The Long But Not Intensive Heating Seasons in Los Angeles and Portland are Important Factors in the Widespread Use of Electricity for Heating in Those Cities

quate. If the radiation is excessive or insufficient, the results will vary in the same ratio.

The "degree-day" figures on the iso-degree-day chart have been replaced, on the iso-oil-consumption chart, by figures representing the gallons of oil necessary to provide heat for 1 square foot of

steam radiation under certain defined conditions, one of which is that the efficiency of the heating plant has been taken as of 100 per cent. This may seem illogical, but it is quite the opposite. It is easier to determine the consumption at 65 per cent efficiency where it is known at 100 per cent

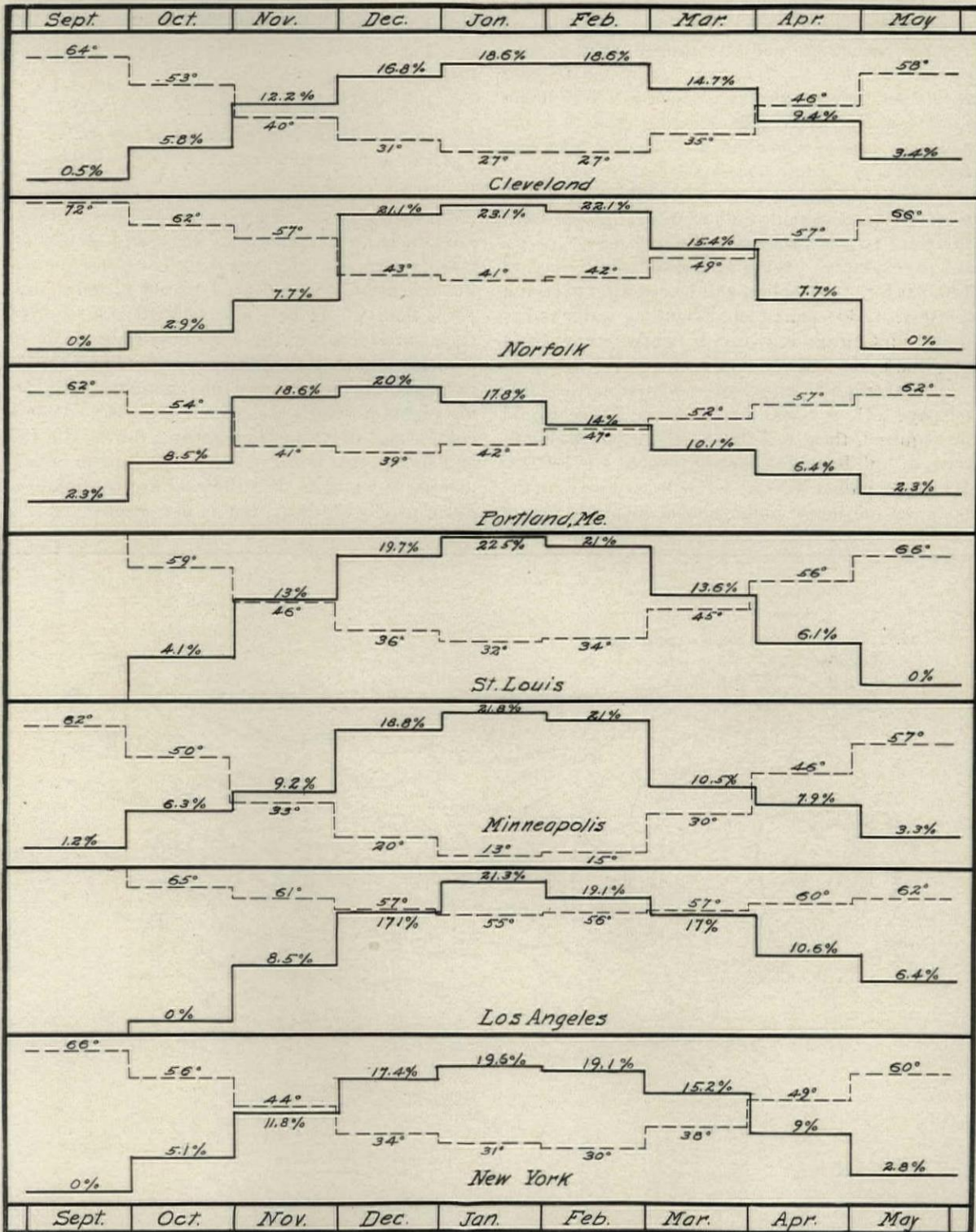


Fig. 3. Average Fuel Requirements for any Period for any Fuel Can be Determined from Charts. Solid Lines Show Percentages of Annual Fuel Requirements; Dotted Lines Show Average Mean Temperatures

than it would be to use 75 per cent, or any other figure, as a base. In the latter case the thoughtless individual might jump to the conclusion that 75 per cent was a fair average value, and thus derive a quantity well under what it should be. Reference to the iso-oil-consumption chart (Fig. 5) shows that for a heating load of 1,000 degree-days, and assuming a heating plant efficiency of 100 per cent, there will be required 0.686 gallons of oil fuel having a heating value of 140,000 B.t.u. per gallon; also it is assumed that steam radiators are under consideration, and that the radiation was designed for a 0° outside temperature and a 70° inside temperature.

It will be a simple matter to make fuel determinations after having followed through the solution of a typical problem. We will take Chicago as an example. What quantity of oil having 130,000 B.t.u. per gallon will be required to heat a house with 730 square feet of standing water radiation? (In Chicago radiation is figured on the basis of a minimum outside temperature of -10° .)

The average heating load, taken from the table on page 281, is 6,000 degree-days. There would be required, then, 6×0.686 gallons, or 4.11 gallons of oil having a heating value of 140,000 B.t.u. per gallon. Now, we will assume that the boiler in the house under consideration is a new

and first class unit, well adapted to the application of an oil burner. Under these conditions it is possible to attain a seasonal efficiency of 60 per cent. As a matter of fact, the selection of this "seasonal efficiency" figure is the real trick in the application of this method; a reasonable knowledge of heating plant operation will, however, aid in the judicious selection of this factor. It might be well to suggest that proper figures will range somewhat as these:

For gas-fired boilers....	65%—70%
For oil-fired boilers.....	55%—65%
For coal-fired boilers....	35%—50%

It will be noted that the range for oil and gas is less than for coal. This is due to the fact that fluid fuels are automatically fired and almost always thermostatically controlled. Consequently the operation of fluid-fired plants is more uniform than would be the case with a hand-fired fuel, in residence work. One important factor in bringing about the relatively high efficiency of gas and oil is the intermittent functioning of heating plants in which these fuels are used. Where coal is used it frequently happens, during the fall and spring, that a day or days will come on which no heat is wanted. But the coal fire continues to burn, producing heat that is not wanted; it is a

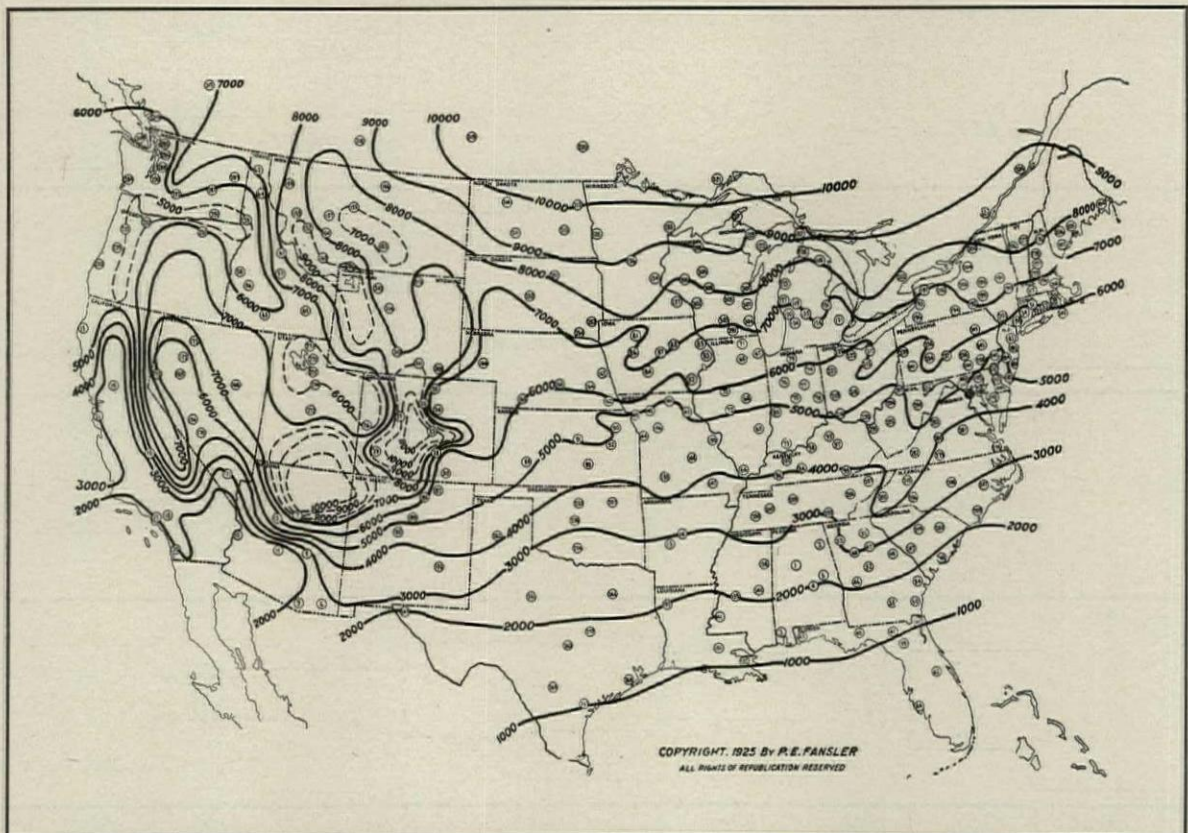


Fig. 4. Iso-Degree-Day Chart of the United States Showing Heating Loads in Degree-Days (See Tables on Pages 281 and 282 for Cities)

condition that warrants the conception of a plant's operating at what is *negative efficiency*.

But, to get back to our problem, allowing for an efficiency of 60 per cent instead of 100 per cent, there would be required—

$$4.11 \text{ gallons} \times \frac{100}{60} = 6.85 \text{ gallons}$$

per sq. ft. radiation per season.

We now must correct for the difference between the assumed heating value of the oil and that of the oil under consideration, and we have:

$$6.85 \text{ gallons} \times \frac{140,000}{130,000} = 7.38 \text{ gallons}$$

The heating plant was designed for minimum outdoor temperatures of -10° , instead of 0° , so we will have to correct for this design difference. The relative temperature differentials will be $70^{\circ} - 0^{\circ} = 70^{\circ}$ and $70^{\circ} - (-10^{\circ}) = 80^{\circ}$, so we have:

$$7.38 \text{ gallons} \times \frac{70}{80} = 6.46 \text{ gallons}$$

The last correction is due to the fact that water heating is specified rather than steam, and we have, as a factor, the ratio of the heat emission assumed for these media, or:

$$6.46 \text{ gallons} \times \frac{150}{240} = 4.04 \text{ gallons}$$

As there is a total of 730 square feet of radiation, the fuel requirement will be:

$$4.04 \text{ gallons} \times 730 = 2,949 \text{ gallons}$$

It will be seen that this process consists in applying to the base figure, as taken from the iso-degree-day chart, a series of corrective factors, each providing for variations from the assumed conditions. The operations are simple, and the entire calculation can be made in five minutes. Correspondence on this subject has brought out the question of possible error due to the fact that no account is taken of wind velocity. Such a correction should not be made, because if the radiation has been correctly determined, sufficient has been provided to take care of heat loss and infiltration due to windage.

Factors used in localities where radiation is calculated on outside temperatures other than 0° are:

For Minimum	Multiply By
-10°	7/8
0°	1
$+10^{\circ}$	7/6
$+20^{\circ}$	7/5
$+30^{\circ}$	7/4, and so on.

For minimum outdoor temperatures higher than that used as a base (0°), it is obvious that less radiation will be installed in a given room.

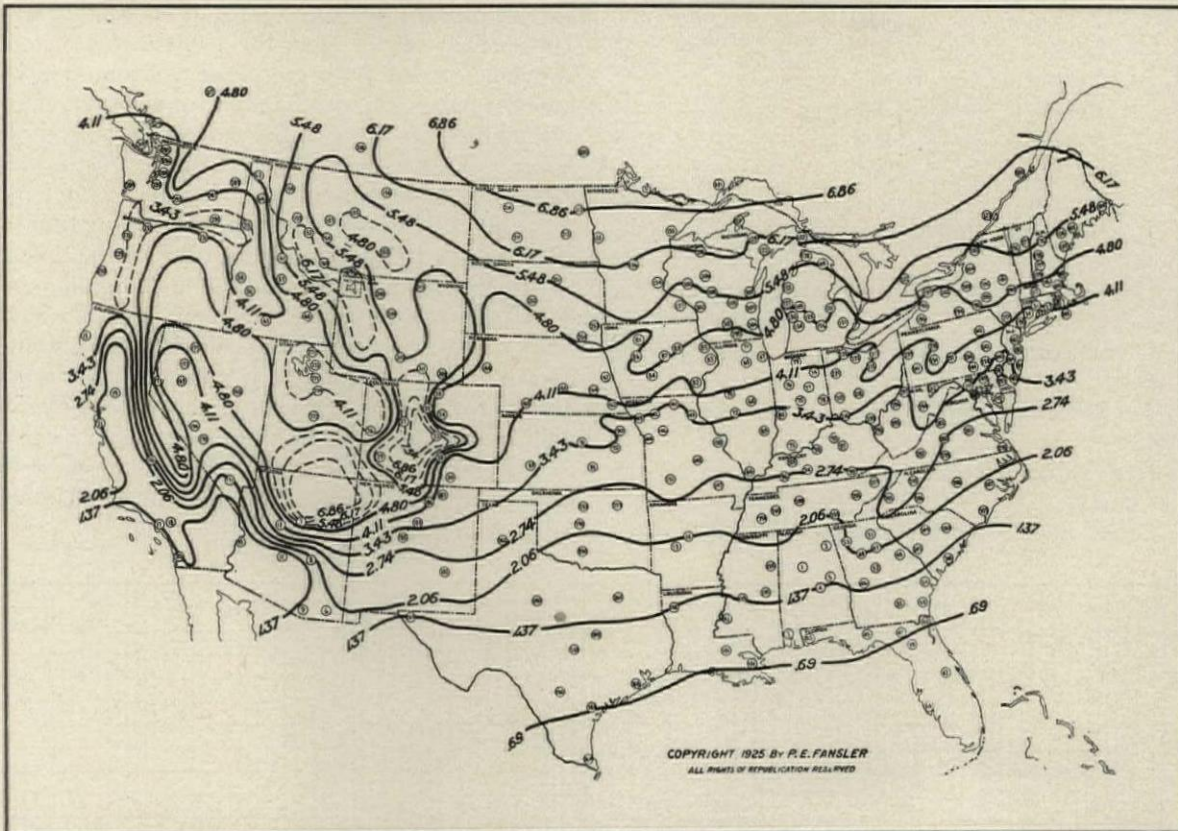


Fig. 5. Iso-Oil-Consumption Chart Giving Gallons of Oil Required for One Square Foot of Steam Radiation (Assumed Heating Plant Efficiency 100 per cent. See Text)

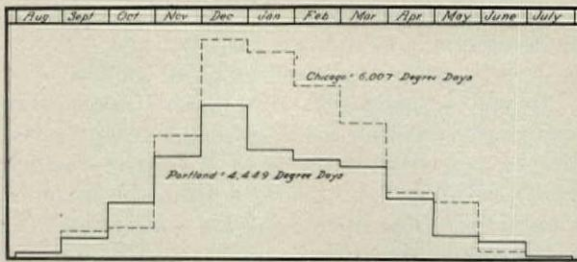


Fig. 6. Chicago Has a Shorter Heating Season Than Portland, Ore., But the Average Demand During the Four Winter Months is Much Greater

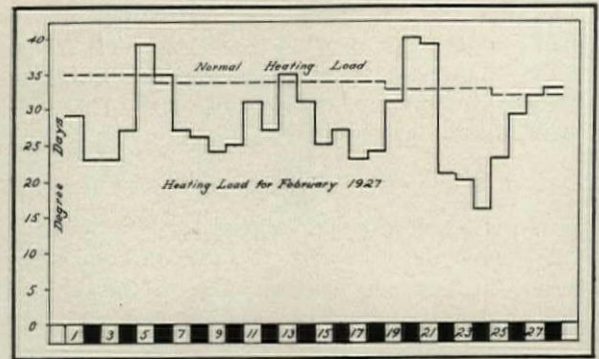


Fig. 7. Graph of an Unusually Mild February in New York. Heating Requirements Were Below Normal on all but Six Days

Consequently, the greater the quantity of fuel consumed to provide for a square foot of radiation per degree-day. If, then, unit figures for fuel are multiplied by the radiation quantity and by the number of degree-days, the total fuel requirements will be lower than would be the case were the same building located at a place where the base temperature is lower, the number of degree-days higher, and the total radiation greater.

Determinations for other fuels are easily made with the data:

Degree-Days	Gas, Cubic Feet ¹	Coal, Pounds ²
1,000	96	8
2,000	192	16
3,000	288	24
4,000	384	32
5,000	480	40
6,000	576	48
7,000	672	56
8,000	768	64
9,000	864	72
10,000	960	80

1. Correction should be made for gas variations:

Heat value assumed to be 1,000 B.t.u. per cubic foot.

Other corrections the same as those for oil fuel.

2. Correction should be made for coal variations:

Heat value of coal assumed to be 12,000 B.t.u. per pound.

Other corrections the same as those for oil.

To indicate the accuracy that can be attained through the use of this method of pre-determining fuel consumption, I might cite a specific case. I was able to obtain exact data regarding the installed radiation in more than 100 homes in Chicago, and for each I computed the gas consumption in terms of cubic feet per square foot of installed radiation, correcting for the heating value of the gas supplied in Chicago,—535 B.t.u. It worked out to be 709.3 cubic feet. Through the courtesy of the local public utility company, I was afforded access to the meter records of the houses under consideration, and the total gas consumed divided by the aggregate radiation was 706.8 cubic feet. Thus the *computed* gas consumption varied from the *actual* consumption by only 1.5 cubic feet, or *less than 0.2 per cent*. This represented an error in the cost of heating these houses of less than \$1 per house. Oil burner salesmen and engineers have frequently told me that they had pre-determined oil consumption to within 50 to 100 gallons per heating season where the total consumption was from 2,000 gallons to 4,000 gallons. Thus the method is simple and accurate, and because of its adaptability to graphic presentation, it is eminently suited to the use of architects and engineers. On the page opposite and on the following page will be found a table of the average yearly heating loads, expressed in degree-days, for some 327 cities in the United States and Canada.

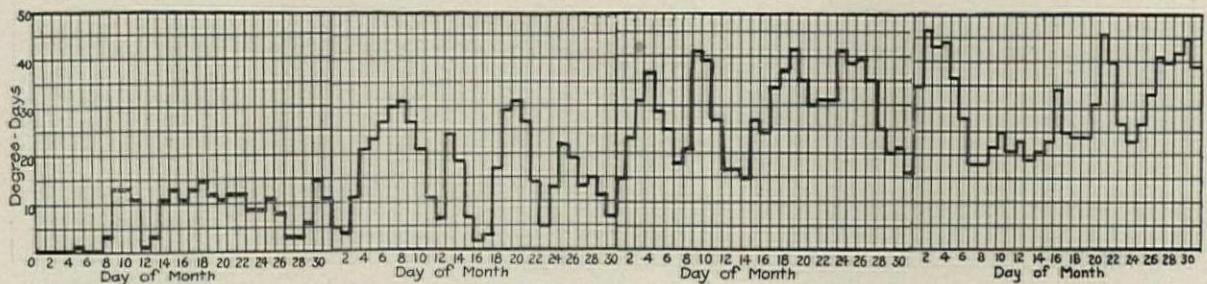


Fig. 8. Monthly Graphs Can be Plotted and Put Together to Show the Yearly Heating Load for Any Locality

HEATING LOADS IN DEGREE-DAYS, CITIES OF UNITED STATES AND CANADA

No.	Degree-Days	No.	Degree-Days	No.	Degree-Days	No.	Degree-Days		
ALABAMA				COLORADO					
1	Birmingham	2527	22	Boulder	5665	43	Pensacola	1288	
2	Gadsden	3006	23	Colorado Springs	10089	44	St. Petersburg	175	
3	Mobile	1439	24	Denver	5880	45	Tallahassee	1421	
4	Montgomery	1898	25	Fort Collins	6877	GEORGIA			
5	Tuscaloosa	2529	26	Grand Junction	5570	46	Americus	1862	
ARIZONA				27	Leadville	11005	47	Athens	2691
6	Bisbee	2706	28	Pueblo	5671	48	Atlanta	2880	
7	Flagstaff	10913	29	Telluride	9372	49	Augusta	2173	
8	Globe	2575	30	Trinidad	5439	50	Brunswick	1269	
9	Nogales	2497	CONNECTICUT				51	Gainesville	3259
10	Parker	1517	31	Hartford	6124	52	Macon	2220	
11	Phoenix	1446	32	New Haven	6039	53	Rome	3073	
12	Prescott	5060	33	New London	6040	54	Savannah	1517	
ARKANSAS				34	Waterbury	5661	55	Waycross	1470
13	Hot Springs	2665	DELAWARE				IDAHO		
14	Little Rock	2861	35	Dover	4539	56	Boise	5657	
CALIFORNIA				36	Seaford	4507	57	Challis	8074
15	Eureka	5021	37	Wilmington	4813	58	Emmett	5587	
16	Fresno	2375	DISTRICT OF COLUMBIA				59	Lewiston	4924
17	Los Angeles	1517	38	Washington	4562	60	Pocatello	6459	
18	Pasadena	2066	FLORIDA				61	Salmon	7866
19	Sacramento	2525	39	Gainesville	791	62	Sandpoint	7357	
20	San Diego	1582	40	Jacksonville	1080	63	Twin Falls	6600	
21	San Francisco	3450	41	Lake City	955	64	Wallace	7228	
			42	Orlando	389	ILLINOIS			
						65	Aurora	6661	
						66	Cairo	4053	
						67	Chicago	6007	
						68	Decatur	5485	
						69	Olney	4751	
						70	Peoria	6146	
						71	Rockford	6847	
						72	Springfield	5495	
						INDIANA			
						73	Evansville	3355	
						74	Fort Wayne	5927	
						75	Indianapolis	5331	
						76	Lafayette	5241	
						77	Marion	5768	
						78	Richmond	6060	
						79	South Bend	6313	
						80	Terre Haute	4920	
						IOWA			
						81	Algona	7594	
						82	Burlington	6261	
						83	Clinton	6628	
						84	Des Moines	6464	
						85	Dubuque	6744	
						86	Fort Dodge	6753	
						87	Marshalltown	7103	
						88	Waterloo	7152	
						KANSAS			
						89	Dodge City	5035	
						90	Leavenworth	4795	
						91	Salina	5030	
						92	Topeka	5282	
						93	Wichita	4675	
						KENTUCKY			
						94	Bowling Green	3883	
						95	Frankfort	4241	
						96	Hopkinsville	3846	
						97	Lexington	5250	
						98	Louisville	4366	
						99	Middlesboro	3977	
						100	Owensboro	4179	
						LOUISIANA			
						101	Baton Rouge	1206	
						102	New Orleans	1044	
						103	Shreveport	2097	
						MAINE			
						104	Eastport	8676	
						105	Gardiner	7537	
						106	Lewiston	7502	
						107	Portland	7267	
						MARYLAND			
						108	Annapolis	4482	
						109	Baltimore	4591	
						110	Cambridge	4273	
						111	Frederick	4926	
						112	Frostburg	5613	
						113	Salisbury	4223	
						MASSACHUSETTS			
						114	Boston	6055	
						115	Lawrence	6682	
						116	Lowell	6504	
						117	Springfield	6464	
						MICHIGAN			
						118	Alpena	8319	
						119	Big Rapids	7440	
						120	Calumet	9217	
						121	Detroit	6202	
						122	Escanaba	8904	
						123	Frankfort	7590	
						124	Grand Rapids	6613	
						125	Greenville	7037	
						126	Lansing	6957	
						127	Ludington	7185	
						128	Mackinaw	8461	
						129	Marquette	8866	
						130	Muskegon	6922	
						131	Saginaw	7080	
						132	Sault Ste. Marie	9707	

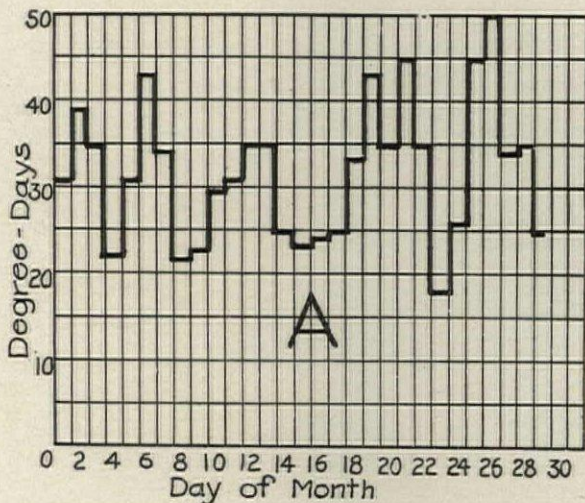
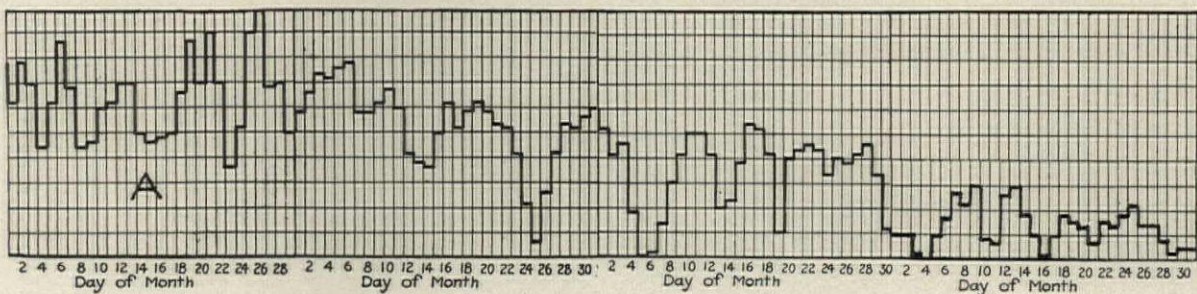


Fig. 9. A Monthly Heating Load Graph in Degree-Days. This Forms Part "A" of the Yearly Graph Shown



Continuation of the Yearly Heating Load Chart Shown on the Opposite Page

(Continued on next page)

HEATING LOADS IN DEGREE-DAYS, CITIES OF UNITED STATES AND CANADA—Continued

No.	Degree-Days	No.	Degree-Days	No.	Degree-Days	No.	Degree-Days
MINNESOTA				VIRGINIA			
133 Duluth	9650	181 Atlantic City	5250	230 Marshfield	4989	278 Cape Henry	3478
134 Minneapolis	7953	182 Cape May City	4821	231 Pendleton	5148	279 Danville	3316
135 Moorhead	9495	183 Long Branch	5393	232 Portland	4449	280 Lynchburg	3849
136 St. Cloud	8687	184 Trenton	5033	233 Salem	4629	281 Richmond	3789
137 Winona	7515	NEW MEXICO				282 Roanoke	4164
MISSISSIPPI				PENNSYLVANIA			
138 Aberdeen	2743	185 Albuquerque	4401	234 Altoona	6115	283 Staunton	4535
139 Jackson	1920	186 Cimarron	5872	235 Clearfield	5994	WASHINGTON	
140 Meridian	2527	187 Raton	5930	236 Harrisburg	5529	284 Aberdeen	5325
141 Natchez	1667	188 Roswell	3399	237 Huntington	5771	285 Bellingham	5994
MISSOURI				RHODE ISLAND			
142 Chillicothe	5017	189 Santa Fe	6064	238 Lancaster	5508	286 Everett	5480
143 Hannibal	5303	NEW YORK				239 New Castle	5932
144 Kansas City	5302	190 Albany	6542	240 Philadelphia	4950	287 Lind	5790
145 Kirksville	5799	191 Amsterdam	7494	241 Pittsburgh	5327	288 Seattle	5156
146 Marshall	5042	192 Binghamton	6882	242 Reading	5487	289 Spokane	6085
147 Poplar Bluff	3914	193 Buffalo	6750	243 Scranton	6197	290 Tacoma	5218
148 Rolla	4671	194 Elmira	6041	244 York	5423	291 Walla Walla	4694
149 St. Joseph	5289	195 Ithaca	6917	SOUTH CAROLINA			
150 St. Louis	4583	196 Jamestown	6740	245 Block Island	5803	292 Yakima	5540
151 Springfield	4650	197 Lockport	6802	246 Providence	6111	WEST VIRGINIA	
MONTANA				SOUTH DAKOTA			
152 Anaconda	9158	198 New York	5303	251 Aberdeen	8709	293 Charleston	3789
153 Billings	6983	199 Norwich	7321	252 Pierre	7213	294 Elkins	5813
154 Butte	8262	200 Ogdensburg	7592	253 Sioux Falls	7683	295 Huntington	4722
155 Great Falls	7222	201 Port Jervis	6310	254 Yankton	7337	296 Parkersburg	4884
156 Havre	8608	202 Rochester	6834	TENNESSEE			
157 Helena	7764	203 Syracuse	7269	255 Chattanooga	3099	301 Green Bay	8201
158 Kalispell	8261	204 Watertown	7396	256 Jackson	3261	302 LaCrosse	7309
159 Missoula	8324	NORTH CAROLINA				303 Madison	7251
160 Virginia City	8682	205 Asheville	4410	257 Johnson City	3950	304 Milwaukee	7366
161 Yellowstone Park	9723	206 Charlotte	3153	258 Knoxville	3517	305 Oshkosh	7508
NEBRASKA				NORTH DAKOTA			
162 Falls City	5197	207 Newbern	2580	259 Nashville	3550	306 Prentice	8765
163 Grand Island	6084	208 Raleigh	3287	260 Perryville	3414	307 Sheboygan	7384
164 Lincoln	6231	209 Wilmington	2493	TEXAS			
165 McCook	5801	210 Winston-Salem	3904	261 Abilene	2610	308 Wisconsin Rapids	8030
166 North Plate	6479	OHIO				262 Amarillo	4655
167 Omaha	6127	211 Bismarck	8498	263 Austin	1578	309 Cheyenne	7360
NEVADA				212 Grand Forks	9724	264 Brownsville	319
168 Eureka	7072	213 Jamestown	8825	265 Corpus Christi	886	310 Cody	7769
169 Fallon	5676	214 Minot	9591	266 Dallas	2455	311 Laramie	8814
170 Goldfield	5556	OKLAHOMA				267 El Paso	1912
171 Las Vegas	2827	215 Akron	6188	268 Galveston	1050	312 Rawlins	8080
172 Lovelock	5710	216 Cincinnati	5302	269 San Antonio	1362	313 Sheridan	8113
173 Reno	5894	217 Cleveland	6096	270 Waco	1838	314 Thermopolis	7489
174 Tonapah	6069	218 Columbus	5426	UTAH			
175 Winnemucca	6266	219 Dayton	5341	271 Logan	6750	317 Kamloop, B. C.	6724
NEW HAMPSHIRE				220 Ironton	4636	272 Manti	6826
176 Berlin	8867	221 Lima	6051	273 Ogden	5848	318 Medicine Hat, Alb.	8152
177 Concord	7335	222 Sandusky	5998	274 Provo	6184	319 QuAppelle, Sask.	11261
178 Franklin	7537	223 Toledo	6107	275 Salt Lake City	5358	320 Winnipeg, Man.	11166
179 Keene	7338	OREGON				321 Port Arthur, Ont.	10803
NEW JERSEY				224 Ardmore	2374	322 Toronto, Ont.	7732
180 Asbury Park	5390	225 Guthrie	3388	226 Oklahoma City	3827	323 Montreal, Que.	8705
		227 Tulsa	3497	227 Eugene	5588	324 Quebec, Que.	8628
				228 Doraville	5527	325 Frederickton, N. B.	9099
				229 Eugene	5588	326 Yarmouth, N. S.	7694
						327 Charlottetown, P.E.I.	8485

THE CLIENT, THE ARCHITECT AND THE CONTRACTOR

PART III—THE CONTRACTOR

BY
CLINTON H. BLAKE

IN the two preceding articles of the present series, we have discussed successively the problems and attitude of the architect and the problems and attitude of the owner. It remains now to consider the contractor. No building operation can be carried to a successful, happy and effective conclusion unless the rights, liabilities and point of view of the contractor are looked at in their proper perspective, and are appreciated and understood. The good will and bona fide coöperation of the contractor are just as necessary as the bank account of the owner and the ability and services of the architect.

It may be said in general that the contractor's relations to the project are three-fold,—his relations to the owner, his relations to the architect, and his relations to his subcontractors, employes and material men, as the case may be. The relations between the contractor and the owner are primarily those of one business man to another. So long as each of them is honest and capable and fair-minded, it is probable that there will not be any disagreements or difficulties. The owner is usually a business man, and between him and the contractor there are not the same possibilities for misunderstanding as in those which are inherent in the relations between owner and architect.

The relations between the contractor and the owner will be affected somewhat by the nature of the contract. If it is a cost-plus contract, considerations will arise which will not be involved in a fixed-price contract, and vice versa. It is fair to say, I think, that on a cost-plus contract the owner usually feels that the contractor will probably not injure himself in his efforts to keep down the cost. This feeling results, perhaps, from business cynicism. It comes probably more, however, from the fact that in some cases contractors undoubtedly are not very careful as to expenses in cost-plus work,—at least within the limits set up by the maximum cost guarantee,—if such a provision be included in the contract. It is, of course, unjust for any owner to feel that contractors in general are unwilling to give him as conscientious service on a cost-plus as on a fixed-price contract. Given a thoroughly honest and conscientious contractor, the owner will in many cases fare better on a cost-plus arrangement than where the contractor is forced to put in a fixed bid and, in so doing, naturally discounts various possibilities for loss and adds sufficient margin to cover them. On the other hand, there is no doubt that contractors in some cases have taken advantage of owners on

cost-plus work, and that, even without any bad faith on the part of the contractor, the work on these projects has not been speeded up by those in direct charge, as it would have been, had the work been carried on for a fixed fee.

While it may seem paradoxical, it is the fact, nevertheless, that the feeling of suspicion held by many owners as to cost-plus work may be turned to distinct advantage by honest and capable contractors. The owner who expects to be taken advantage of on a contract of this kind will be the first to react favorably when he finds that the contractor is giving him a square deal and doing his best to save him money. The contractor who does this will make a firm friend of such an owner and receive from him free advertising worth many times the additional compensation which the contractor might have received if he had not handled the work as conscientiously as he did. Many of the larger building concerns are fully alive to this situation and have built up and are building up day by day an extraordinarily valuable good will by the simple process of pleasantly surprising their clients in the results secured.

Where the contract is on a fixed-price basis, the situation is changed. Under these conditions, the contractor will not have any incentive to delay the work or add to the cost, but rather to expedite it and keep down the cost as much as possible. In this case the suspicious owner is looking, therefore, for skimmed work rather than unnecessary work. There is introduced under this form of contract, also, a new element and one which may be very troublesome,—namely, the matter of extras. There is nothing which will more quickly and completely wreck the good will existing between the contractor and the owner than claims for extra work not covered by the original contract. Even where these claims are bona fide, the owner will many times feel that they are unfair and that they should have been covered by the contract price. It is in the interests of a sound and permanent understanding between the parties that the contract in the first instance be as complete as possible. It is never possible completely to avoid extras; at least, I do not now remember any instance where some extras were not necessarily involved. There is no doubt, also, that some unscrupulous contractors make it their practice to put in low bids and make up their profit in the form of extras. If the contract and specifications are not carefully worded, the contractor is often presented with an excellent op-

portunity to do this and still be within his strict legal rights. The result will mean additional profit for him on that particular contract, but it will not aid him in building up the good will and prestige which are, in the long run, of vastly more advantage to him. On the other hand, it is no less true that the owner in many cases is entirely unreasonable as to extras which are properly claimed. It is also true that the honest contractor often loses a contract to a more unscrupulous competitor, because the latter has under-bid him, trusting to extra claims to offset the difference.

The architect can be of special service to both the contractor and the owner in meeting this situation. By his experience he is far better fitted than the owner to foresee the difficulties ahead and to prevent them so far as possible. One of the greatest services which he can render to the owner and to the high-class contractor alike is to make the specifications and contract so definite and comprehensive in the first instance that extras are, so far as possible, eliminated. Where this is done, it is correspondingly difficult for the unscrupulous contractor to take advantage of the situation and unfairly to under-bid his honest competitors. The reduction in the number of extra items works a corresponding reduction in the opportunities for misunderstanding and dispute. As a matter of sound business, therefore, as well as a matter of sound ethics, the contractor will do well to cooperate in seeing that the specifications and contract cover as nearly as is practical all of the work required for the completion of the work and that the possibilities of extras are reduced to a minimum. Where the contract is not complete in this respect, and extra work is made necessary, the contractor is, of course, entitled to be paid for it and to stand upon his rights in this respect. He will find it distinctly to his interest, however, in the long run to so handle the situation as to make clear to the owner his desire to be fair and to remove any suspicions that he is claiming, in the guise of extras, any additional payments to which he is not fairly entitled. A contractor whose attitude is obviously fair and liberal in this respect will be the contractor to whom the architect and the owner will give preference in future work.

I have had an excellent illustration of this within the last few weeks. About a year ago, an owner employed a contractor with whom he had not theretofore dealt. The project was not easy, as it involved alterations and was, therefore, peculiarly adapted to "extra" claims. The contractor proceeded with the work promptly and efficiently. There were many items where the owner rather expected that extras would be asked and for which indeed he was prepared to pay reasonable costs. The contractor knew of the owner's at-

titude and knew that if he put in a claim for extras it would be honored. He nevertheless voluntarily disregarded this opportunity and included many of these items in the contract price. The result was that the owner was tremendously pleased and that he became a real and enthusiastic "booster" for this particular contractor. Within recent months the same owner has had another project on which bids were submitted by many high-class contracting firms. Some of them were lower than the bid submitted by the contractor who had done the previous work. There was no reason to think that the lower bidders were not responsible and conscientious. The owner, however, did not hesitate for a moment, but promptly reemployed the same contractor, giving him a contract several thousand dollars higher than the contract which he could have secured from others. The additional profit which the contractor will secure in all probability under this second contract will amount to far more than the aggregate amount of the extras which he might have secured, had he so wished, on the first project. This is a typical and practical example of the investment value of convincing the owner that he will have fair treatment, few extras, and real cooperation in keeping the cost within his limits.

Another situation with which the contractor is often confronted is that in which the contract drawings or specifications, through carelessness, mistake or otherwise, do not properly provide for the work. This situation is often, but not necessarily, related to the question of extras. However that may be, there is no question but that the duty of the contractor is to bring to the attention of the architect or the owner the discrepancies or mistakes involved. It will probably be more tactful for him to bring them to the attention of the architect in the first instance. This will give the architect an opportunity to correct them himself and will not give him the feeling that the contractor has been officious or has gone over the head of the architect in taking up the matter with the owner. If it is not possible or practical to consult the architect to have the corrections made in this way, it is then the duty certainly of the contractor to consult the owner. By saying that this is a duty, I do not mean that it is necessarily a legal duty. It is clearly, however, the right course for him to follow. More than this, it is distinctly the course most to his advantage. If the contractor, knowing that omissions have been made, inadvertently proceeds with the work and, when the situation later develops, demands extras for the changes or additional work resulting from them, he will secure some temporary benefit undoubtedly from the extra allowance. The architect will usually feel, however, that he should

have been consulted, and the owner will feel that someone is to blame and will probably place the blame upon both the architect and the contractor.

Some contractors incur criticisms by subletting practically the entire work and then losing interest in it, being assured that they are protected under their subcontracts.

This is an especially aggravating situation from the point of view of both the owner and the architect. If the general contractor undertakes the work, the owner is entitled to look to him as the responsible party and to expect him to give it real attention. There are many contractors, without doubt, however, who in the true sense of the word are not engaged in building operations themselves, but who merely take contracts, sublet all the work, and include a profit for themselves. Architects are not partial to contracting organizations of this character. They feel, and rightly, that the contractor who takes an active part in the building work through his own organization, will give fair attention and far better coöperation. Even if, in a given case, the contractor sublets the greater part or all of the work, he will do well, in the interests of the good will of the architect and the owner, to evince a continuing and effective interest in the work done and a proper supervision of his subcontractors and material men.

The attitude of the contractor toward the architect is usually very complimentary to the latter. The contractor is either suspicious of the architect and his abilities or he follows the other extreme in his reliance upon him. In the great majority of cases, the contractor's inclination is to rely upon the architect to protect him and see that is is not taken advantage of under the contract. It is natural that the contractor should have a very definite feeling of either trust or distrust toward the architects with whom he works. The architect is in a position to be of great help to the contractor or to cause him considerable difficulty and loss. If the architect is unfair or not capable or experienced, he can very easily cause the contractor to lose his expected profit and considerably more, in addition. On the other hand, if, as is usually the case, he is experienced and conscientious and capable, he can be of great assistance to the contractor in interpreting the latter's attitude to the owner and the owner's attitude to the contractor, in promoting a harmonious handling of the operation and in protecting the rights of the contractor where it is proper and necessary that he should do so. We have noted briefly in another connection the position of the architect as arbitrator. His powers as such have many ramifications. The architect does not always himself realize how often and on how many questions he is called upon to decide judicially be-

tween the owner and the contractor. Many of these decisions are made casually and accepted without question by the parties concerned. Some of them are more formal and difficult. The architect again and again is called upon to hold the scales as between his client and the contractor and to do justice between them. This may be in connection with his interpretation of the drawings and specifications; it may be in connection with the condemnation of work or the issuance of certificates or the approval of extras.

So far as the contractor is concerned, it is a practical necessity that he should rely, whether he wishes to or not, upon the ability and good faith of the architect. The status of the architect is necessarily such that, in order to make his employment and work effective, he must be and is endowed with powers which, if improperly exercised, would be very harmful to the contractors. This has been recognized as a necessary condition. The tendency for some years has been to cut down somewhat the power of the architect in this connection and to limit his purely discretionary and arbitrary powers and throw open the door to arbitration on various points, which formerly might have come to him for sole decision. There remains, however, sufficient discretionary power in his hands, so that the contractor has a real interest in the choice of the architect. If the architect does not know his business or is not sound in his practice and sensible in the conduct of the work, the contractor would much better not undertake the contract. On the other hand, if the architect is experienced, fair and reasonable and has a reputation for doing the right thing by contractor and client, the contractor is reasonably safe in entering upon the work, even if the contract gives wide discretionary powers to the architect.

In the last analysis, the contractor must depend, and does depend, upon the good faith, fairness and ability of the architect. That there are very few cases in which any objection is made to the architect by the contractor indicates how well this dependence is justified and is a real compliment to the architectural profession. A wise contractor will argue the terms of the contract before it is signed, and not afterwards. If there is any question which is not entirely clear or if any ambiguous provisions are inserted or if there are some points which are not covered, he will bring these to the attention of the architect or the owner, before the contract is signed. It is true that many contractors are not diligent in this respect and that some even knowingly enter into ambiguous contracts with the thought that the ambiguities may result in benefit to them, in promoting opportunities for extras and in making possible additional compensation and claims. This is un-

doubtedly the result in some cases. In the long run, however, the contractor who does his talking and arguing beforehand and not afterwards is the one who will succeed and build up real prestige. No owner and no architect care to deal many times with a contractor who is constantly wrangling over the terms of his employment and their interpretations. They much prefer to deal with one who may be a shrewd bidder and, if one will, "fussy" in the framing of the contract in the first instance, but who stands by it and by its terms and by the architect's interpretation of it, after it has become effective.

There is some misapprehension in the minds of contractors with regard to their authority in emergencies. Some have the idea that in any emergency they are authorized to act on their own initiative. This is not necessarily true and is not a safe rule for them to follow. If an emergency arises where there is no possibility of consulting the owner or the architect, the contractor necessarily must act as he thinks best and necessary. On the other hand, if the emergency is not so acute and if it is possible to consult the owner or architect, this should be done. It should be done, not only in the interest of the owner, but in the interest especially of the contractor.

The contractor will do well, also, to have in mind the limits of the architect's authority in the matter of changes and the authorizing of extras. It is natural that where the architect gives definite, verbal directions regarding the work, the contractor should follow it. Such directions are given constantly and constantly obeyed without any unfortunate results. This is because, however, the owner, in effect ratifies the action of the architect and raises no question regarding it. I have already pointed out some of the limitations of the architect's authority as an agent. The contractor is interested in these limitations, fully as much as the architect or the owner. In fact, his interest is probably greater. If he proceeds with work and incurs expense on a verbal authorization, which the architect has no power to give, and in which the owner does not back up the architect, the contractor will face a serious loss in consequence. Wherever possible, the contractor will do well to have these directions of the architect confirmed in writing and, if the directions are such as to entail substantial changes or additions in the contract, he will do well to ask that they be confirmed in writing by the owner. Of course, if the construction contract provides that the contractor may honor any directions given by the architect for changes or additions, this latter precaution may not be necessary. The contract provides, more often, however, that such changes

shall be approved in writing by the owner. The clauses in the contract dealing with this point are of vital interest to the contractor and should be borne in mind by him, especially in negotiating and executing the agreement.

On the whole, the architect and the contractor probably understand each other better than do the owner and architect or the contractor and owner. The contractor, from long association with architects, appreciates the position which they occupy in the building world and their functions and limitations. The architect, from his association with builders, understands the problems which confront the contractor and, without any lessening of his loyalty to his client, is able to take a sympathetic view of many of the contractor's difficulties. The owner and contractor and the owner and architect have direct contractual relations. There are no such relations between the architect and the contractor. This, perhaps, is one reason why there are fewer serious misunderstandings between them. On any building project, coöperation is the real essential. The architect and owner can do little without the coöperation of the contractor. The contractor needs their coöperation. In some cases it will be lacking because one of the parties is inclined to be unfair or unreasonable. In a great majority of cases, however, if lacking, it will be absent because of a lack of understanding on the part of architect, owner or contractor. As I indicated at the commencement of these articles, this understanding is the real essential. The architect is in an excellent position to promote mutual understanding. He can interpret the contractor's position and problems to the owner and he can interpret the problems and point of view of the owner to the contractor. In so doing, he will not render a general service alone. He will be making smooth, also, his own path, diminishing the chances of friction and misunderstanding on the work, increasing the prospect that his client will be wholly satisfied, and strengthening the foundation upon which the permanence of his own prestige and the good will of his practice and organization depend. The American Institute of Architects has, as an organization, done valuable work along these very lines. Its standard forms of agreements alone are a considerable accomplishment. It is not an easy matter to draft a contract which is satisfactory and fair to owner and architect and contractor alike. The Institute and similar architectural associations may well take pride in the part which they have played, and are playing to an increasing extent, in eliminating misunderstandings and points of friction and promoting coöperation and good will and understanding throughout the building operation.

AERIAL DRAFTING

BY
H. G. HALL

THIS title does not refer, as might be supposed, to the familiar publicity method commonly called "sky writing," but refers to the pictorial presentation of objects as viewed from the air. The increasing airmindedness and the increasing familiarity of the general public with the appearance of the ground and of objects on the ground as viewed from airplanes, raise a question as to the best method of making and presenting perspective drawings, giving what used to be called "bird's-eye" views. This question is of timely interest to architects, as the very same developments which have made accurate presentation more important have also increased materially the general usefulness of air views of great varieties of subjects, — towns, cities, housing developments, buildings, groups of buildings, airports, to mention a few.

The methods universally used for making perspective projections from plans or maps require projection of the subject upon a vertical picture plane. These methods produce satisfactory results in all usual cases when the viewpoint is close to the ground, or when the picture plane is nearly perpendicular to the line joining its center with the viewpoint, because the objects are thus pictured in substantially the same proportions and relations as if viewed by the eye or recorded by the camera. When, however, objects are seen or recorded from a viewpoint at a great distance above the ground, the retina of the eye and the plate of the camera are usually tilted far from the vertical, and the perspective drawing of the same view, projected on a vertical picture plane, seems to show serious distortion. Increasing familiarity with airplane views increases the seriousness of this distortion, and although a

true view can be obtained of such perspective drawings by tilting them to the proper angle to the line of sight, it is quite impossible to expect this to be done by the usual reader.

Another method sometimes employed in making perspective drawings of objects covering large horizontal areas consists of photographing the plan at the desired angle, thus securing directly the desired perspective projection of the plan, and then sketching in on the photograph all lines of the picture which lie outside of this plane. By this method, however, it is impossible to obtain

accurate representation of any of the objects portrayed except only those portions which lie in the plane of the plan, i.e. horizontal.

Without the use of the camera it would, of course, be entirely impracticable to project a drawing on a picture plane which is not vertical. While it would be possible to do so, the labor involved in calculating a different proportion for the projection of each point would be prohibitive. It is, however, a comparatively simple matter to make the

drawing in the usual manner, projecting it on a vertical picture plane, and then to correct the distortion by photographing the original drawing tilted so as to form the proper angle with the camera plate, or vice versa. The resulting photograph when viewed directly will show the picture as it would be seen from the air.

The illustrations accompanying this article show how this method has been carried out with a perspective drawing of an airport. Fig. 1 shows a plan drawing of the airport design, with landing field, runways, buildings, etc., in simple outline. Fig. 2 shows the perspective drawing of this airport, projected in the usual manner from the plan to a vertical picture plane and repro-

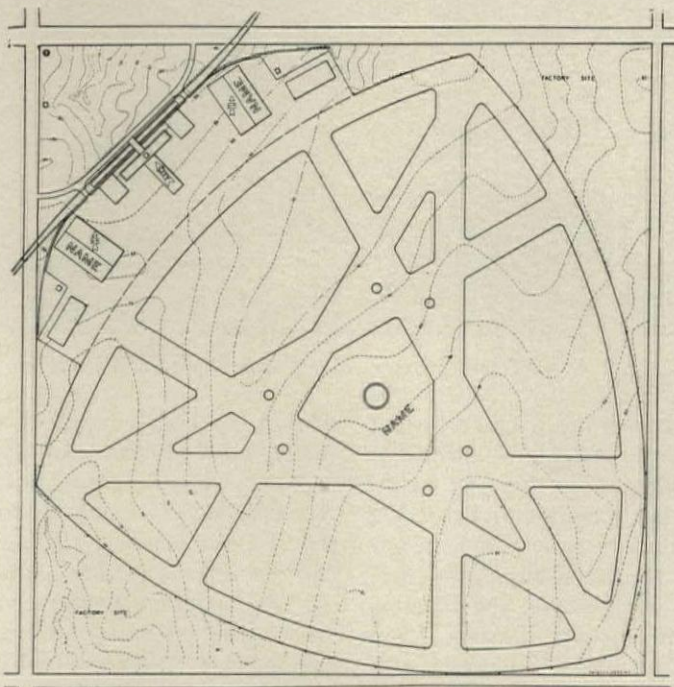


Fig. 1. Plan of the Airport Shown in the Perspectives, Figs. 2 and 3

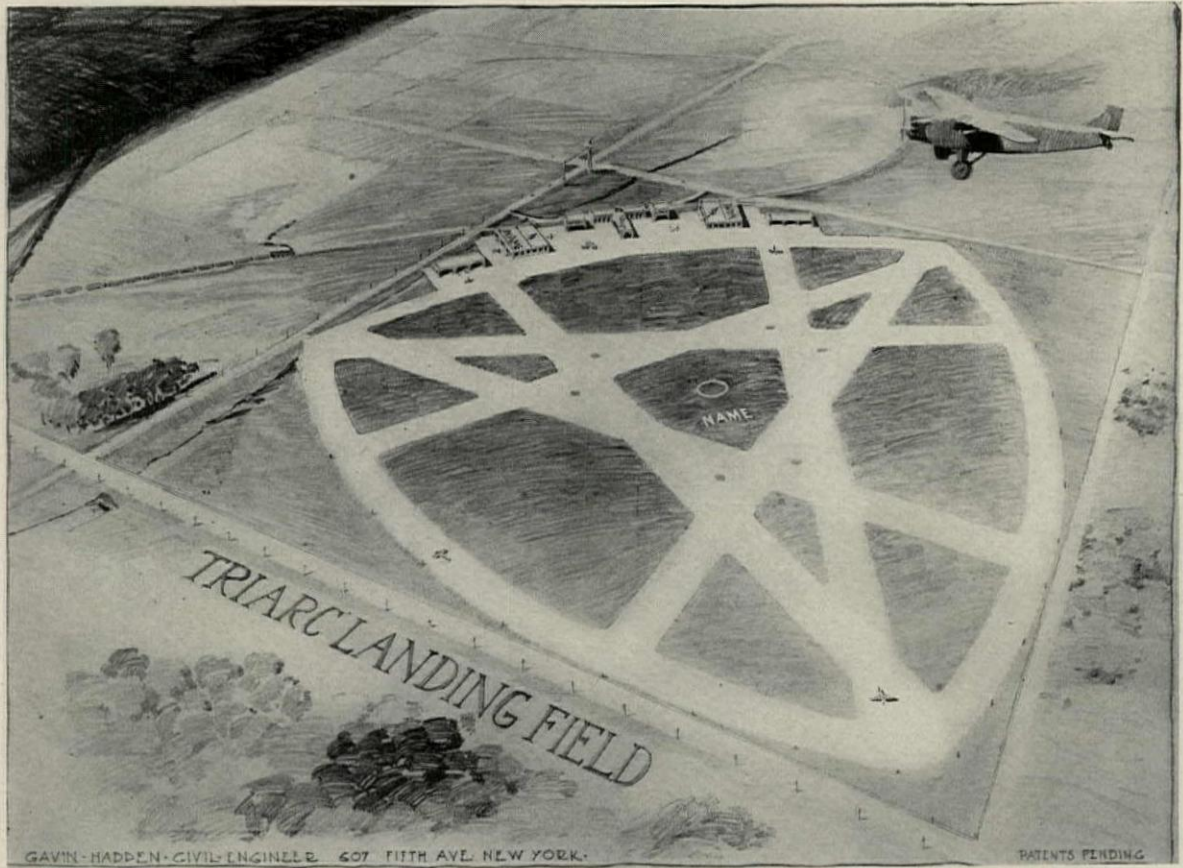


Fig. 2. Usual Aerial Perspective, Showing Apparent Distortion

duced from a normal photograph. The apparent distortion is quite obvious, particularly when it is realized that the site enclosed by the four boundary roads is almost exactly square and that the landing field and its runways have complete triangular symmetry, as is shown clearly in the plan. To get a true view of this picture, the illustration must be held at the proper distance from the eye and at an angle of about 57 degrees with the line joining the center with the eye. Fig. 3 shows the same perspective drawing, reproduced, however, from a photograph taken with the drawing tilted at an angle of about 33 degrees from the plane of the camera plate. The dis-

tortion has been corrected, and when viewed directly the airport now appears in its proper proportions. The diagrams in Figs. 4, 5, and 6 show the method which was followed. Fig. 4 shows the relation between the airport, the viewpoint, and the vertical picture plane as assumed in making the original perspective drawing. Fig. 5 shows the relation between the airport, the camera lens, and the tilted camera plate as they would be placed in taking a similar picture from the air. The angle between the picture plane of Fig. 4 and the camera plate of Fig. 5 gives the angle to which the drawing was tilted in relation to the camera plate when photographed to correct

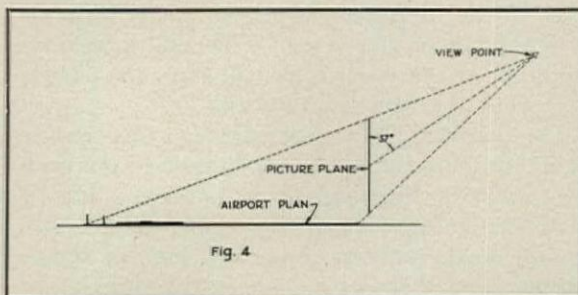


Fig. 4. Diagram of Relation of Plan, Picture Plane and Viewpoint Used for Fig. 2

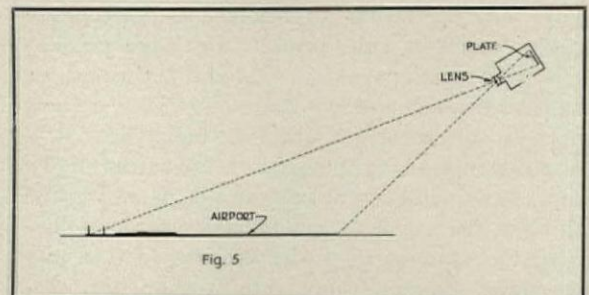


Fig. 5. Diagram of Relation of Plan to Picture Plane When Photographing From the Air

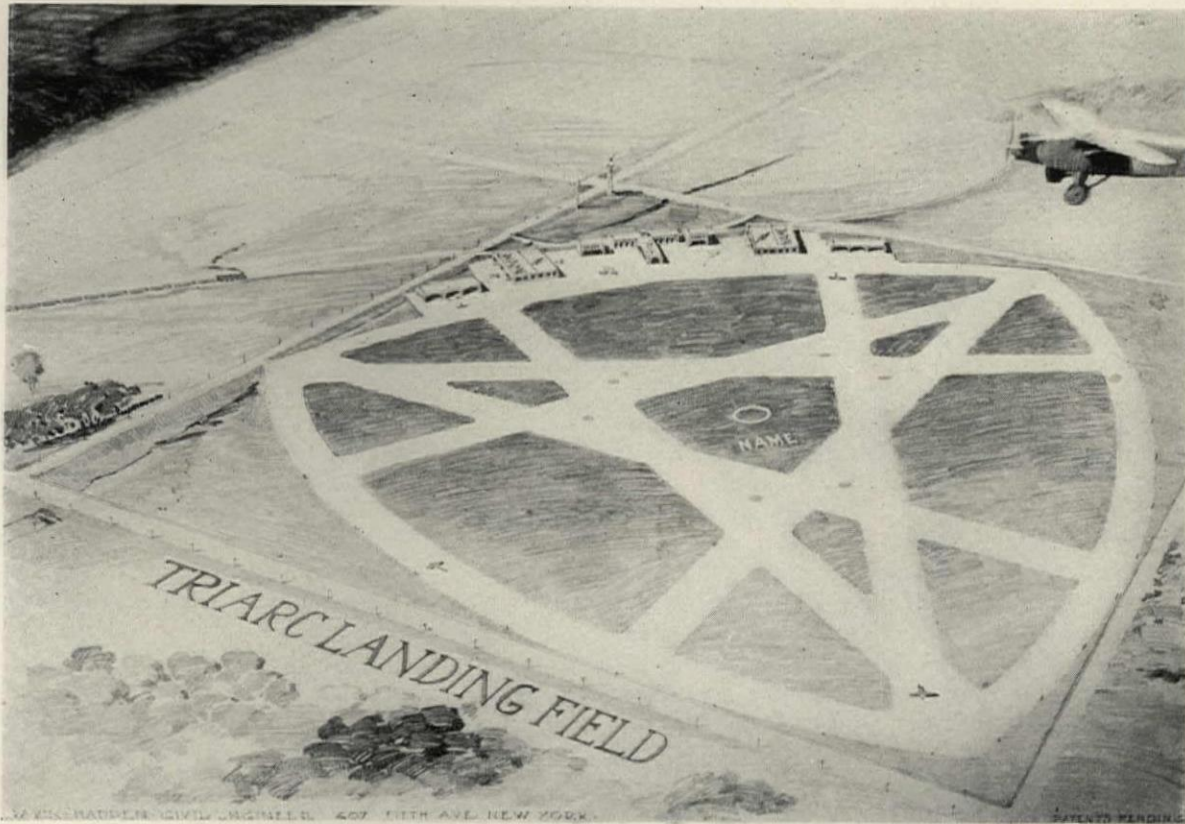


Fig. 3. Aerial Perspective Photographed, as Explained, to Correct Distortion

the distortion, as shown in Fig. 6. This angle was in this particular instance about 33 degrees.

No special camera or apparatus was used in photographing this drawing, and therefore parts of the photograph reproduced in Fig. 3 are slightly out of focus, as can be seen from careful inspection and comparison with the illustration from the normal photograph. The lower and nearer portions of the picture are given in sharp definition, while the upper and farther portions are slightly out of focus. Although sharp definition throughout could readily be obtained if the camera were especially equipped for the purpose, using perhaps a pinhole lens, there is no disadvantage in this case, and the slight loss of sharp definition perhaps makes the view even more in-

teresting and realistic; in a real view, the edge of the wing cutting off the upper left hand corner of the picture, and the fast-moving plane in the upper right hand corner would naturally be out of focus, while a hazy atmosphere would naturally cause a slight blurring of the more distant parts of the view. The principal features of the picture, which is particularly well suited for bringing out the distortion produced by the usual methods, include a new type of landing field and a new system of runways which show the most efficient and economical method of development on a square or nearly square airport site. The maximum lengths of runways are obtained with the minimum amount of runway surfacing, due to the intersections.

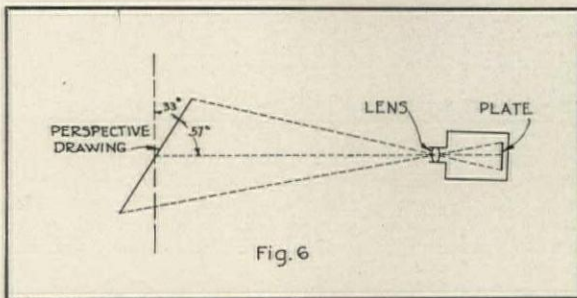


Fig. 6

Fig. 6. Relation of Perspective Drawing to Plate to Make Correction Shown in Fig. 3

EDITOR'S NOTE. *The perspective drawing used to illustrate this method of corrected drafting was made in the office of Gavin Hadden, Civil Engineer, New York. It was rendered by Floyd Yewell, and the photographic work was done by J. Dreyer under the direction of C. A. Holden, of Mr. Hadden's office.*

THE BUILDING SITUATION

A MONTHLY REVIEW OF COSTS AND CONDITIONS

DECEMBER, 1928 brought to a close the high record year in the history of the country's building construction, according to the reports of the F. W. Dodge Corporation. Figures covering contracts let during the year in the 37 states east of the Rockies, which constitute 91 per cent of the active construction area in the United States, show a total value of \$6,628,286,100. This figure exceeds that of the previous year by approximately 5 per cent and is 4 per cent above the 1926 figures, the previous high record.

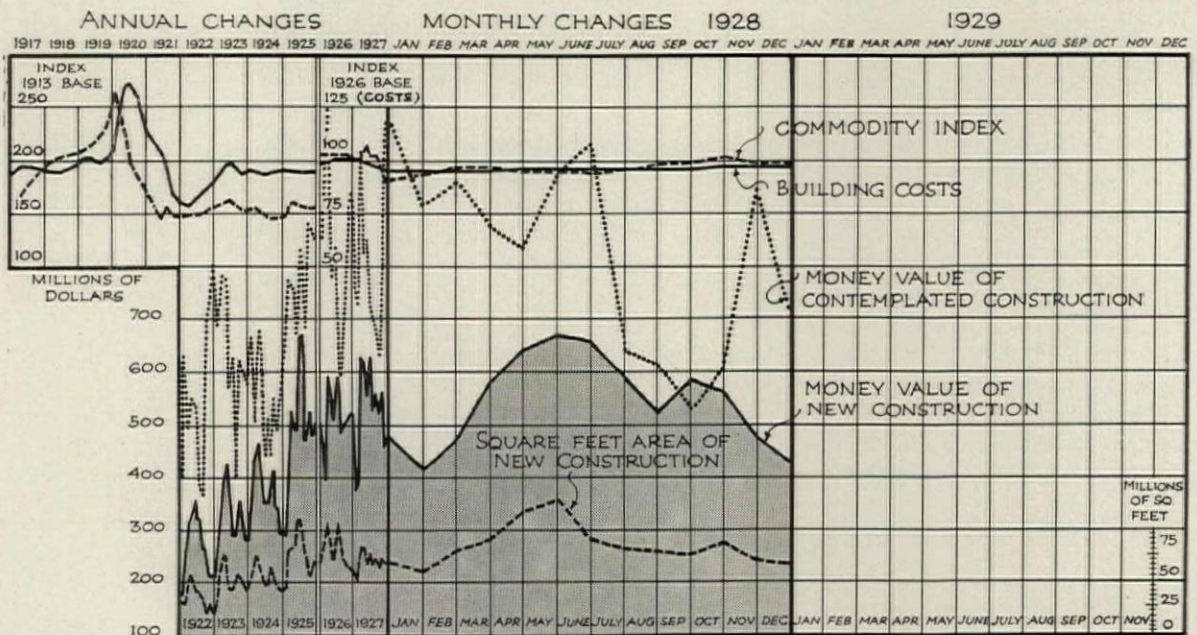
This record for the year 1928 was attained in spite of a fairly decided falling off of contracts let during December. The total for this month was reported as \$432,756,300, which was 8 per cent below the total for November and 9 per cent below that of December, 1927. The district which includes New York and also northern New Jersey is the only one in which the December, 1928 record exceeds those of both the previous month and December, 1927. The total contract figures for this district amounted to \$138,340,700, an increase of 2 per cent over the previous month and 7 per cent over December of 1927.

In the Northwest the sharpest decline of any

section was noticeable. The December, 1928 total was 34 per cent below that of November, and 74 per cent below the previous December. In the Central West, contracts fell off 27 per cent from December, 1927, and 11 per cent from November, 1928. In the New England states, the total contracts let amounted to \$28,222,900, which was 8 per cent below the value for November and 9 per cent below that month in 1927.

The chart below indicates that the money value, and also square foot area of construction contracted for during December, are about on a par with the low points for the year. The contemplated construction is somewhat below the average for the year, but considerably above the low points reached during the last half of the year.

It will be noted that in portraying building cost trends in this chart, the year 1926 has been adopted for the index base. This constitutes a more logical "normal" than did 1913, inasmuch as it is more nearly typical of the present economic era and is being generally adopted by economists as the key year for indexing purposes. The commodity index is that developed by *The Analyst*, a source of reliable data on building.



THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs*. This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index*. Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction*. Value of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Corp. and *Engineering News-Record*. (4) *Money Value of New Construction*. Total valuation of all contracts actually let. The dollar scale is at the left of the chart in millions. (5) *Square Foot Area of New Construction*. The measured volume of new buildings. The square foot measure is at the right of the chart. The variation of distances between the value and volume lines represents a square foot cost which is determined, first by the trend of building costs, and second, by the quality of construction.

SANITARY DESIGN IN MODERN BUILDINGS

MISCELLANEOUS SERVICES

BY

HAROLD L. ALT

CLOSELY associated with the cold water supply are the fire-protection or standpipe service, to which all fire hose is connected, and the automatic sprinkler system,—if any. There is considerable variation in practice concerning the location of standpipes, various fire departments having different ideas. Where smoke or fire towers are built into a building, there are usually 2½-inch firemen's valves placed in the towers from standpipes located somewhere near the towers, and 1½-inch hose outlets and hose are placed in the corridors. In other cases it may be permitted to eliminate the 2½-inch valves in the fire towers and to install 2½-inch valves at the hose racks and removable reducers to come down to the 1½-inch size of hose.

Standpipes. In theory, standpipes in a building are for two purposes only,—the first, for the emergency use by the building occupants before the arrival of the firemen, and the second, for the use of the fire department. The number of standpipes should be sufficient for reaching any part of the building with a hose not exceeding 50 feet in length and not over 1½ inches in diameter. Hose racks having 75-foot and 100-foot lengths of hose

are sometimes used, but these are poor in practice as everyone who has seen the occupants or even the operating force of a building actually try to use a fire hose in a real fire will agree. Such a fire generally flares up suddenly and unexpectedly; a commotion ensues, everyone becomes excited, the hose is pulled off the rack where it has probably been packed tightly for months, it falls in kinks and is only partially straightened out; some of the many kinks remain, water is turned on at the valve, but the nozzle remains dry. Finally the last kinks are straightened out and water flows, but much valuable time has been lost at the most critical time. The longer the hose, the more kinks there are to be straightened out and the more difficult it is for inexperienced users to handle it. Hence the recommendation of the 50-foot length. This does not mean, however, that the distance from the standpipe to the farthest part of the building must not exceed 50 feet, as the length of the stream from the hose must also be considered, so that it may be said a 50-foot hose will cover a distance of 70 feet from the standpipe provided that the last 20 feet are in a straight line. The hose may be run around a corner, but

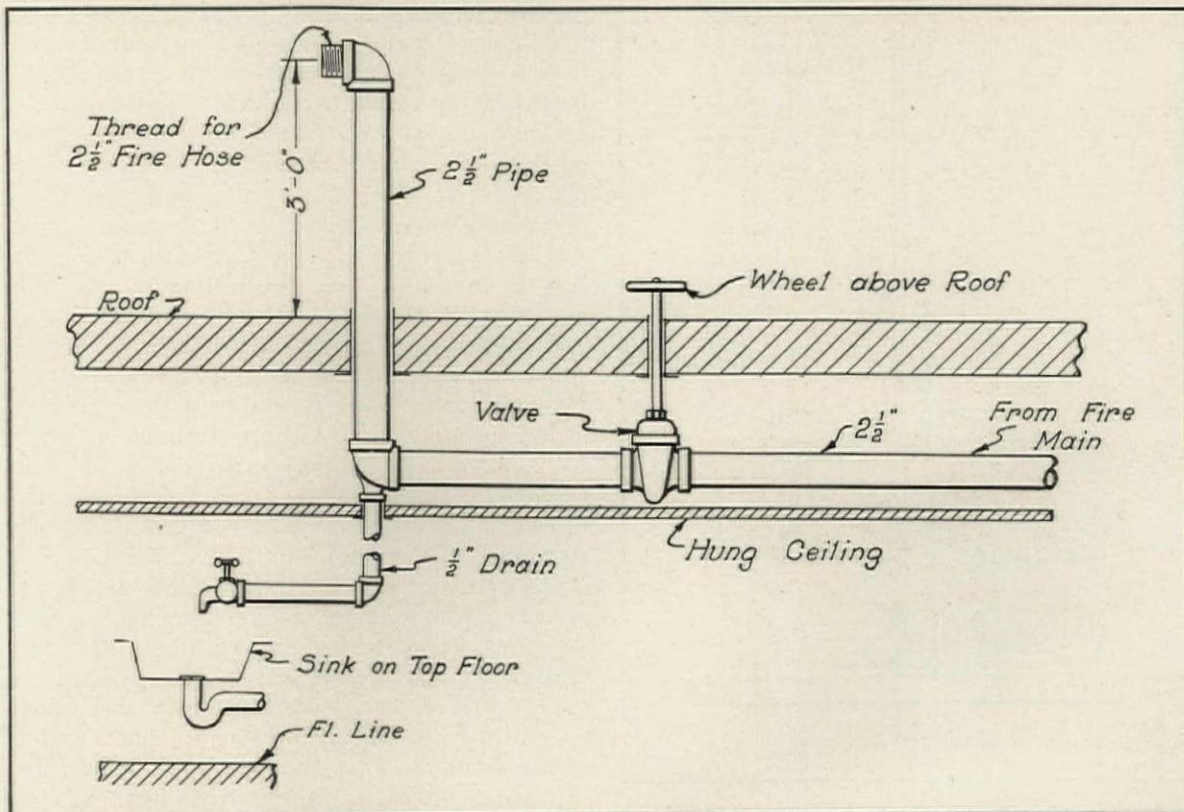


Fig. 1. Detail of Typical Roof Outlet, Valve and Drain

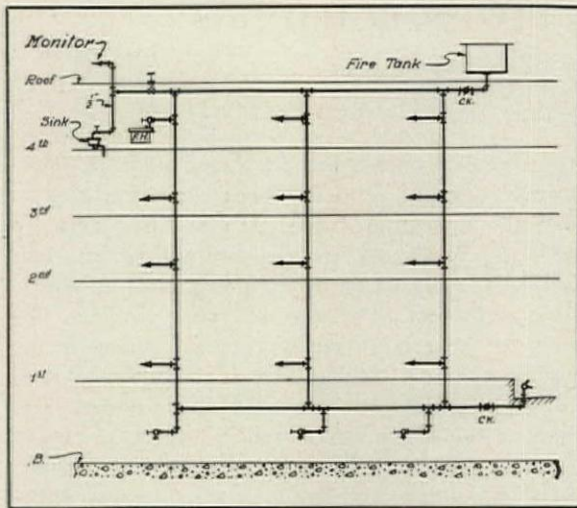


Fig. 2. Layout of a Typical Standpipe System

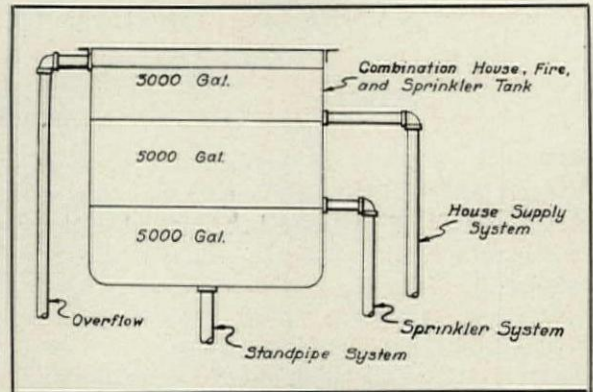


Fig. 3. Combination House Tank Connections

the stream from the nozzle on does not possess this desirable feature. The law or building code usually sets minimum requirements in regard to the standpipe provisions.

In order to provide an emergency supply of water for the use of the hose by the occupants, a connection to the street main or to the house tank or both is made from the standpipes, and, where the top of the building is above the height of effective city pressure, the house tank connection must be made; only in this case the house tank is either a separate fire tank for fire use only, or else it is combined with the house tank so as to reserve a certain amount of water for standpipe service, this amount usually being between 3,000 and 5,000 gallons. When a separate fire tank is used, it is filled either by city pressure or by pumping, and it has a bottom connection which is run into a horizontal main which connects into the tops of all the standpipes, with a check valve close to the tank, the use of which will be explained later. The street connection is made in a similar manner through a check, but to the bottoms of the standpipes. The object of this is to supply the hose as far up as the city pressure will reach in case the tank reserve should be exhausted.

For the use of the fire department a Siamese connection is installed at the sidewalk, having two 2½-inch connections and a 4-inch outlet to a 4-inch line which also connects through a 4-inch check valve to the bottom of the standpipe. The fire engines are coupled up to the Siamese, and the fire engine pressure is delivered direct into the standpipes. It is to prevent this pressure (which is higher than that of the fire tank and the city system) from backing up into the tank or out into the city mains that the checks on the house tank and city connection previously mentioned are used. Hose of regular 2½-inch size is then taken up into the building by the firemen and coupled to the standpipes at the floor levels where the fire is to be attacked. Owing to the fact that 2½-inch hose under high pressure requires expert

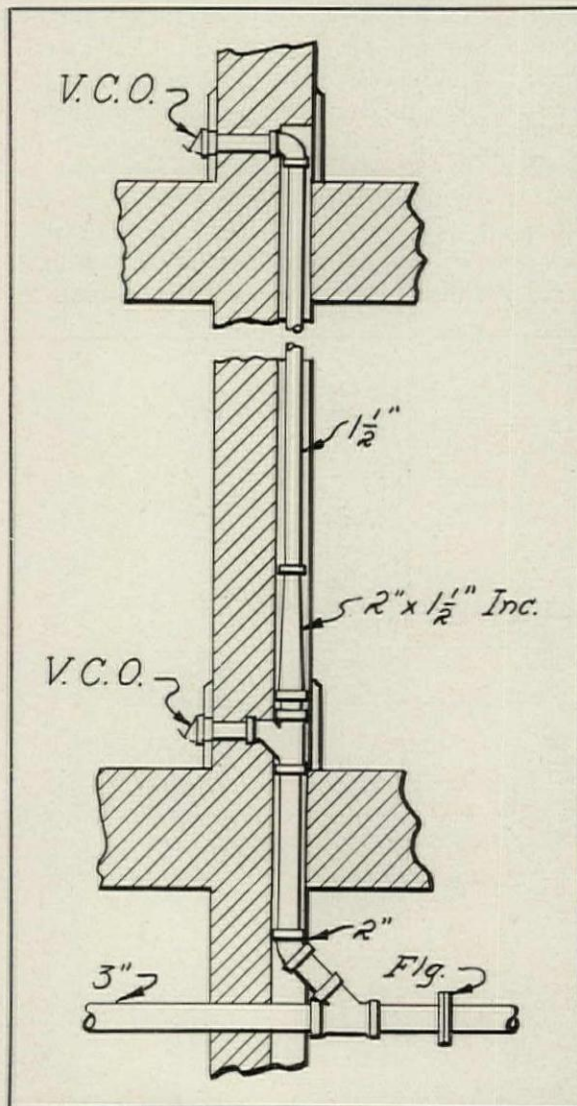


Fig. 4. Connections for a Typical Central System Vacuum Cleaning Installation.

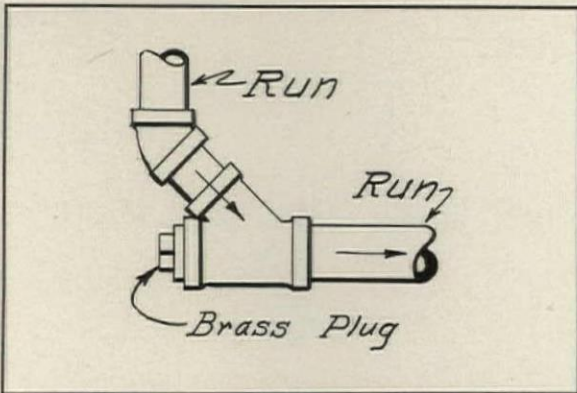


Fig. 5. Cleanout Plug Correctly Placed in Direction of Flow in Vacuum Cleaning Pipes

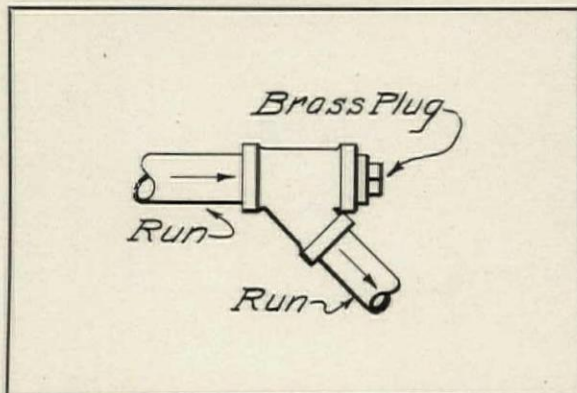


Fig. 6. Cleanout Incorrectly Placed Against Direction of Flow Causes Trouble

and trained manipulation, the hose in the building racks is made of 1½-inch size and as short as possible to facilitate handling by the occupants; but the firemen's hose is 2½ inches, in order to get a larger stream on the fire and because the firemen know how to handle the larger size at the higher pressure.

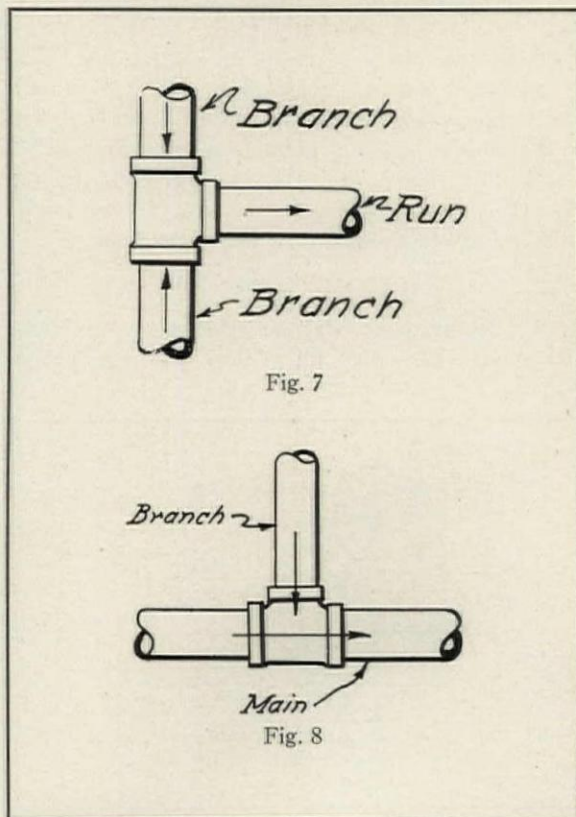
It is often desirable to place "monitors" or hose outlets on the roof to be used against fires in adjacent buildings, the fire monitor being the most expensive. The hose outlet possesses the advantage of allowing a hose to be run to any point on the parapet, whereas the location of the fire monitor is fixed. Such roof outlets should be protected against freezing by having the valves installed inside of the building with wheel handles above the roof. Valved drains should also be installed on the outlet sides of the valves to drain out the pipes after use, as otherwise the water will stand in the pipes above the roof and be exposed to freezing.

In Fig. 1 is shown a detail of a typical roof outlet, valve and drain, while in Fig. 2 is a layout of a typical standpipe system. The riser sizes vary from 4-inch to 6-inch, according to building height and local requirements; a 4-inch standpipe will supply two 2½-inch hose, a 5-inch, four 2½-inch hose, and a 6-inch about six 2½-inch hose. It is seldom that standpipe lines exceed 6 inches in size. The fire tank connection and the street connection need not exceed the size of the largest riser. In some cases fire pumps are installed for standpipe lines, but this is not usual except for very large buildings; in some districts two Siamese connections are also required.

SPRINKLERS

Closely allied with the standpipe system are automatic sprinklers. These usually require fusible heads located on about 10-foot centers on the ceilings of all rooms to be protected. Basements, factories, dry kilns, packing rooms and other locations where fires are likely to have their origin

are desirable areas for sprinklers. It is not necessary to go into all the details of the various sprinkler installations, as these are governed by Underwriters' regulations which cover the subject fully. Separate Siamese connections will be required for the sprinkler system and separate reserve water, either in a sprinkler tank or in a combination tank, such as is shown in Fig. 3, where 3,000 gallons are for house use, 5,000 gallons for sprinkler use, and 5,000 gallons for standpipes. Sprinkler pumps are also required on certain installations, although the gravity tank is



Connections as shown in Figs. 7 and 8 are Easily Clogged and Should Not Be Used in the Vacuum System

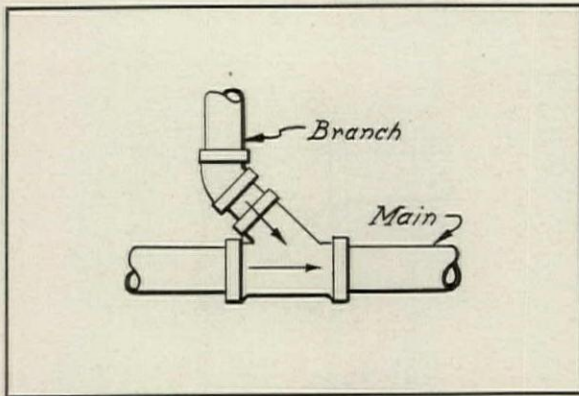


Fig. 9. Proper Connections between Horizontal Main and Branch

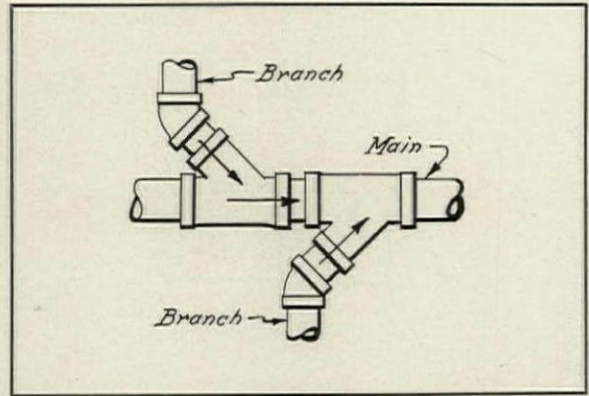


Fig. 10. Proper Connection between Main and Two Branches

regarded as the most dependable of all sources of water supply for fire protection and sprinkler use.

Piping for fire protection lines is most frequently made of galvanized steel pipe with galvanized, screwed, malleable pattern steam and water fittings. Where pressures of over 150 pounds are possible, extra heavy fittings should be used. Hose valves, hose racks and hose are often placed in hose cabinets set flush with the wall, not only to protect the hose but also for the sake of appearance. Where cabinets are used they should have manually-operated handle catches so that immediate access can be obtained by anyone at any time. A locked door and glass which requires breaking are likely to result in cutting the hose in getting it out of the cabinet. For locations where tampering is prevalent, a locked cabinet door with the key in a glassed-in box adjacent to the cabinet will be a better arrangement than a cabinet in which the glass in the cabinet itself must be broken to secure access to the hose.

VACUUM CLEANING

Vacuum cleaning may be effected by the central system in which all outlets are piped to a

vacuum cleaning machine in the basement, or by means of the portable type which is run around and plugged into electric outlets at convenient locations. The portable system is perhaps not as convenient as the pipe system, but it has the merit of being less expensive to install. With the piped system it is essential to have the vacuum cleaning outlets installed in locations not only convenient for access but also so placed that a 50-foot hose when run around the halls and through doorways, etc., will actually reach to the extreme portions to be cleaned. The most desirable type of vacuum cleaning inlet is the snap-flush type which finishes flush with the wall and automatically closes when the hose is removed. Vacuum cleaning inlets are customarily located in walls near the floor, but occasionally in theaters they will be located in the floor out from the walls to avoid unreasonable lengths of hose. The size of inlet is 1 1/4 inches, and the pipe and riser are never made less than 1 1/2 inches to avoid matches' clogging the line. The risers are usually carried downward, but they can be carried up a floor or two where conditions make this necessary.

The piping is nearly always of black steel, on

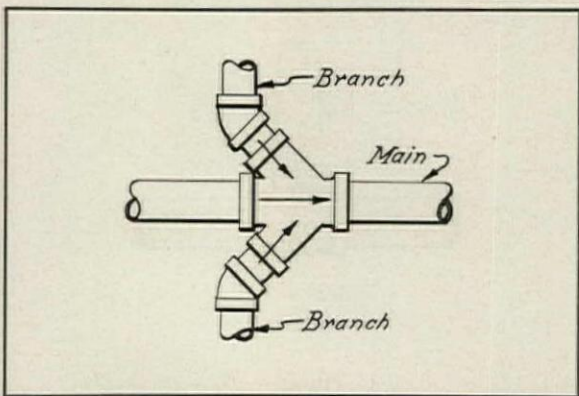


Fig. 11. Double "Y" Connections are more Subject to Stoppage than Connection Shown in Fig. 10

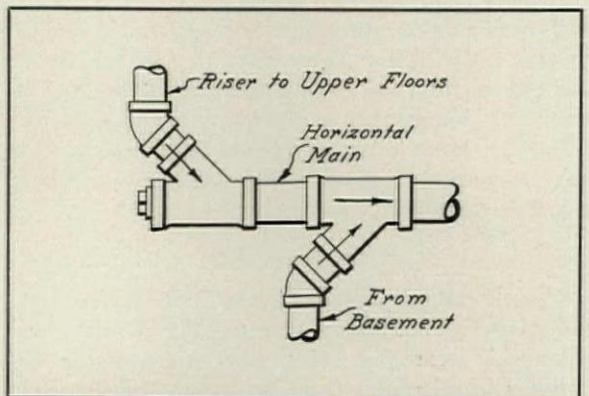


Fig. 12. Dirt from Riser Is Likely to Clog Pipe from Basement if Connections Are As Shown

account of cheapness, and of smooth interior bore, and the fittings should be black, cast-iron, long-radius, recessed drainage fittings. The sizes of the mains are determined by the maximum number of tools or sweepers for which the system is designed. The mains should not be unduly increased over the sizes actually required with the idea of securing a better pulling vacuum at the tool. This undoubtedly does result, but the oversized main also causes a large drop in velocity which tends to allow the air to slow down sufficiently to drop the dirt out of it, resulting in quickly stopping up the main. In a plant running from two to six sweepers' capacity, it is usual to consider $1\frac{1}{2}$ -inch risers sufficient; a 2-inch main is required for two sweepers, a $2\frac{1}{2}$ -inch main for four sweepers, and a 3-inch or $3\frac{1}{2}$ -inch main for a six-sweeper plant. In every case the main begins at $1\frac{1}{2}$ -inch size at the bottom of the first riser, is 2-inch after taking in the second riser, $2\frac{1}{2}$ -inch after taking in the third riser, and 3-inch after taking in the fourth riser, etc. As soon as the size of main is sufficient to carry all the sweepers for which the plant is designed, there is no object of any further increase in size. Fig. 4 shows typical risers for a two-story building and the method of connection to basement main.

Usually at frequent intervals brass screwed cleanout plugs are located. Where a horizontal line makes a 90 per cent turn, the cleanout should be arranged to clean in the direction of flow, as shown in Fig. 5, and not against the flow as indicated in Fig. 6. Use of such junctions as are shown in Fig. 7 and Fig. 8, employing a straight tee, is absolutely impossible, as they are easily clogged. The best way to bring one horizontal main into another is indicated in Fig. 9. If two branches are to be connected into a main at practically the same point, the branches should be connected one back of the other as shown in Fig. 10, and not into a double Y-branch as shown in Fig. 11, because dirt coming into one side of a double Y is likely to be thrown over into the opposite inlet and thus plug it. Outlets located in basement rooms and below the level of the main have to be connected to the overhead main in such a manner as to prevent the dirt from the upper floors falling into the pipe from the lower outlets; a connection such as is shown in Fig. 12 is bound to plug the basement pipe by the dirt stopping it, but if the basement pipe is brought into the horizontal main back of the upper floor connection, or if brought into the horizontal main from the side instead of from the bottom, this difficulty will be avoided. Flanges on horizontal mains at frequent points are useful on long runs to allow for cleaning.

In order to determine the number of sweepers which will be required for a given installation, 4,000 square feet of bare floor per sweeper per

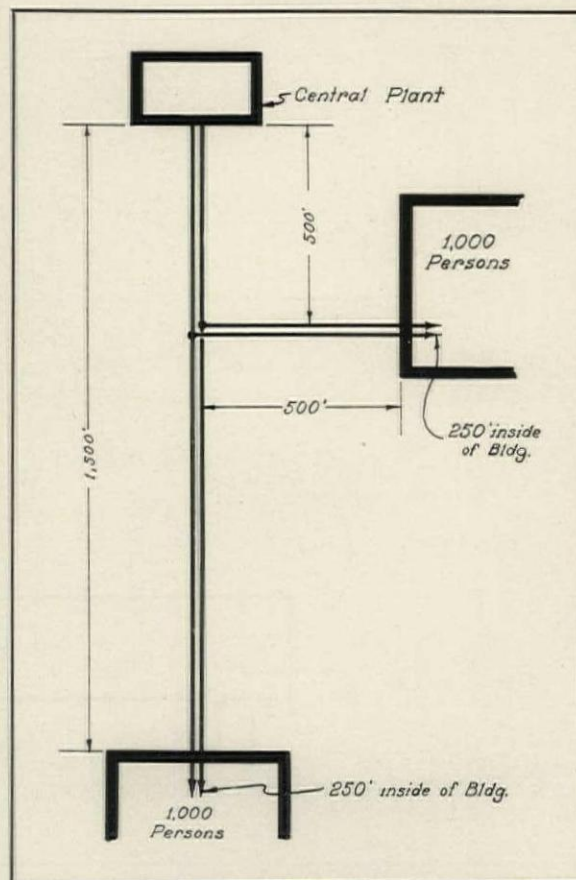


Fig. 13. In Providing Cooled Drinking Water from a Central Plant to the Other Buildings, Length of Run Is an Important Factor

hour may be assumed. Upholstery and carpets of course require much more time, and the probable type of floor covering as well as the number of hours when their operation will be permissible must be considered in estimating the capacity of sweepers. In schools, for instance, it is usual to assume $2\frac{1}{2}$ hours after school sessions for cleaning, and it is presumed that the average classroom can be cleaned in about 15 minutes. If the corridors and special rooms are cleaned during school sessions, this will work out to one sweeper for every eight classrooms or fractions thereof.

DRINKING WATER SYSTEMS

Drinking water systems are of two kinds,—one in which only a few fountains are required, such as in a main hall or in the back of a theater, and the other in which outlets are required in a number of locations, as in each office of an office building or in each room of a hotel. In the small installation, a combination unit electrically operated may be obtained and a small circulation pump provided to rotate the water through the circuit (Fig. 14). In the larger systems real refrigeration, running from 3 to 10 tons' capacity, must be provided. Both large and small systems cool the

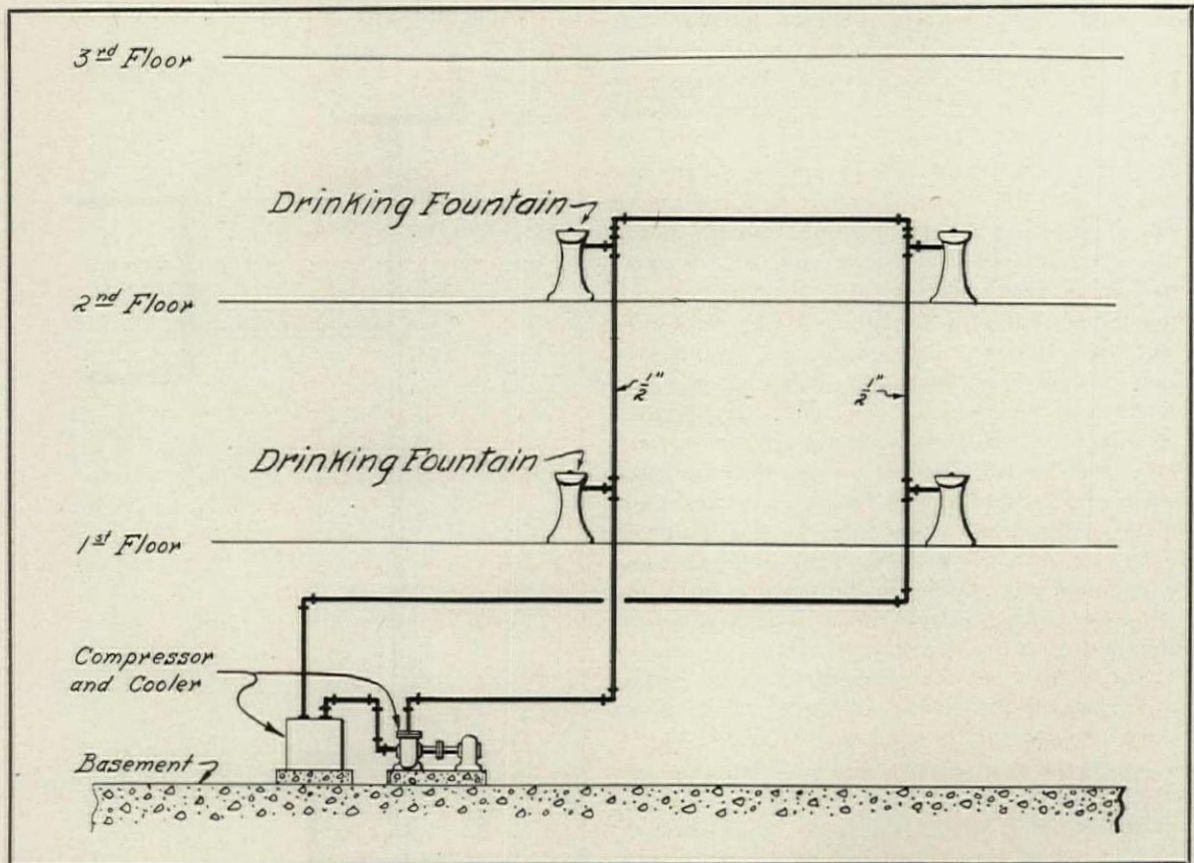


Fig. 14. A Small Drinking Water System with Circulation Pump

water at a central point and then circulate it through drinking water supply and return mains so as to include all fountain outlets in the circuit.

The calculations for a drinking water system are more or less complicated by the matter of so much of the load's consisting of heat absorption by the pipe lines and so little being involved in the actual water furnished. In estimating for a large drinking water system the length of run is a more important item than the exact amount of water which will be required. Consequently, every effort should be made to keep the pipe lines as short as possible and as small as possible, the size being consistent with the amount of circulating head allowable on the circulating pump. Half a gallon per day is allowed per person for drinking and wastage, as this is fairly close to averages obtained in actual installations. The ideal drinking water temperature is about 50° Fahr. Refrigeration is reckoned in tons per day of 24 hours, each ton being equal to about 200 B.t.u. per minute. In order to determine the quantity of water which it is necessary to circulate, it is necessary to know the allowable rise in water temperature permissible while traveling around the circuit and the amount of heat absorption by the circuit. The heat absorption is determined by the pipe size, and the

pipe size is determined by the circulation which it is desired to calculate. From this it will be seen that the whole matter travels in a circle, and that in order to break the circle, certain arbitrary factors must initially be assumed, only to be corrected later if the results indicate that they are incorrect.

These factors may be settled upon at once as a basis for calculation:

- (a) The average water temperature in the system is to be 50° Fahr.
- (b) The maximum temperature in the building will not exceed 100° Fahr.
- (c) The efficiency of the drinking water covering will approximate 80 per cent.
- (d) The circulation head allowable on the drinking water pump should not exceed 25 feet (or 10.8 pounds per square inch).

The next assumptions are only tentative and will require modification when more figures have been worked out.

- (1) That the average size of line for the system is 1½ inch.
- (2) That the variation in water temperature shall not exceed 10° Fahr. across the ends of the mains in the central plant.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

THE DUTIES OF SUPERINTENDENTS—(Continued)

Editor's Note. This second part of Mr. Beach's series continues Chapter 2 which appeared in the January issue of THE ARCHITECTURAL FORUM.

17. *Job Program.* At the beginning of a given work, the Chief Construction Engineer will confer with the contractors and agree with them upon a job program and time schedule, from which will be determined the time for ordering all materials, dates when they should be in readiness, and the degree of advancement of the whole work at each fortnightly interval. It shall thereafter be the duty of the Superintendent to bend every effort toward seeing that each contractor and foreman is doing his best to live up to this program and is looking ahead and planning accordingly. If not, he should be required to show cause. The Home Office demands specific information on such matters.

18. *Changes.* No employe of this office will be excused for suggesting a change to an Owner or Contractor. Any advice or criticism is to be made to the Chief or to the Home Office direct. It will be welcomed as part of the whole-hearted service each employe is expected to render; but the Home Office will take care of all such business dealings with both Owner and Contractor. The Superintendent must notify the Home Office immediately in event of any expression of dissatisfaction on the part of the Owner and shall not allow the portion of the work involved to proceed until a permanent or temporary settlement of the point has been made.

The Home Office will prepare an "Extra Work Order" and send a copy to the Contractor and one to the job office, covering each piece of extra work added to the original contract. Such orders will bear consecutive numbering and will show in detail the specific sort of work to be done and the basis of payment for it (percentage rate, if cost-plus; or stipulated amount, if lump-sum). Similar order will be issued covering each deduction. For all cost-plus work, whether for specific extras, for cleaning premises, plaster patching, glass replacement, or for any other work for which a Contractor expects to collect in addition to his contract price, the Superintendent must keep a daily record and check it each day with that of the Contractor, as the only method by which an authentic accounting can afterwards be made.

19. *Tests.* The Superintendent must post himself regarding all tests called for; know when they are to be made and be sure to witness them.

Later, he must secure and forward to the Home Office all records, exactly as specified. He should look ahead and be in a position to recommend tests where they appear necessary, in addition to those specifically called for. In this connection, he should have an early understanding with his Chief regarding tests of the bearing capacity of the soil, if any are indicated, and arrange for them accordingly.

20. *Coöperation.* One of the most important duties of a man assigned to watch construction is to actively assist in coördinating the various branches of field work so that all crafts will work together harmoniously. Matters of working space, storage space for materials and questions of job procedure are all up to the Superintendent to take care of before the occurrence of misunderstandings or conflicts.

21. *Expediting.* It is a distinct duty of a man supervising construction to follow up all work promptly upon his assignment to a job, and continuously thereafter. This means knowing at all times the state of progress of shop drawings, fabrication and manufacture of all various materials, such as cut stone, terra cotta, structural steel and iron, millwork, etc. It is dead wrong to assume that these matters take care of themselves in due time, but it is the particular duty of a Superintendent to keep himself informed as to the exact status of every subject pertaining to his job.

22. *In General.* The Appointee will be held responsible to the Home Office for all details in the conduct of the work to completion, or will have to be convincing in otherwise fixing such responsibility. The loyalty of the Home Office to the Owner is its first consideration, but the success of our operations depends greatly upon the loyalty of our employes to the Home Office and to the job. Therefore,

Don't gossip about the work.

Don't be undignified in either your language or your deportment.

Don't get chummy with men on the job or with their employers.

Don't accept favors from contractors, subcontractors, material dealers or employes, large or small.

Don't be unfair. You'll lose your point.

Don't lose your temper. Simulate righteous wrath, if advisable, but do so deliberately and remain in command of yourself and the situation.

Keep your head up and your mind clear.

that contractors are likely to cheat, when, if and as opportunity offers. This assumption should be amended by saying that contractors are merely average humans, some honest and some otherwise. It is the business of a superintendent of building construction to ascertain which type of man the owner is dealing with, and to function accordingly.

There is no doubt but that the system of competitive bidding contracting generally in vogue in architects' offices throughout the land offers peculiar temptations to individuals who rely upon their cleverness in evading, substituting and covering up. Such swindlers deliberately allot portions of their work to others at figures which induce similar crookedness on the part of their subcontractors. In order to avoid such abuse of the owner's trust, the wise architect will use his best efforts to prevent the awarding of contracts to concerns other than those of known integrity. This custom results ultimately in the compilation of lists of general and trade contractors acceptable in such an office, made up of those who are known to refrain from dishonest practices.

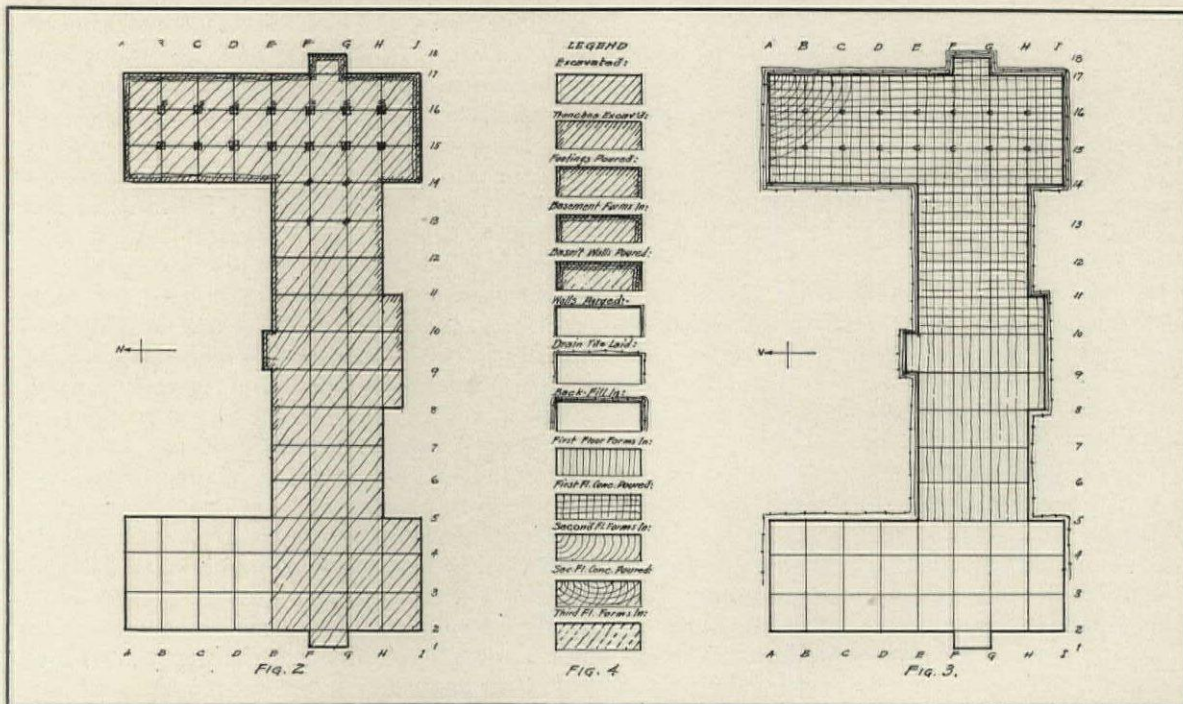
Supervision of the work of these concerns resolves itself mainly into a matter of assisting in interpreting contract documents and generally expediting the work. To be sure, a penurious owner will seek to defeat this by insisting upon the retention of the low bidder, regardless of the latter's reputation, claiming the privilege of reliance upon the contractor's bond and the architect's supervision to secure his money's worth. The mistaken economy of such procedure is easily demonstra-

ble. It is much safer for an owner to entrust his work to a reputable contractor without a bond than to commit it to an individual with a shady reputation who is apparently protected by a bond. But, even under those contractors intent upon honorably carrying out their obligations, one must be always alert in detecting mistakes or willful wrong doing of workmen and subcontractors.

An example of this is seen in the performance of those concrete foremen and laborers who persist in "saving" cement whenever the inspector's back is turned, even when their employer has given no such instructions. One such workman, in his misguided zeal for his employer's interest, was seen to be using heaping shovels in measuring sand and gravel, but not more than one-fourth as much in each shovel in doling out the cement. Similar defections must be guarded against in other trades. The author will call attention to these as the reader is conducted successively in these articles through the various trade operations as the work progresses; but there can be no such thing as a complete category of contractors' and laborers' shortcomings. These are likely to crop out when least expected and the necessity for their prompt detection keeps a superintendent constantly alive and vigilant in the exercise of his duties.

The supervisory duties of an architect (he being best termed the "supervisor" and his representative the "superintendent") are well expressed in his contract with the owner, thus:

"The Architect's supervision shall include assistance to the Owner in:



Figs. 2, 3 and 4. Methods of Recording Construction Progress as Explained on Page 300

Record should be made of all phone calls. All Long Distance calls must be recorded in triplicate, one to other party, one to home office, one on job. All unrecorded calls must be paid for by persons making calls.	JOHN SMITH JONES ARCHITECT MILLVILLE, P. M. TELEPHONE RECORD AND CONFIRMATION	JOB No. _____ OWNER: _____ LOCATION: _____ DATE: _____
TALKED TO _____ OF _____ TO-DAY, AT _____ A. M. P. M. ABOUT _____ MY UNDERSTANDING OF CONVERSATION IS THAT _____		
TOLL IS \$ _____ PAID TO BE BILLED CHARGE TO _____ SIGNED _____		

Fig. 5. Telephone Record and Confirmation Blank. Original 8½ x 5½ inches

1. Maintaining an effective working organization of the contractors employed on the structure.
2. Instructing them as to their work.
3. Passing upon the merits of materials and workmanship.
4. Demanding correction and remedy of all discovered defects.
5. Keeping accurate records of all conditions pertaining to the work.
6. Computing partial payments due contractors and issuing certificates for them.
7. Auditing payments to subcontractors and material supply concerns to prevent the filing of mechanics' liens."

For the duties involved in item 5, the superintendent is supplied with certain forms and is instructed as to their use. Principal of these is the "Daily Report" report blank, a specimen of which is shown in Fig. 1. If these blanks are especially printed for a given job, it is well to have an outline diagram of the building plan printed on the back, occupying about half the page, leaving the remainder for notes and correspondence. If a diagram is not so printed, a rubber stamp can be cheaply made and used for the purpose. This should include a number of small rectangles in which the symbols used can be indicated. The importance of filling in every item every day (or at other stipulated intervals) cannot be too thoroughly impressed upon the superintendent. He

must keep the home office posted fully and faithfully. It may take a half hour or longer to fill out a report after a busy day, but his time cannot be more valuably employed. His records may be the means of settling more than one controversy and of saving the owner much time and expense,—and of relieving the architect of much worry. Figs. 2, 3 and 4 illustrate methods of recording construction progress. This is merely a matter of compiling a "legend" or series of symbols and proceeding accordingly. The use of colored pencils for the purpose will afford much greater flexibility and legibility than is indicated in these examples. When a superintendent is required to stipulate at regular intervals just what percentage of each contract or trade is completed (or its degree of progress), these daily diagrams will materially aid in computing such percentages.

It can readily be seen, from inspection of the diagram in Fig. 2, that, at the time it was filled in, the general excavating was complete, except the north end of west wing; more than half of the outside wall trenches had been dug, also about one third of those for the column footings; outside wall footings of each wing and half of those under north wall had been poured, also the footings under 14 columns of the east wing; forms had been erected for outside basement walls of the east wing and concrete poured therein; and basement steel had been erected along column line 16. Diagram of Fig. 3 shows first floor forms all in

	<p>JOHN SMITH JONES ARCHITECT MILLVILLE, P. M.</p> <p>CERTIFICATE FOR PAYMENT</p>	JOB NO. _____ CERTIFICATE NO. _____ DATE _____
To This certifies that Contractor for For your at entitled to Payment on account under his contract to the amount of Dollars (\$ _____)		
Contract Price Extras Deductions Total Contract Previously Allowed This Certificate Allowed to Date Balance	Received the amount of above certificate. _____ 19 _____	Architect

Fig. 6. Certificate for Payment. Original 8½ x 5½ inches

place, except in west wing, and concrete in them extending almost to center line of building; columns erected along lines 15 and 16, and second floor form work started in northeast corner; basement walls stripped and parged, except west wing and adjoining portion of front wall; drain tile laid along outside of footings, except for a portion of west wing; and back filling well under way around east wing. It is easy, of course, to try to record too much, thus rendering the diagrams too intricate to be readily filled in and too involved to be quickly comprehended. Again, one should be sure than common sense is standing by him. "One's system should be ever the servant, never the master." If an architect be superintending his own work, he will find it to his advantage to keep job records as faithfully as if he were reporting to someone else. It is the surest way to avoid falling into slipshod habits.

Another preventive against carelessness is the habit of recording telephone conversations immediately after the receiver is returned to the hook. This habit can be more readily formed if special blanks for the purpose, with carbon sheets in place, are kept handy. Fig. 5 is a specimen of such a blank. Fig. 6 is the certificate for monthly payments. This is of ordinary form, except that more space than usual is allowed for the record of accounts with the contractor. These certificates may be made out by either the architect or his superintendent, but are customarily signed by the architect personally. Contractors have been known

to make a practice of depositing them to their bank accounts, the same as checks, and the importance of care and exactness in their preparation cannot be over-rated.

The bookkeeping upon which the issuance of certificates is based need not be complicated if a proper record book (preferably loose-leaf) is used. The pages should be ruled for eight columns of figures, preceded by four columns for explanatory matter to accommodate these entries:

Column

1. Date of contract.
2. Name of contractor.
3. Kind of contract.
4. Number of certificate or change order.
5. Amount of contract.
6. Amount of extra.
7. Amount of deduction.
8. Total net changes, plus or minus.
9. Total net contract.
10. Amount of partial payment.
11. Total payments to date.
12. Amount of unpaid balance.

Thus each entry is a complete record to date of the particular contract recorded, and there should be no question of anything failing to balance later on. On small jobs, a single page can be used, each line consecutively, for all contracts, and all entries made chronologically. On larger work, each major

contract should be allotted a separate page. On work remote from the home office, a duplicate of these accounts should be part of the superintendent's file at the job and should be frequently checked with the home office record.

The method of computing the amounts of monthly payments is more strictly a matter of office procedure than it is a duty of the superintendent, though he is often called upon to perform the service. For this, reference is had to a copy of the detailed estimate of job costs which should be part of the file records, whether compiled by the contractor or in the architect's office. In the former case, the figures should be carefully reviewed and checked by the architect. An instance can be cited where a contractor added a considerable amount to such items as excavating and foundations, and correspondingly reduced such items as painting and glazing, which are among the things last completed. As a result, when he confessed insolvency at the time the work was half finished, it was found that, instead of receiving 85 per cent of the value of material and labor as the work progressed, he had actually collected about 110 per cent. In view of such a possibility, it is well, when a contract is about two-thirds or three-fourths fulfilled, to estimate the value of work still to be done, rather than what has been done, and to compile the remaining certificates accordingly. One is wise, too, to have the article on par-

tial payments in the contract read that they shall be based, not "on the actual value of labor and material incorporated in the work" (or "delivered on the premises," as the case may be) but on "the architect's estimate" of such value. This renders the protests of a grasping contractor of no avail against an architect's firm convictions.

If payments are to include amounts sufficient to cover unused materials on the premises, the superintendent is then charged with observing that there is no undue surplus of any material delivered and that none for which allowance has been made is hauled away. On work of moderate size, all such difficulties can be avoided by arranging to have payments fall due in five (or other suitable number) equal installments, at such times as "when first floor framing is in place," "when roof is on," etc.; the final payment being due 30 or 35 days after the work is accepted.

Whoever is charged with this task of issuing certificates should have sufficient knowledge of the working of the mechanics' lien laws in the state in which the work is located to prevent any liens being filed. Where contractors are accustomed to file waivers of liens from subcontractors and material men or to submit sworn statements that all material and labor are paid for, they do so without demur. In any case, the architect must see that the owner's interest in this respect is fully safeguarded. It is one of his important obligations.

CHAPTER 4

THE FIRST DAY ON THE JOB

WHETHER one be a green novice setting forth to act as clerk-of-the-works or inspector on his first assignment or if he be a seasoned superintendent, to whom the passing from job to job is an old story, there is always something akin to the spirit of adventure in the approach to the beginning of a work of construction. Regardless of what may have happened on other operations, some features of this are bound to be different. New situations are forever arising, new emergencies to be met, fresh experience to be gained.

The appointment of a superintendent is made about the time contracts are awarded, and he at once confers with the architect (or construction manager) on all the various details pertaining to the conduct of the work. A time schedule has been arranged with the principal contractors, general, heating, plumbing and electrical. The general contractor has submitted a list of his "subs," which is given to the superintendent with instructions to look up those residing in the city where the building is to be erected. He is also

given a complete set of contract documents and a copy of "Instructions to Superintendents" and is told to spend a day or two in the office acquainting himself with it and with the file records before presenting himself at the building site. He makes note of such items as are left to the judgment of the architect for decision and either discusses them with him or marks the items for future reference. A superintendent knows that a specification frequently stipulates that the decision of the architect will govern this or that, when it is actually expected that the ruling will be made by the man on the job, whether he be the architect himself or his representative. In this respect, as in all others, the superintendent should have a very definite understanding as to just how much authority and responsibility are to be vested in him.

He should also be most particular to "iron out" all changes and addenda which have been incorporated in the contract by virtue of the acceptance of alternates or the issue of change orders. The ramifications of some of these may extend

throughout the entire construction, and it makes much smoother going for the superintendent to be set right at the start, and at the home office on everything that appears the least bit hazy, rather than to bother with such uncertainties at the job, where there are plenty of other duties to absorb his attention. For the same reason, he will be as meticulous as time will permit in reviewing drawings and specifications before departing for the scene of action, knowing that the requisite checking and cross-checking are too likely to be neglected, if postponed.

In going through the specifications, he notes particularly those clauses which apply particularly to the initiation of the work, inasmuch as he should be familiar with these at the time of his arrival. Some of the clauses in the General Conditions published by the American Institute of Architects he finds to be only partially applicable to his particular work. For instance, in "Art. 12. Protection of Work and Property," he reads, "He (the Contractor) shall adequately protect adjacent property as provided by law and the Contract Documents." This school site (being considered here) is so isolated as to render it unlikely that the building operations will in any way threaten damage to property adjoining. If, however, the contractor's work should happen to be in a busy section of the city, this protection clause is most pertinent. State laws vary somewhat as to whose is the responsibility for party line construction operations carried on immediately adjacent to existing structures. If, as in Illinois, the law provides that the adjoining property owner must, on due notice, take necessary steps to protect himself against possible damage, then it is up to the architect to see that proper legal notice is duly served before construction begins. It thereafter is the business of architect, superintendent and all others concerned to closely cooperate to the end that all indicated precautions are observed to properly safeguard the interests of all parties. If shoring is needed, it is within the province of the contractor to see to it that such protection is adequate and to cooperate with the party employed to look after the interests of the adjoining owner. This specification clause governs:

"The Contractor shall provide all permanent and temporary shoring, anchoring and bracing reasonably required by the nature of his work, in order to make all parts absolutely stable and rigid, even where such shoring, anchoring and bracing are not explicitly called for. He will be held strictly accountable for any damage resulting from failure to provide it, either through lack of proper judgment or from any other cause."

In this, as in other cases where the contractor is supposed to use his own best judgment and has,

by contract, accepted responsibility for so doing, the superintendent must be exceedingly careful not to unduly stress his own ideas, whether he be in agreement with those of the contractor or at odds with them. It is general practice to hold the contractor liable in all matters pertaining to the adequacy and working capacity of the temporary facilities, as well as that of his equipment. Therefore, although it is the plain duty of the superintendent to warn the contractor of anything deemed insufficient, defective or otherwise improper, the character of the warning should be such as not to, in any degree whatever, imply that either the superintendent or his employers have any hand in the corrections or improvements adopted. This does not mean that either the superintendent or the architect is improperly evading in any way. The line of demarcation between their responsibilities and those of the contractors is, or should be, plainly drawn, and there is no need of either's encroaching on the other.

An example of the trouble that may result from a superintendent's carelessness in this regard occurred on a certain building where a contractor's men had secured a derrick guy-wire to a growing tree. Fearing that the tree might suffer damage, because of its small size, the superintendent suggested a better anchorage for the guy. The foreman thereupon had the wire removed and attached to the floor construction of a well filled cement shed. The superintendent, in an unguarded moment, gave assent to the change, but neither he nor the foreman noticed when the quantity of cement in the shed was too greatly reduced and an unusually heavy load on the derrick wrecked the shed and caused considerable damage to the work under construction. The contractor claimed cause of action against the owner on the ground that the latter's agent had compelled the foreman to change a safe anchorage to an anchorage which was dangerous.

Arrived at the site of the new school building on a certain Monday morning in April, two days ahead of the scheduled time for beginning the work, our superintendent found the excavating contractor already on hand, with several men and teams operating slip scrapers, and a steam shovel working its way into position. The superintendent had been charged by the architect to receive the general contractor's bond and send it in for approval, also to secure the name of his liability insurance company and the number of his policy. He found the contractor directing some carpenters as to locating temporary buildings and was promptly given both the bond and the information as to liability insurance policy. It may be assumed that the matter of acceptance of a contractor's bond is strictly an office transaction with which the superintendent has nothing to do. But, inasmuch as the contractor is technically

trespassing on the property until acceptance of his bond has validated his contract, it is incumbent upon the superintendent to bear this in mind and act accordingly. The details of this incident are therefore given as being typical of cases of the kind.

The bond was found to be the regular printed form of a surety company, properly licensed to do business in the state, instead of being on the form supplied by the architect, of which the superintendent had a copy, and duplicates of which had been sent the contractor. The contractor, in defense of his occupancy of the premises before formal approval of the bond, said that he was told by the agent (who happened to be a member of the board of education) that he knew the bond would be acceptable and that it would be all right for him to take every possible advantage of the good weather; but the contractor could not explain why the architect's form of bond (which was that of the Illinois Society of Architects) had been ignored. Inasmuch as it was evident that both the board member and the contractor had exceeded their authority, it was evident that a situation had developed right at the start that demanded careful handling. If the superintendent stopped the work and ordered the men and equipment off the premises, he would only be making trouble and creating antagonism that would not easily wear off. Later, if charged with improper delays, the contractor might allege in defense that there was a lack of cooperation from the very beginning of the work. The superintendent chose the better plan by suggesting that they call together on the agent, it being understood between themselves that, pending approval of a bond, the contractor was trespassing and subject to ouster.

Before leaving the site, the superintendent directed the contractor to box certain trees and mark for removal certain others that were too close to the building site. He also called attention to the damage already done to walks and curbs by driving over them, and he suggested the locations of four driveways with protection of walks and curbs as specified, citing the specification paragraphs on these subjects:

"BOXING TREES. All trees and shrubbery endangered by operations under this contract shall be carefully and adequately boxed with substantial planking."

"ALL WALKS, CURBS AND FENCES that are to remain shall be adequately protected wherever liable to damage. If driveways across side-walks (other than those indicated) are used, such walks and adjoining curbs shall be protected by 2" planking and 6" of tamped earth. No driving over unprotected walks will be permitted."

The contractor agreed to give these subjects proper attention and added that he would have a

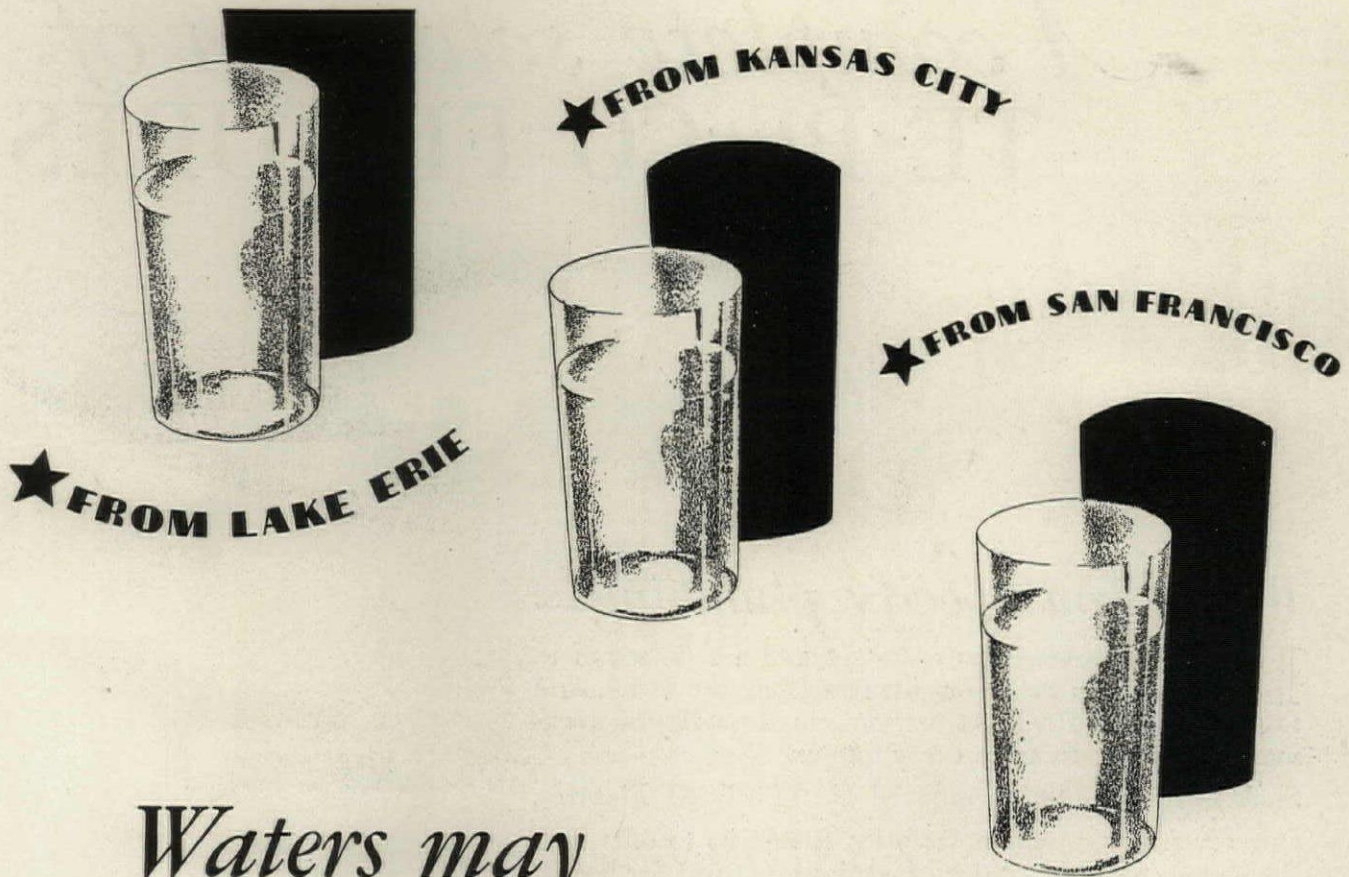
foreman and additional carpenters on the job in the afternoon and get the building staked out.

The agent was in and appeared surprised that there should be any question as to the form of bond. He admitted having transmitted the architect's printed form to his company but supposed that his concern never issued a bond on other than its own form, of which he had handled many. He was so evidently inclined to make an issue of the subject that the superintendent suggested the advisability of calling a meeting of the building committee for discussion of the subject. This resulted in an evening session of the entire board at which the superintendent explained the difference between the two forms of bond and pointed out that the architect's form compelled the surety simply to carry out the terms of the contract, should the contractor fail to do so, whereas the form submitted contained several clauses making it incumbent upon the owner to do certain things to protect the surety company, which the owner might easily fail to do,—had no previous intention of doing. The agent continued to insist, contrary to the opinion of the superintendent, that his company would not change its form, which insistence induced the contractor to suggest the feasibility of his putting up a personal bond, signed by two local property holders of sufficient means. He also called attention to the fact that he had stated in his bid that he would deduct the price of a bond (\$10,500) if the surety should be waived, adding that his company was so well and favorably known that it was seldom asked for a bond, the cost of it being a sheer waste of good money. Asked for his views on the subject, the superintendent heartily endorsed the latter opinion and stated the attitude of the architect on the whole subject.

The objections to a personal bond are, first, that someone must accept the responsibility for approval as bondsmen,—men who are not officially registered as such, as are accredited surety companies; next, that, in case of default and suit against such bondsmen, they can readily enlist the sympathy of jurymen, in the character of innocent martyrs being sacrificed for their friend to the benefit of the community, the verdict resulting in some sort of a compromise, though the same jury would be quite ready to hold an outside corporation for the full amount of the loss, a good part of which would be considered as covered by the original premium. Further, the endorsers of a personal bond are necessarily persons of good standing in their community, men whose good will one does not care to jeopardize by forcing them to incur heavy financial loss in case the worst should happen.

(To be continued in the April, 1929 issue of

THE ARCHITECTURAL FORUM)



Waters may look alike and taste alike—YET...

.....Yet their effect on pipe may be entirely different. Depending on their sources and the treatment they undergo, some waters are but *normally* corrosive, while other waters—often those which are purest and most healthful—are *highly* corrosive.

When you write pipe specifications, the local water conditions are one of the most important factors to be considered. Brass pipe will outlast rustable pipe under *all* water conditions, but not all alloys of brass will give the same satisfactory service everywhere.

To meet all different water conditions, The American Brass Company offers *two* alloys of Anaconda Brass Pipe.

For normally corrosive waters—Anaconda 67 Brass Pipe. This pipe contains not less than 67% copper. It is guaranteed to be structurally sound and physically perfect. It is semi-annealed and seamless.

For highly corrosive waters—Anaconda 85 Red-

Brass Pipe. This pipe contains not less than 85% copper, and is offered as the best corrosion-resisting pipe obtainable. It, too, is fully guaranteed.

Proved by 16 years of testing!

These two alloys will serve all water conditions. This has been proven in 16 years of exhaustive research—when various alloys of brass pipe were tested, to determine which alloys would best resist various degrees of corrosion. The laboratory tests were then checked with tests of actual use—and Anaconda 67 Brass Pipe and 85 Red-Brass Pipe is the result.

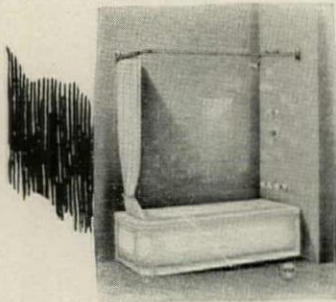
An important service to architects

Today, the Technical Department of The American Brass Company is prepared to help determine the character of the local water supply and recommend the best alloy of pipe for use under specific conditions. You are cordially invited to communicate with The American Brass Company, General Offices, Waterbury, Conn.

ANACONDA BRASS PIPE

FOR HOT AND COLD WATER LINES

A complete selection of TE-PE-CO FIXTURES



When you specify plumbing—

It is a convenience, an economy and a satisfaction to select all your bathroom fixtures from one make. And to know that you will get the same high quality of workmanship and material in every fixture.

Such is the reputation enjoyed by TE-PE-CO Fixtures. Our unusually complete facilities enable us to offer you the widest possible choice of sanitary fixtures for hotels, apartments, schools, hospitals and residences of every size and description.

To check up on all equipment being installed, it is well to look for the TE-PE-CO Trade Mark—which is the symbol for the TE-PE-CO Guarantee.

*Every
Te-pe-co Fixture*

OUR GUARANTEE

We, of the Trenton Potteries Company, make but one grade of ware—the best that we can produce—and sell it at reasonable prices. We sell no seconds or culls.

Our ware is guaranteed to be equal in quality and durability to any sanitary ware made in the world.

The Te-pe-co Trade Mark is found on all goods manufactured by this company and is your guarantee that you have received what you paid for.

*—has this
trade mark on it*

THE TRENTON POTTERIES COMPANY

TRENTON, NEW JERSEY, U. S. A.

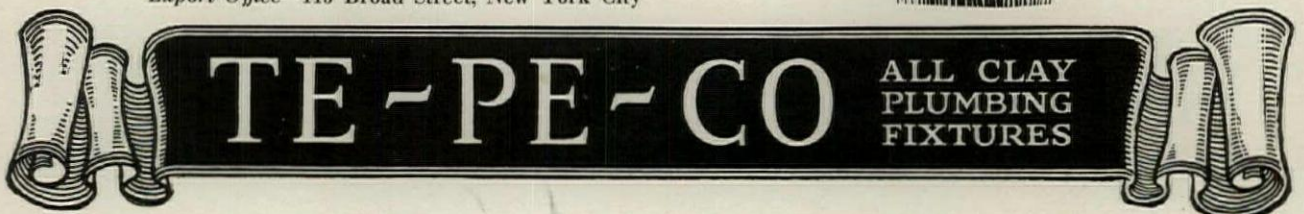
National Showroom—New York City

101 Park Ave., Entrance on 41st Street

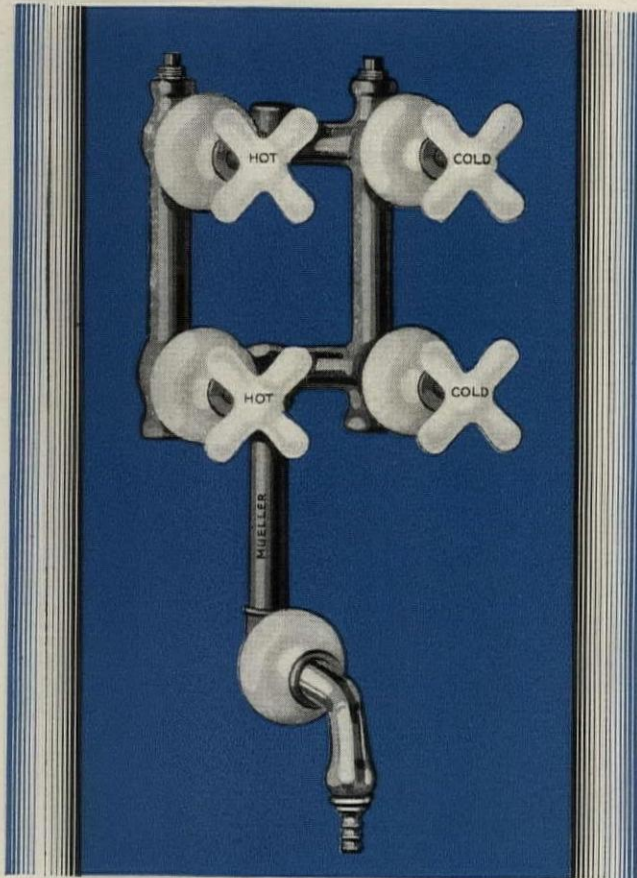
Branch Offices

Boston, Philadelphia, Chicago

Export Office—115 Broad Street, New York City



FAUCETS ARE THE VITAL SPOTS OF PLUMBING



A simple and distinctive built-in fitting for the bath

JUST as all Mueller fittings are designed to assure dependable operation and easy maintenance, this built-in combination gives lasting satisfaction to owners and tenants, alike.

Valve parts are uniform in size and interchangeable, and packings are outside the wall—making repairs a simple matter. The deep china escutcheons and large cross handles are of the finest quality.

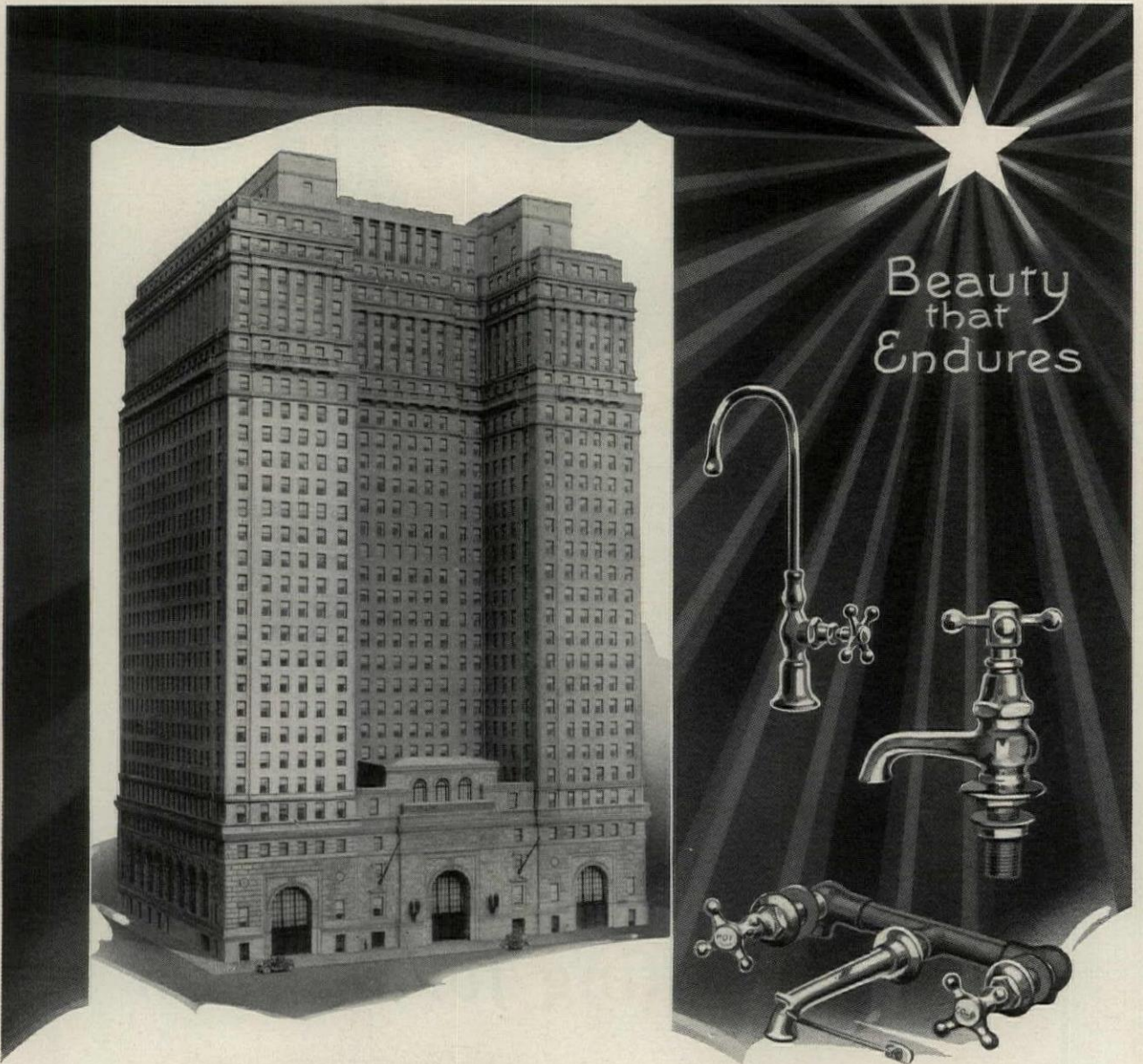
There are Mueller fittings to harmon-

ize with every interior plan, from the most conservative to the latest modern creations. Finished in nickel or chromium, these fittings all have the same high quality that has made the Mueller name famous for over seventy years.

MUELLER CO. (Established 1857), Decatur, Illinois. *Branches:* New York, 135th Street and Walnut Avenue, Bronx, and Dallas, San Francisco and Los Angeles. *Canadian Factory:* MUELLER, Limited, Sarnia.

MUELLER

PLUMBING BRONZE AND VITREOUS WARE



FIDELITY PHILADELPHIA TRUST Co. BLDG.,
PHILADELPHIA, PA.

Equipped with Douglas plumbing fixture fittings of SOLID NICKEL SILVER. Simon and Simon, Architects, Philadelphia, Pa. Wm. M. Anderson, plumbing contractor.

PLUMBING FIXTURES WHICH WILL REMAIN PERMANENTLY ATTRACTIVE

Materials which will give a longer service life and remain permanently attractive are the great need of modern construction. Particularly are these qualities necessary in the case of plumbing fixture fittings. The heavy expense of renewals can only be avoided by the use of such materials.

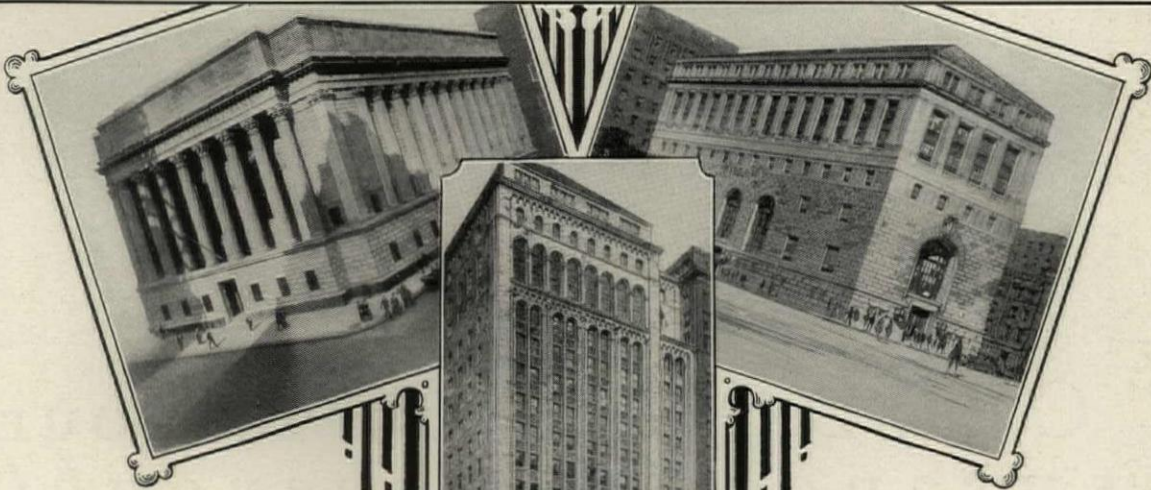
The question of appearance is a source of constant criticism after the original beauty of new installation gives place to familiar marks of age.

Solid Nickel Silver plumbing fixture fittings are recommended because they are made of a copper nickel alloy of which the physical properties are superior to brass and resemble those of tough bronze. The color is identical with Nickel-Plated fittings and is SOLID all the way through. There is no plating to chip or wear off. Years of satisfactory service confirm the judgment of those who select them.

Let us send you our catalogue showing a complete line of plumbing fixtures.

THE JOHN DOUGLAS COMPANY
Manufacturers of Plumbing Fixtures
CINCINNATI, OHIO

MEETING ARCHITECTURAL STANDARDS OF QUALITY



Above: Greenwich Savings Bank New York. York and Sawyer, Architects. Solid Nickel Silver plumbing fixtures by The Meyer-Sniffen Company, New York.

Right: Bowery Savings Bank Building, New York. York and Sawyer, Architects. Solid Nickel Silver plumbing fixtures by The Meyer-Sniffen Company, New York.

Above: Central Savings Bank New York. York and Sawyer, Architects. Solid Nickel Silver plumbing fixtures by The Meyer-Sniffen Company, New York.



MODERN BANKING HOUSES

Find Beauty and Permanence in Solid Nickel Silver® Plumbing Fixtures

BY MEYER-SNIFFEN

IN THESE modern buildings—widely known for their beauty and for their completeness of appointments—plumbing fixtures must meet the highest architectural standards of quality.

Attractive in appearance, lasting in finish and color, not easily marred or broken either in use or during installation, Solid Nickel Silver plumbing fixtures measure up to all requirements for quality equipment.

The permanent, silver-like lustre of Solid Nickel Silver

is very similar to that of Pure Nickel and other high Nickel Alloys. It is easy to keep clean and its unusual physical properties—hardness, toughness and strength—insure resistance to wear and add a degree of permanence

to bath, shower, lavatory and sink fixtures unattainable in other available material.

For permanent installations calling for the most modern type of sanitary equipment—where quality and appearance must be unquestioned—specify Solid Nickel Silver plumbing fixtures.

18%
22 Nickel
SILVER

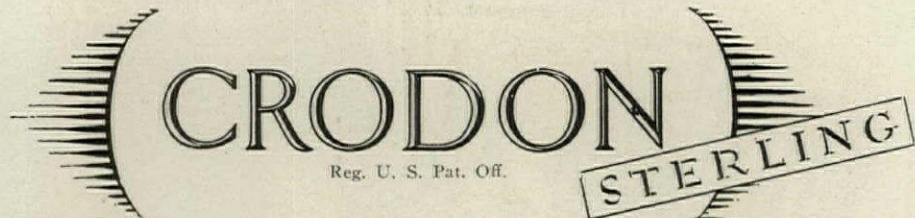
°Diamond Metal is the name used by The Meyer-Sniffen Co. to identify its Nickel Alloy used in manufacturing Nickel Silver plumbing fixtures. This is a solid white metal and contains a high percentage of Nickel.



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



— MARKS *that* CERTIFY —



The CRODON mark is your assurance of *dependable* CHROMIUM PLATING

IN the sense that **STERLING** typifies solid silver, so **CRODON** assures solid dependability in Chromium plate.

There are very logical reasons why Architects should be familiar with the **CRODON** mark . . . what it means . . . what it assures . . . why it warrants their good will:

Chromium plating is an art. It has very distinct standards of quality. Uniformly successful application is a definite goal . . . on this, the usefulness and dependability of the finished product is proved . . . its value judged.

This is what **CRODON** means:

It means the sum-total of long years of intensive pioneering and research work

by the Chromium Corporation of America. It means Chromium plate at the fullest stage of its development . . . applied according to the most rigid specifications. . . It means that final results are definitely known.

CRODON is the mark of the practical—the seal of achievement. . . It is your assurance of satisfaction.

Manufacturers of fixtures and fittings who are licensed to use the **CRODON** Process of Chromium plating and to attach the **CRODON** tag to their products, are peculiarly representative of the country's most noteworthy designers and producers. A complete list of these licensees will be gladly sent to you on request by our Service Department.

CRODON

TRADE MARK REG. U. S. PAT. OFF.

THE CHROME PLATE



Artline



Diamond Sink Fixture



Anyforce Head

SPEAKMAN

Style Setters ~ ~ ~

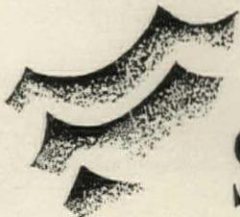
STYLE! Find the woman who is not conscious of it—who does not seek it! Her pursuit of style is reflected in the clothes she wears, the house furnishings she buys. Automobiles now sell frankly on a style basis.

This modern consciousness of style and beauty has brought new prestige to the name Speakman. For Speakman are style, as well as quality, leaders. Speakman Showers and Fixtures reflect the modern desire for grace and beauty in every line.

In chromium-plating—most beautiful, permanent and durable of finishes—Speakman has gone far. It reaches new heights in the brilliant Artline group—for showers, lavatories, bathtubs and kitchen sinks. It offers remarkable beauty at moderate cost in the new Diamond Fixture for kitchen sinks.

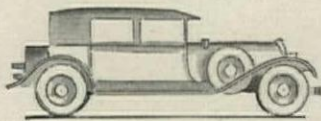
Speakman Showers and fixtures are leading today as never before. Architects who specify them bequeath their clients greater beauty and permanence, and lasting, trouble-free satisfaction.

SPEAKMAN COMPANY
WILMINGTON, DELAWARE

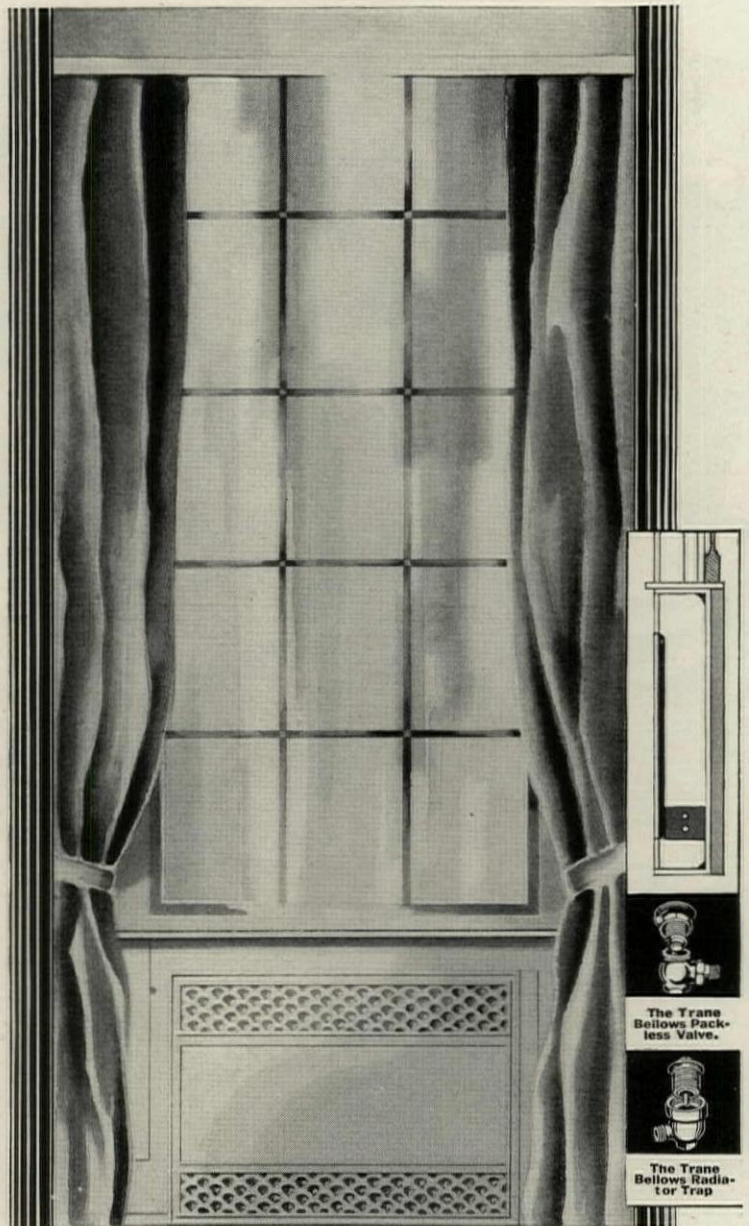


SPEAKMAN SHOWERS & FIXTURES

Trane
 Leads the Movement
 toward
 A New *Style* in Heating



Success of the Trane Under-Window Concealed Heater is primarily a matter of appearances . . .



How much does the owner of the average building know or care about the details of the heating system, so important to you as the man responsible for results? But he knows at once when an older method is *out of style*.

He did not wait in 1926 for the 1929 A. C. radio set — he did not wait in 1925 for today's type of motor car. And he won't wait now for 1935 heating units in his rooms. He wants Trane Under-Window Concealed Heaters *now*.

As leader of this style change, Trane has recognized a responsibility to you on the technical side. The Trane organization promptly went to architects' offices and heating shops for facts on the first big success of Trane Concealed Heaters. The result was the latest Under-Window model — a complete assembly with nothing extra to buy, a one-man job of installation, a completely accessible arrangement through a removable front panel—everything practical men asked for to make concealed heating universally applicable.

You can always depend on Trane engineering leadership. Trane Traps and Valves are a result of the same careful analysis of heating troubles and the needs of the industry. Balanced pressure and the signal feature, in Trane Bellows Traps, are only two of the points which have made this equipment standard for important, high-class jobs. Before you recommend any part of a heating system, except the boiler and piping, find out what Trane has done recently in that particular branch of heating.

HEAT CABINETS **TRANE** CONCEALED HEATERS
 PUMPS, UNIT HEATERS, AND HEATING SPECIALTIES

THE TRANE CO., Dept. 2
 220 Cameron Ave., La Crosse, Wis.

Send complete facts on your Under-Window Concealed Heater

Name _____
 Name of Firm _____
 Address _____
 City _____ State _____

Kohler Colorware is for all bathrooms

KOHLER fixtures in color are naturally thought of when an elaborate bathroom is to be planned. They should be thought of no less for simple bathrooms where cost is a vital factor.

Bathrooms with Kohler colored fixtures cost very little more than those with white fixtures. The fixtures themselves are somewhat more expensive — but that adds nothing to the cost of fittings, of installation, of walls or floor. The extra charge for Colorware is a minor part of the cost of the completed bathroom.

Besides, there are Kohler fixtures in color to meet any price requirement. You may not have realized that this complete line includes bath tubs in color, complete with chromium-plated fittings, to retail for as little as \$80; lavatories for \$40; toilets for \$70.

Beautiful in color

These less expensive fixtures have all the color charm of the more costly ones. They are made in the same delicate, livable shades of ivory, green, blue, lavender, brown and gray — and in striking jet black.

This range of color and pattern affords the architect the fullest possible scope in designing beautiful modern bathrooms — in planning several bathrooms for the same house, each with its individual color appeal; or in creating for a group of apartment homes a series of unusual color effects.

Admirable in quality

In beauty and permanence of coloring, Kohler Colorware lives up to the intrinsic worth of the ware itself. All Kohler fixtures, whether of enameled or vitreous china ware, are made in one place — and they partake of the unique quality of Kohler Village, one of America's



These modern Kohler fixtures are paneled Mayfair bath and Fairfax vitreous china lavatory

"It Pays to Modernize Your Plumbing and Heating"

most beautiful town-planned communities. In specifying Kohler Colorware you specify superior worth — at the cost of the ordinary.

We urge you to take advantage of the first opportunity to inspect

Kohler Colorware at a Kohler display room. And we invite you to write for a new booklet illustrating Kohler fixtures in color for bathrooms, kitchens, and laundries. The coupon below will bring it.

KOHLER Co., *Founded 1873*, KOHLER, WIS. . Shipping Point, Sheboygan, Wis.
Branches in Principal Cities

KOHLER OF KOHLER

Plumbing Fixtures

LOOK FOR THE KOHLER TRADE MARK ON EACH FIXTURE

KOHLER CO., KOHLER, WIS. Gentlemen: Please send your book of Kohler Colorware. A. F. 2-29

Name

Street

City.....State.....

© 1929, Kohler Co.



There's No Forgetting Here... ...And No High Costs Either

Record No. 107

In 1906, 15 Clow Madden Automatics were installed. Today they are still in splendid condition. The janitor of this school states there has not been a repair necessary on any of these closets in the last 6 years. Location: May Street School, Benton Harbor, Michigan.

One, two, count them on your thumbs... the moving parts to the Clow Madden valve. It has nothing to cause expensive repairs.

A quarter century or more is the average life of Clow Madden Automatics. (Read record No. 107). They ask about half the usual amount of water, less than half for repairs.

Clow Madden Automatics flush themselves every time, *every time*.

Dirty, unflushed closets are perilous. Dirty, unflushed closets are *never* Clow Madden Automatics. *They couldn't be.*

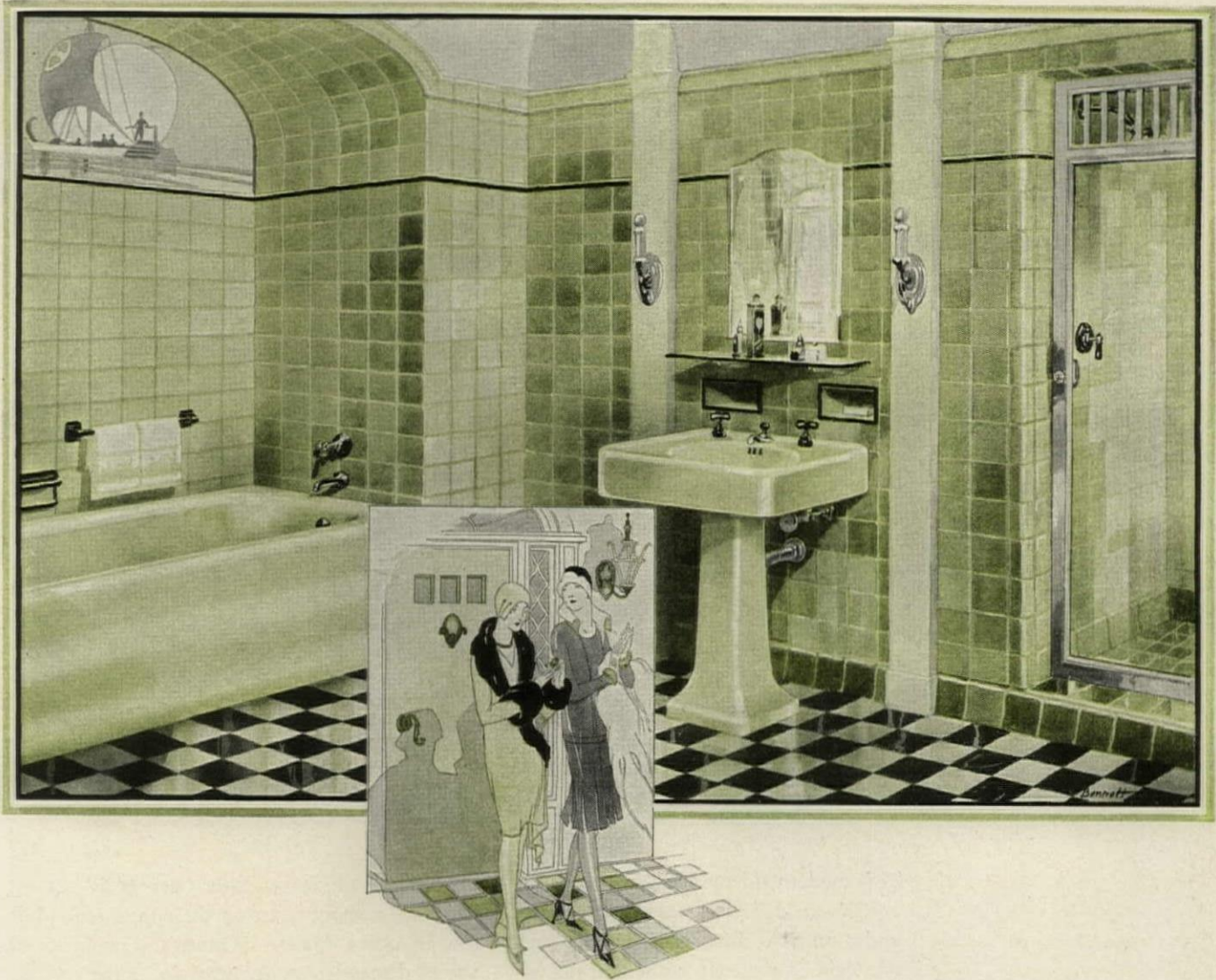
Three gallons of high pressure water scour the Clow bowl each time. Three gallons of water cleanse more thoroughly here than twenty sometimes do in other closet bowls.

May we send you a copy of the Clow School Plumbing Booklet?

James B. Clow & Sons, 201-299 N. Talman Avenue, Chicago

CLOW MADDEN AUTOMATIC

Forty-Eight Styles, Heights and Types to Meet Your Requirements



“Did You Notice? The Bathroom Was by Wolff”

TO draw comment from neighbors visiting a new home, the prestige of a trade-name representing a line of plumbing fixtures must rest on something more substantial than decorative appearance.

So much scientific accuracy has been applied to the work of making Wolff fixtures pleasing to the eye, and giving a permanent, lasting character to the varied “DURO” enamel-tones, that the *mechanical* superiority of the different products may have received less than its share of recognition.

The exceptional roominess of the different bathtub models, without increase in exterior dimensions, the special features of waste-design, assuring a watertight seat, the diverter valve switching to the shower and *controlling pressure on the shower head* (exclusive with the Wolff line), the exceptionally easy valve action of the Superior closet, the space-saving features of the lavatories—these and many other points illustrate a standard of efficiency as impressive as the rare beauty of the perfectly matched enamel color-tones.

The ingredients of the latter are combined under a formula tested by the years and applied at an intense heat; each tint is rendered absolutely permanent, with a hardness that is proof against scratches and scars.

Wolff “DURO” brass fixtures, both the concealed and exposed parts, represent the same exacting ideal, so that the character of each installation is in complete conformity, without a single detail out of keeping with the high standard of the ensemble.

WOLFF



WHY BE
ASHAMED
OF YOUR
BATHROOM?

SUPERIOR PLUMBING FIXTURES

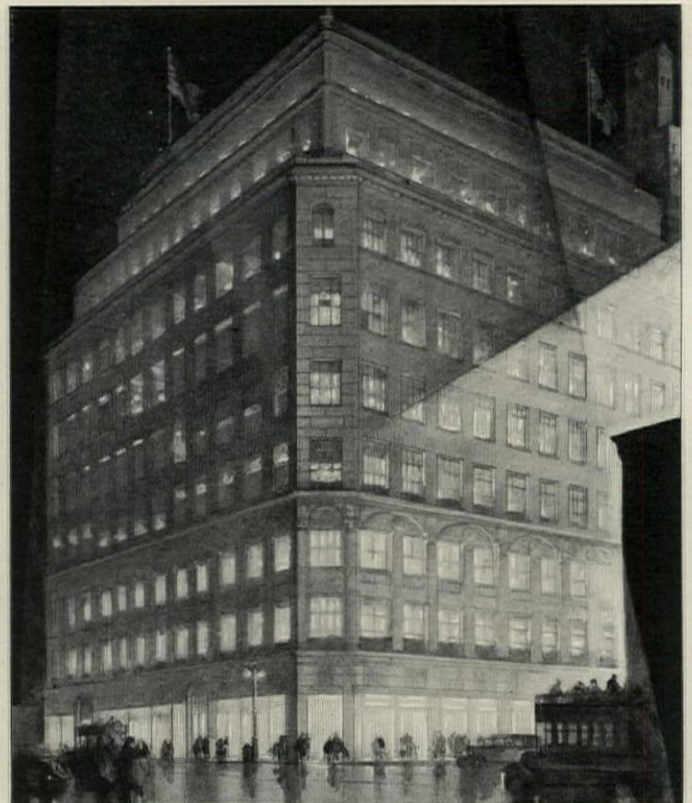
WOLFF CO., Established 1855. General Offices: 2058 W. Fulton St., CHICAGO
Branches and Distributors in All Principal Cities

The illustration shows the inviting effect obtainable with Wolff “sea-foam” green enameled fixtures, matching a background of light green tile. A Berkeley bathtub is shown separate from the glass partitioned shower, with an Afton pedestal lavatory between them. 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 a catalog and full details on request.

In **ZERO** weather
a 12 ounce pressure
heats this building—



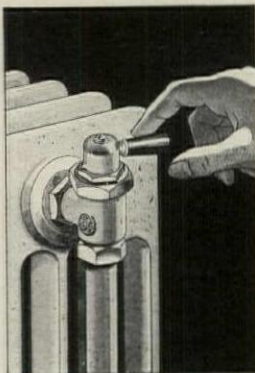
3 ounces
heat this
home...



with FINGER-TOUCH CONTROL

This modern time-tested system is *guaranteed* to deliver ample heat always under control. More flexible than electric light, completely automatic yet unencumbered by mechanical devices—Hoffman Controlled Heat.

room as much or as little heat as is required, without effect on the temperature of other rooms. Women's scanty attire demands more heat in some rooms—men's woolen garb requires less in other rooms.



The Hoffman No. 7 Modulating Valve may look like other similar radiator valves. But this valve's flexibility, its custom-made port, and its ability to work perfectly for years, are apparent only on minute examination.

With any standard boiler and radiators, whether fired by coal, oil or gas, it is easy to add the equipment that makes it a Hoffman Controlled Heat system. This equipment places precise controls over boiler and radiators at every point necessary to assure automatic, amazingly safe and flexible operation. This system automatically adjusts itself to the hour-to-hour need for heat. Only as the call for heat increases does the supply of steam accumulate. Close comparative check-ups on fuel costs prove drastic savings in operation.

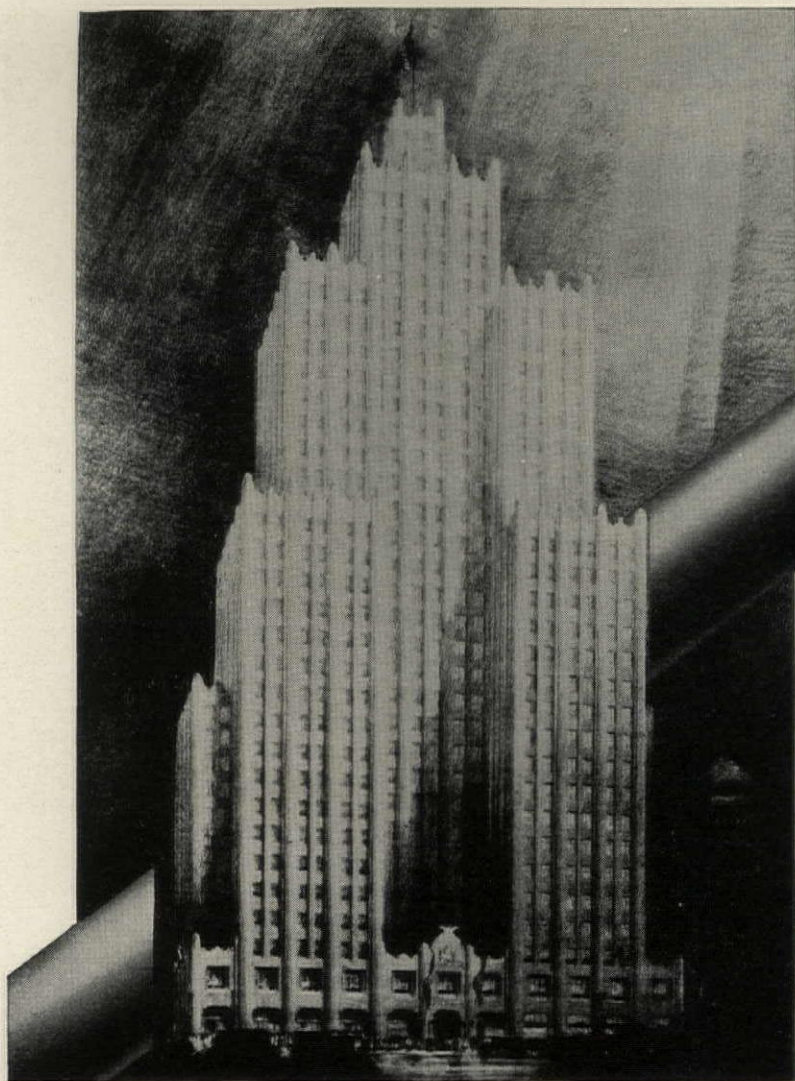
Hoffman Controlled Heat installations are guaranteed in writing by a long-established, conscientious maker. Hoffman Specialty Company also offers expert engineering counsel.

We have published a fact-full booklet describing in charts, pictures and words the operation of this system. You are cordially invited to write for a copy. Address Hoffman Specialty Company, Inc., Dept. EF-2, Waterbury, Connecticut.

This heating system delivers to each



HOFFMAN CONTROLLED HEAT



NATIONAL

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 . . .

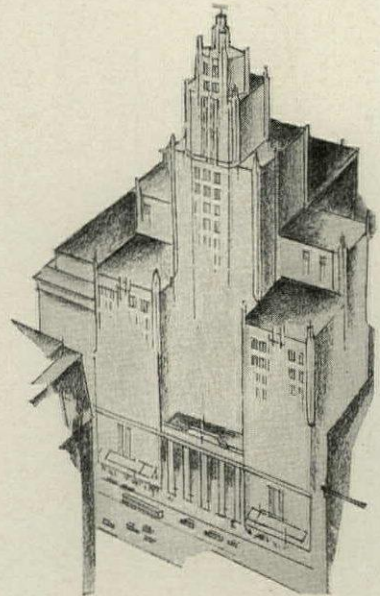
THE will of a great city—to go ahead. Here one finds a determination to build greater—to expand—to do real things—a typical American populace. St. Louis, on the tongue of the world, interprets modern progress. From here went, with unflinching bravery, the mighty Lindbergh—symbolic of the spirit of her 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

"You can't save money by skimping on pipe!"



"Mr. Camp, I confess I never viewed the matter quite in that way before. If the useful life is doubled, as it seems likely to be from our investigation, of course the economy is plain enough. Still, I wonder if the owners of buildings will appreciate it?"

"And by my reckoning, Mr. Camp, wrought iron would give you about double service, but it would double your cost, too. So, since we have to trim wherever we can, I think we'd better use cheaper pipe."

"Wrought Iron would double one small item of your cost, possibly. But it would double the life of your whole pipe job, too. Wrought iron doesn't really cost double; but suppose it did. Remember that nine-tenths of your cost in such a case goes for labor, fittings, incidentals, and overhead. Only one-tenth actually goes for pipe. What we need to consider is that on our complete installation the extra cost of wrought iron pipe wouldn't be more than 5%. If you can make the whole system last twice as long for that small difference, you're serving the best interest of your client, aren't you?"

"Offhand. I don't expect they will. But I think they'll agree with us after we show them the facts. Anyhow, if we make the right recommendation and give sound reasons for it, nobody can turn it down and then blame us for the outcome. Untimely pipe failures, by the way, are mighty unpleasant occurrences, and frightfully expensive, I've learned. So let's stick to the wrought iron specification."

A. M. BYERS COMPANY

Established 1864 - Pittsburgh, Penna.

Distributors in all Jobbing Centers

Write for Bulletin No. 38

It is a complete cost analysis of a large variety of pipe systems and dispels the fallacy that genuine wrought iron pipe is too costly to use. A copy will be mailed gladly on request.

BYERS PIPE

GENUINE WROUGHT IRON





Chase National Bank
Building
NEW YORK CITY

Architects
GRAHAM, ANDERSON
PROBST & WHITE

General Contractor
C. T. WILLS, Inc.

Plumbing Contractor
GEORGE E. GIBSON CO.

Where Beauty and Character Are Deep-Rooted in Quality

In keeping with the recognized quality of all building materials that combine to create modern architectural masterpieces, such as the Chase National Bank, pictured here

Republic Pipe is found in the hidden structural elements, a logical and fitting choice for a steel tubular system, the dependability of which there must not be a doubt.

In this case Republic is installed in the role of protector—used in the Fire Lines of the building.

- Branch Offices*
- | | |
|------------|---------------|
| Birmingham | Detroit |
| Boston | El Paso |
| Buffalo | Los Angeles |
| Chicago | New York |
| Cincinnati | Philadelphia |
| Cleveland | Pittsburgh |
| Dallas | San Francisco |
| Denver | Seattle |
| St. Louis | |

REPUBLIC

IRON & STEEL CO. YOUNGSTOWN O.

STEEL PIPE

5 POINT PIPE

Art Endures—When “Five Point” Pipe Protects It

Back of the thought and skill that produce a structural masterpiece must stand the assurance of *completely* dependable pipe. For no building is younger than its pipes, and beauty cannot endure when walls and ceilings must be torn open to replace pipe that gives only *partial* protection.

That's the value of specifying Reading Genuine Puddled Wrought Iron Pipe—the “five point” pipe that lasts for generations because it resists *all* the forces that tend to shorten pipe endurance.

There is no substitute for genuine *puddled* wrought iron pipe. To be certain of complete protection, specify Reading Genuine Puddled Wrought Iron Pipe—and look for the Reading name and spiral knurl mark on every piece.

1
Resists Corrosion—the puddling process* coats every inmost particle of Reading Pipe with age-lasting silicious slag.

2
Defies Vibration—puddling imparts a tough, rope-like structure that does not crystallize or fracture sharply.

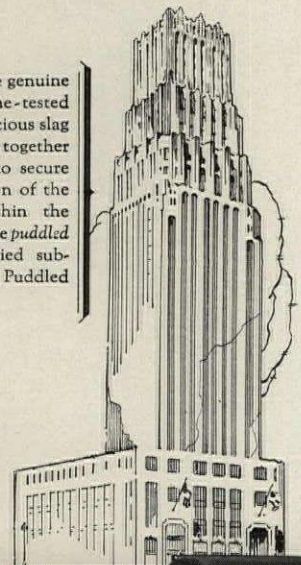
3
Threads Better—clean threads are quickly cut, insuring tight joints that stay leak-proof.

4
Welds Easily—pipe walls have maximum strength; no “weak spots”.

5
Holds Coatings Permanently—due to the texture of genuine puddled wrought iron, galvanizing adheres to Reading Pipe four times more thickly than to any other ferrous pipe material. Paint and other coatings last indefinitely.

*There is only one way to make genuine puddled wrought iron—the time-tested material. Pure pig iron and silicious slag must be kneaded and worked together inside a flame-filled furnace, to secure perfect and uniform distribution of the protective slag filaments within the metal. Time tells of only genuine puddled wrought iron—accept no untried substitutes for Reading Genuine Puddled Wrought Iron Pipe.

New Gulf Building, Houston, Texas. Alfred C. Finn, Architect, Kenneth Franzheim and J. E. R. Carpenter, Consulting Architect. Reading Pipe is installed in this structure.



READING 29 

READING PIPE

GENUINE PUDDLED WROUGHT IRON

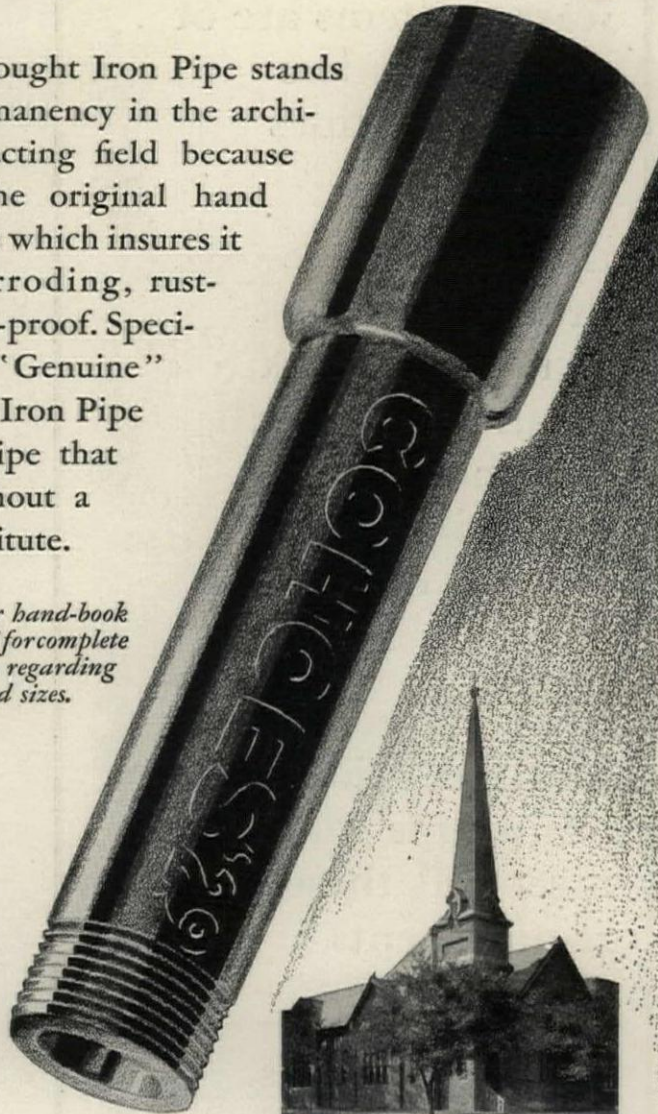
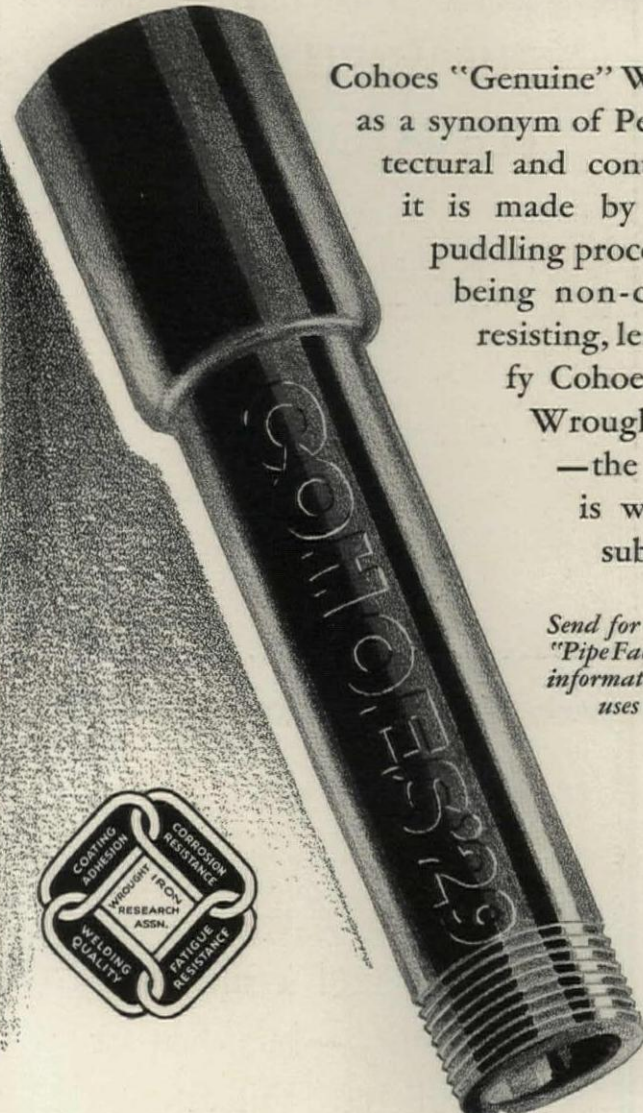
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Fourth St. Baptist Church, Portsmouth, Va. Architect, Charles Major; Plumbing Contractor, J. M. Black.

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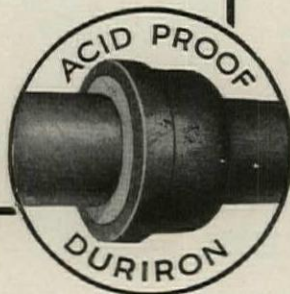
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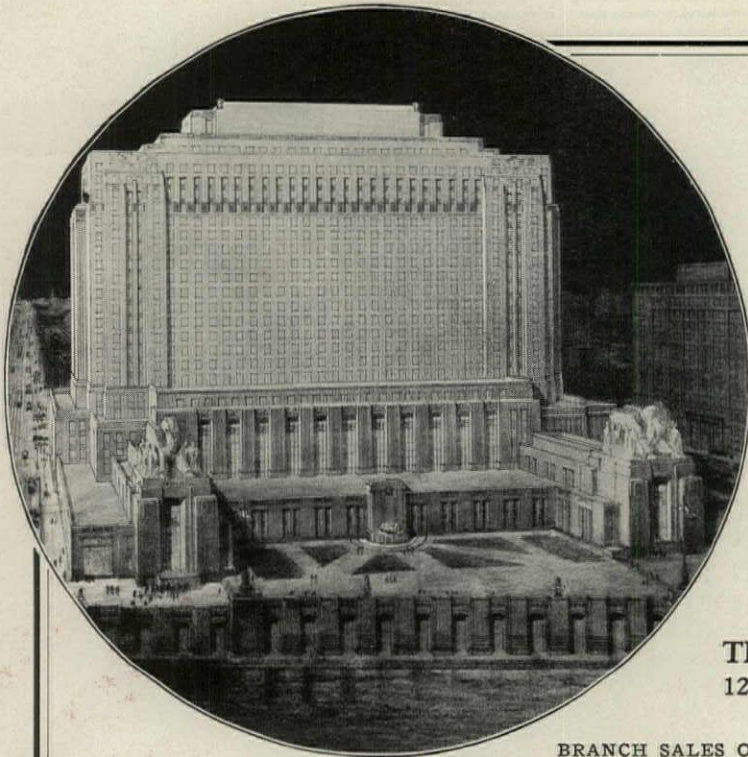
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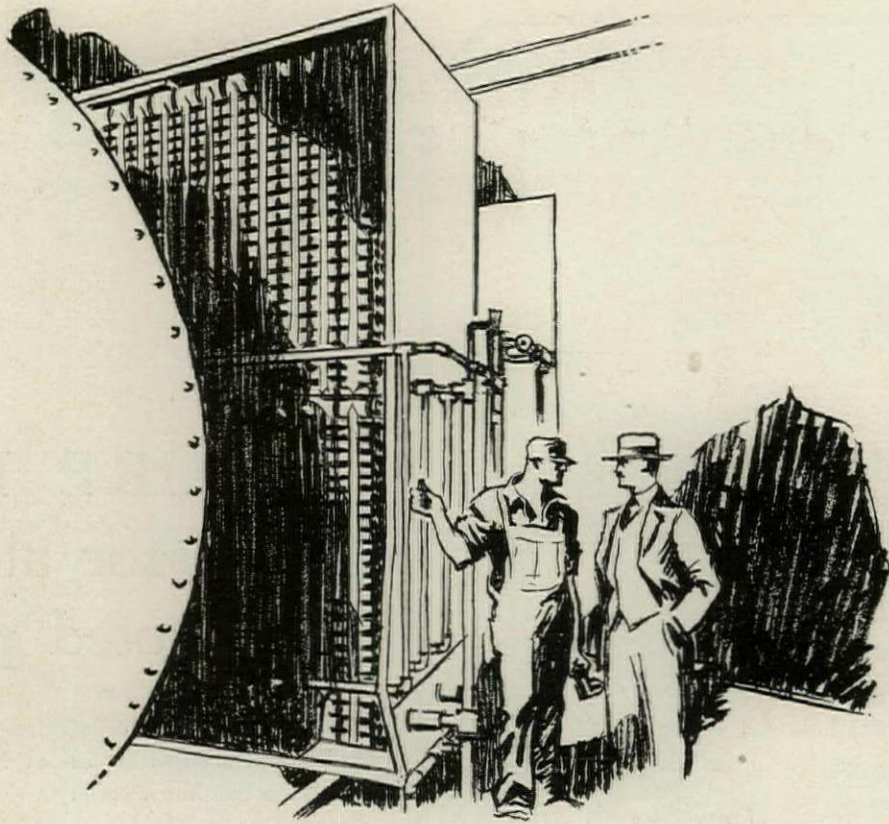
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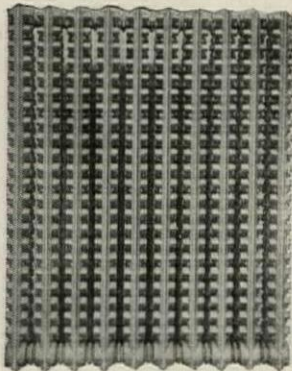
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Selected List of Manufacturers' Publications

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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.
- Making the Most of Your Protectomotor. Folder, 6 pp., 3½ x 6½ ins. Illustrated.
- The Protectomotor Industrial Air Filter. Folder, 6 pp., 4 x 9 ins. Illustrated.
- Introducing the Model C. P. Pipe Line Filter. Folder, 8 pp., 4 x 9 ins. Illustrated.

ASPHALT

- Barber Asphalt Company**, New York, Philadelphia, Chicago, Pittsburgh, Kansas City, St. Louis, San Francisco.
Specifications for Applying Genasco Asphalt Mastic. Booklet, 16 pp., 8 x 9 ins.
- Genasco Trinidad Lake Asphalt Mastic. Brochure, 32 pp., 6 x 9 ins.
- Specifications for Applying Genasco. Booklet, 16 pp., 8 x 10½ ins.

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 4¾ 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 pp., 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 employees' 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, 24 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.

CEMENT—Continued

- 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.
- Portland Cement Association**, Chicago.
Concrete Masonry Construction. Booklet, 47 pp., 8½ x 11 ins. Illustrated. Deals with various forms of construction.
- 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 page, 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 10¾ 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

- 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 157

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, 6 x 9 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 an important detail of elevator mechanism.
- Modern Electrical Equipment for Buildings. Booklet, 3½ 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.

FIREPLACE CONSTRUCTION

- H. W. Covert Company,** 243 East 44th Street, New York, N. Y.
Covert Fireplace Construction. Booklet, 12 pp., 8½ x 11 ins. Illustrated. Valuable data on an important topic.

FIREPROOFING

- Concrete Engineering Co.,** Omaha, Nebr.
"Handbook of Fireproof Construction." Booklet, 54 pp., 8½ x 11 ins. Valuable work on methods of fireproofing.
- North Western Expanded Metal Co.,** 437 South Dearborn St., Chicago, Ill.
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)

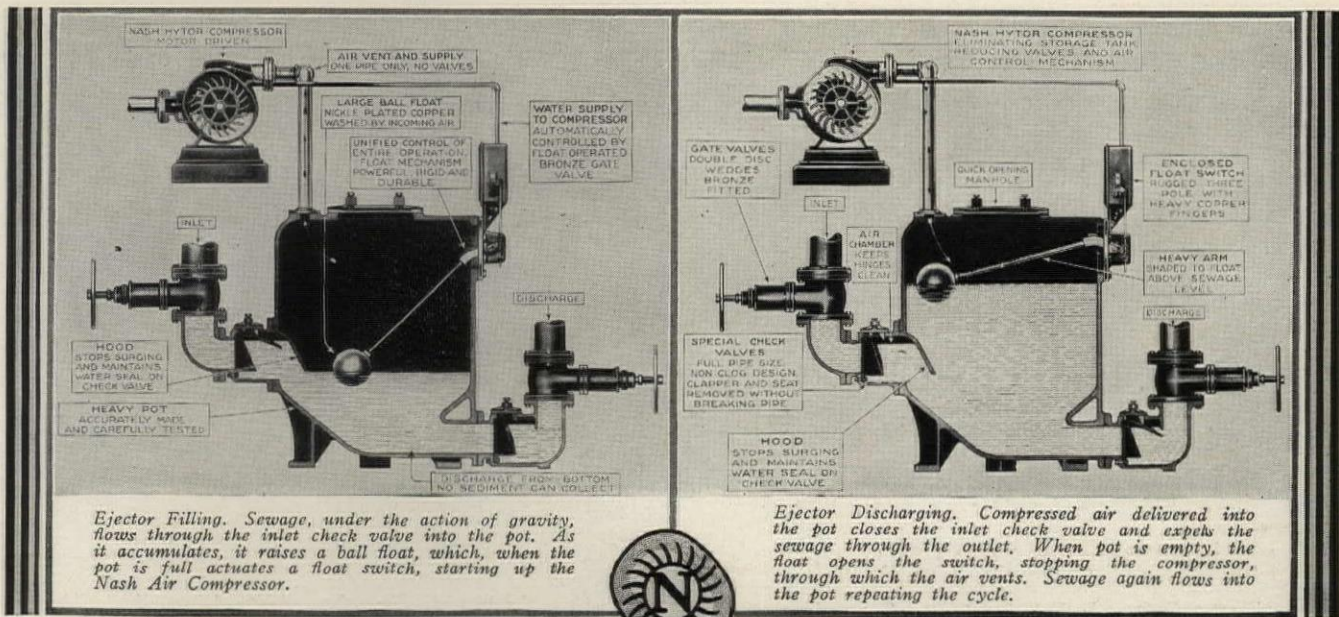
- Master Builders Co.,** Cleveland, Ohio.
Concrete Floor Treatment. File, 50 pp. Data on securing hardened dustproof concrete.
- Concrete Floor Treatments—Specification Manual. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Valuable work on an important subject.
- Sonneborn Sons, Inc., L.,** 116 Fifth Ave., 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 Floretype Construction. Booklet, 8½ x 11 ins., 16 pp. Illustrations of actual jobs under construction. Lists of 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., 44 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors. Newly revised, February, 1929.
- Armstrong's Linoleum Pattern Book, 1929. Catalog, 9 x 12 ins., 44 pp. Color plates. Reproduction in color of all patterns of linoleum and cork carpet in the Armstrong line.
- Linoleum Layer's Handbook. 5 x 7 ins., 36 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., 3½ x 8½ 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, Missouri.
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. 9¾ x 11¾ 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.
- Cellized Oak Flooring,** Memphis, Tenn.
Style in Oak Floors. Booklet, 16 pp., 6 x 9 ins. Illustrated.



Ejector Filling. Sewage, under the action of gravity, flows through the inlet check valve into the pot. As it accumulates, it raises a ball float, which, when the pot is full actuates a float switch, starting up the Nash Air Compressor.

Ejector Discharging. Compressed air delivered into the pot closes the inlet check valve and expels the sewage through the outlet. When pot is empty, the float opens the switch, stopping the compressor, through which the air vents. Sewage again flows into the pot repeating the cycle.

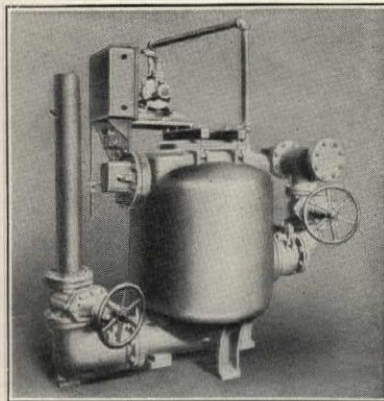
If it will flow through the inlet— this ejector will pump it

NO need to provide screening or separation for sewage, drainage, effluent, sludge or other heavy liquids if you specify a Jennings Sewage Ejector. It will pump any material that will flow through the inlet. Its simple principle of operation permits the Jennings to adapt itself automatically to the rate of flow. Large, expensive storage basins are eliminated. Material is handled efficiently and at low cost.

And long years of service, free from the need for serious repairs or

replacements can be expected from the Jennings Ejector. Simplified design has reduced the number of its working parts to a minimum. Air valves and other intricate apparatus that might leak or otherwise cause trouble have been dispensed with. Every one of the

few moving parts of the Jennings is placed well out of contact with the material being handled. No chance for dirt and grit—always present in unscreened liquids—to get into bearings and cause undue wear. Write for Bulletin 67.



The Jennings Sewage Ejector, complete with motor driven compressor. Supplied in standard capacities up to 1500 g.p.m Heads up to 50 ft.

Jennings Pumps

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

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 158

FLOORING—Continued

- Thomas Moulding Floor Co.**, 165 W. Wacker Drive, Chicago, Ill.
Better Floors. Folder, 4 pp., 11¼ x 13¼ ins. Illustrated. Floors for office, administration and municipal buildings.
Better School Floors. Folder, 4 pp., 11¼ x 13¼ ins. Illustrated. Characteristics, Specifications and Uses. Brochure, 16 pp., 11¼ x 13¼ 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, Ill.
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, N. Y.
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.
Ars 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 theater 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, Pa.
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 11¾ ins. Filled with valuable illustrations.

GARAGES

- Ramp Buildings Corporation**, 21 East 40th St., New York, N. Y.
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., 5¾ x 7¾ ins. Illustrated. History of manufacture of flat, clear, sheet glass.

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, Pa.
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., 66 pp. Illustrated. Complete information accompanied by data and illustrations on different kinds of garage door hardware.
Distinctive Elevator Door Hardware. Booklet, 90 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.
Door Closer Booklet. Brochure, 16 pp., 3½ x 6 ins. Data on a valuable detail.
Garage Hardware. Booklet, 12 pp., 3½ x 6 ins. Hardware intended for garage use.

HARDWARE—Continued

- 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, Mich.
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. Broadside, 4 pp., 10¼ x 15 ins. Illustrated. Data on the IN-AIRD invisible air valve.
In-Aird, 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, Ill.
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.
- The Fulton Sylphon Company**, Knoxville, Tenn.
Sylphon Temperature Regulators. Illustrated brochures, 8½ x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments.
Sylphon 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.
- 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.

For THE FINEST
BUILDINGS
...THE FINEST
RADIATION..

AERO

THE NATIONAL RADIATOR

In the years when Aero, the National Radiator, was the only complete line of tube-type radiation on the market, it was the almost invariable selection for the finest buildings. That was only natural.

Now, competing with many imitations, it is still chosen with amazing regularity. *That is significant.*

It indicates appreciation of the fact that Aero has, during more than six years, been rendering faithful, trouble-free service on heating applications of every character; and that it is the only complete line of tube-type radiation that can show so impressive a record of demonstrated dependability.

The man who selects Aero, the National Radiator, takes no gamble on the quality or on the satisfactory performance of his warming equipment.



No. 1 FIFTH AVENUE, NEW YORK

Architect, Helmle & Corbett
Heating Contractor, Chas. Darmstadt, Inc.
Builder, Jos. Seigel

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



SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 160

HEATING EQUIPMENT—Continued

- Oil Heating Institute**, 420 Madison Ave., New York, N. Y.
What About the Supply of Oil Fuel? Booklet, 16 pp., 5½ x 8 ins. Illustrated.
- Petroleum Heat & Power Co.**, 511 Fifth Avenue, New York, N. Y.
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.
- Petro Mechanical Oil Burner & Air Register. Booklet, 24 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.
- Spencer Heater Co.**, Williamsport, Pa.
Catalog. Booklet, 20 pp., 6¼ x 9 ins. Illustrated. Complete line of magazine feed cast iron sectional and steel tubular heaters.
- The Fire that Burns Uphill. Brochure, 24 pp., 6¼ x 9¼ ins. Illustrated in color. Magazine feed heaters for steam, vapor and hot water heating.
- 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.**, 369 Lexington 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, linolite 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, N. Y.
Lighting Specific for Hospitals. Booklet, 30 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, 22 pp., 7½ x 9¼ ins. Valuable data on an important subject.
- Wilmot 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.
- 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., 5½ 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.

INCINERATORS—Continued

- 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.

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 Gypsteel. 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.

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, 11 x 17 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, 6 x 9 ins. Illustrated. The design and equipment of school cafeterias with photographs of installation and plans for standardized outfits.

LABORATORY EQUIPMENT

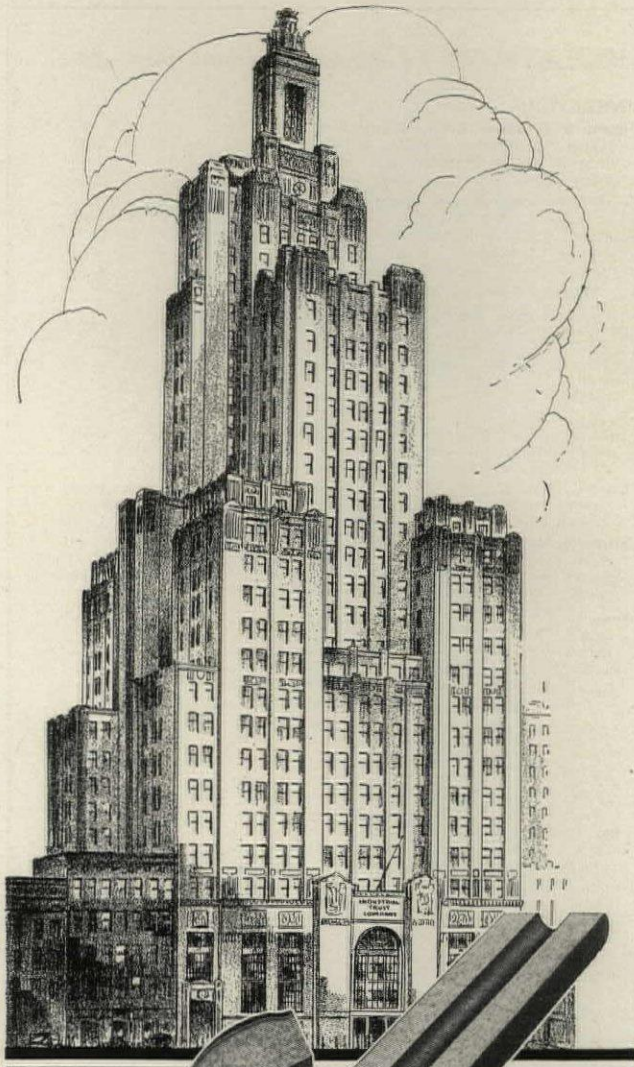
- Alberene Stone Co.**, 153 West 23rd Street, New York City.
Booklet, 8¼ x 11¼ ins., 26 pp. Stone for laboratory equipment, shower partitions, stair treads, etc.
- Duriron Company**, Dayton, Ohio.
Duriron Acid, Alkali and Rust-proof Drain Pipe and Fittings. Booklet, 8½ x 11 ins., 20 pp. Full details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

LANTERNS

- Todhunter, Arthur**, 119 E. 57th St., New York, N. Y.
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.

LATH, METAL AND REINFORCING

- National Steel Fabric Co.**, Pittsburgh, Pa.
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 10¼ 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.



Industrial Trust Building, Providence, R. I. Walker Gillette, architect. Refrigerated drinking water system insulated with 2700 feet of Armstrong's Cork Covering; roofs insulated with 46,000 square feet of Armstrong's Corkboard.

Drinking Water Lines Insulated ~ Permanently

THE architect who uses Armstrong's Cork Covering on the lines of a refrigerated drinking water system can dismiss that job from his mind as far as insulation is concerned. Armstrong's Cork Covering will last as long as the pipe without sweating, deterioration, or loss of efficiency.

The insulating value of Armstrong's Cork Covering is ample to prevent any sweating of the lines. Air infiltration is prevented by an ironed-on asphalt mastic finish, and the covering fits so accurately that there are no "pockets" to collect condensation. Armstrong's Cork Covered low-temperature lines can be safely enclosed in chases with every assurance that there will be no sweating or drip, and that the insulation will stay dry and efficient *permanently*.

Furthermore, since the efficiency of Armstrong's Cork Covering does not diminish, no excess refrigeration need be provided to allow for progressively increasing line losses—an initial economy of no small importance.

An excellent book on the design and installation of drinking water systems is available to architects without cost. Ask for "Refrigerated Drinking Water." Armstrong Cork & Insulation Company, 152 Twenty-fourth Street, Pittsburgh, Pa.; McGill Building, Montreal; 11 Brant Street, Toronto 2.

Armstrong's Cork Covering

For Cold Lines, Coolers and Tanks

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 162

LATH, METAL AND REINFORCING—Continued

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 Pfaulder Company, 217 Cutler Building, Rochester, N. Y.
Pfaulder Glass-Lined Steel Laundry Chutes. Booklet, 5½ x 7¾ ins., 16 pp. Illustrated. A beautifully printed brochure describing in detail with architects' specifications THE PFAULDER 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.

Troy Laundry Machinery Co., Inc., 9 Park Place, New York City.
Laundry Machinery for Large Institutions. Loose-leaf booklet, 50 pp., 8½ x 11 ins. Illustrated.

Laundry Machinery for Small Institutions. Loose-leaf brochure, 50 pp., 8½ x 11 ins. Illustrated.

Accessory Equipment for Institutional Laundries. Leather bound book, 50 pp., 8½ x 11 ins. Illustrated.

Dry Cleaning Equipment for Institutional Purposes. Brochure, 50 pp., 8½ x 11 ins. Illustrated.

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 Polaralite Signs.

Holophane Company, Inc., 342 Madison Ave., New York, N. Y.
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, N. Y.
Lighting Fixtures, Lamps and Candlesticks. 24 pp., 8½ x 11 ins. Illustrated. Fine assortment of lighting accessories.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
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, 1528 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

Central Alloy Steel Corporation, Massillon, Ohio.
Sheet Iron Primer. Booklet, 64 pp., 5¼ x 7¾ ins. Illustrated.
The Path to Permanence. Brochure, 52 pp., 8½ x 11 ins. Illustrated. Data on sheet iron.

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., Inc., Henry, 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, 184 pp., 8½ x 11 ins. Completely covers the subject of doors for interior use.

Roddis Doors for Hospitals. Brochure, 16 pp., 8½ x 11 ins. Illustrated work on hospital doors.

Roddis Doors for Hotels. Brochure, 16 pp., 8½ x 11 ins. Illustrated work on doors for hotel and apartment buildings.

MORTAR AND CEMENT COLORS

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.

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, 184 pp., 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 comes.

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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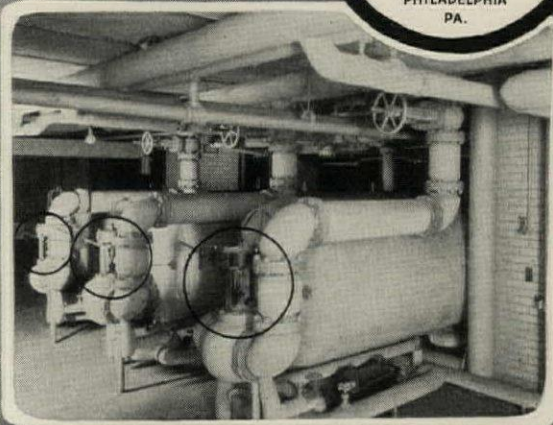
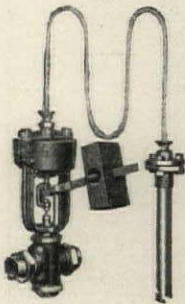
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Five Sylphon No. 930 Regulators are employed. At the right is shown the installation of three No. 930 Regulators on storage tank heaters. These Regulators contain as their expansion element, as do all Sylphon instruments, the famous all metal Sylphon Bellows, the one piece solderless flexible and durable diaphragm, the most efficient expansion member known to science.



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European Representatives, Crosby Valve & Engr. Company, Ltd., 41-2 Foley St., London, W. 1., England
Canadian Representatives, Darling Bros., Ltd., 140 Prince St., Montreal, Que., Canada

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 164

PAINTS, STAINS, VARNISHES and WOOD FINISHES—Continued

Protective Paints for Metal Surfaces. Bulletin No. 4. $8\frac{1}{2}$ 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, $8\frac{1}{2}$ x $10\frac{3}{4}$ ins. 4 pp.

U. S. Gutta Percha Paint Co., Providence, R. I. Barreled Sunlight. Booklet, $8\frac{1}{2}$ 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., $3\frac{3}{4}$ x 8 ins. Deals with domestic uses for Valspar.

How to Keep Your House Young. Illustrated brochure, 24 pp., 7 x $8\frac{1}{2}$ ins. A useful work on the upkeep of residences.

Architectural Four-Hour Varnishes and Enamels. Booklet, 8 pp., $4\frac{1}{2}$ 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., $8\frac{1}{2}$ 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. $8\frac{1}{2}$ x $11\frac{1}{4}$ 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, $8\frac{1}{2}$ 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. $8\frac{1}{2}$ 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. $8\frac{1}{2}$ 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, Ill. Pyrobar Partition and Furring Tile. Booklet. $8\frac{1}{2}$ 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. $8\frac{1}{2}$ 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 ARMCO 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." 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 $7\frac{1}{2}$ ins. Data on wrought iron pipe.

Duriron Company, Dayton, Ohio. Duriron Acid, Alkali, Rust-proof Drain Pipe and Fittings. Booklet, 20 pp., $8\frac{1}{2}$ 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, $8\frac{1}{2}$ 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, $8\frac{1}{2}$ 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. $8\frac{1}{2}$ 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. $8\frac{1}{2}$ 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.

PLASTER—Continued

Plasterers' Handbook. Booklet, 16 pp., $3\frac{1}{2}$ x $5\frac{1}{2}$ ins. A small manual for use of plasterers.

Interior Walls Everlasting. Brochure, 20 pp., $6\frac{1}{4}$ x $9\frac{1}{4}$ 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, 96 pp., $7\frac{3}{4}$ x $10\frac{1}{2}$ ins. Illustrated. Data on Sani-White and Sani-Black toilet seats.

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill. Catalog "M." $9\frac{1}{4}$ 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 $6\frac{1}{2}$ 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. $8\frac{1}{2}$ x 11 ins. Illustrated. General catalog.

Another Douglas Achievement. Folder. 4 pp. $8\frac{1}{2}$ x 11 ins. Illustrated. Data on new type of stall.

Hospital. Brochure. 60 pp. $8\frac{1}{2}$ x 11 ins. Illustrated. Deals with fixtures for hospitals.

Duriron Company, Dayton, Ohio. Duriron Acid, Alkali and Rust-Proof Drain Pipe and Fittings. Booklet, $8\frac{1}{2}$ 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. $8\frac{1}{2}$ x 11 ins., 136 pp., loose-leaf catalog, showing roughing-in measurements, etc.

Maddock's Sons Company, Thomas, Trenton, N. J. Catalog "K." $10\frac{1}{2}$ x $7\frac{1}{2}$ 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., $8\frac{1}{2}$ x $10\frac{1}{2}$ ins. Illustrated. Data on showers and equipment details.

Trenton Potteries Company, Trenton, N. J. The Blue Book of Plumbing. Bound volume. 181 pp. $8\frac{1}{2}$ x $10\frac{1}{2}$ ins. Illustrated.

PUMPS

Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill. Bulletin E. $7\frac{3}{4}$ x $10\frac{1}{4}$ 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., La Crosse, Wis. Trane Small Centrifugal Pumps. Booklet. $3\frac{3}{4}$ x 8 ins. 16 pp. Complete data on an important type of pump.

Weil Pump Co., 215 W. Superior St., Chicago, Ill. Pumps. Booklet, $8\frac{1}{2}$ 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, N. Y.

R. C. A. Antenna Distribution System for Multiple Receivers. Booklet, 15 pp. $8\frac{1}{2}$ 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, N. Y. Building Garages for Profitable Operation. Booklet, $8\frac{1}{2}$ 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., $8\frac{1}{2}$ x 11 ins. Illustrated. Deals with cold storage, chilling of water, etc.

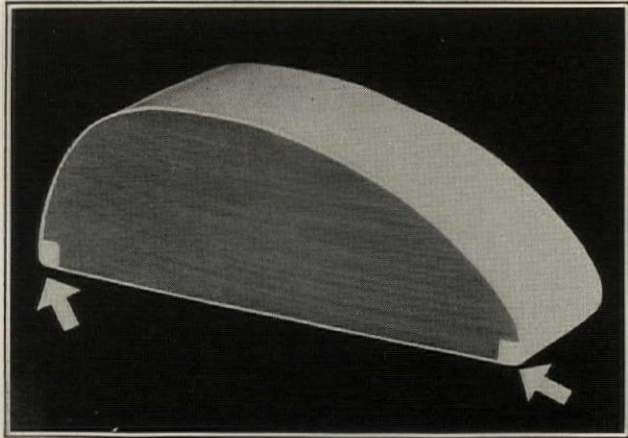
REINFORCED CONCRETE—See also Construction, Concrete

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 $\frac{3}{4}$ -inch Rib Lath. Folder 4 pp., $8\frac{1}{2}$ x 11 ins. Illustrated. Deals with a new type of V-Rib expanded metal.

Truscon Steel Company, Youngstown, Ohio. Shearing Stresses in Reinforced Concrete Beams. Booklet. $8\frac{1}{2}$ x 11 ins. 12 pp.

You Should Have Brunswick's Catalog.. Showing the Complete Line of Brunswick Closet Seats



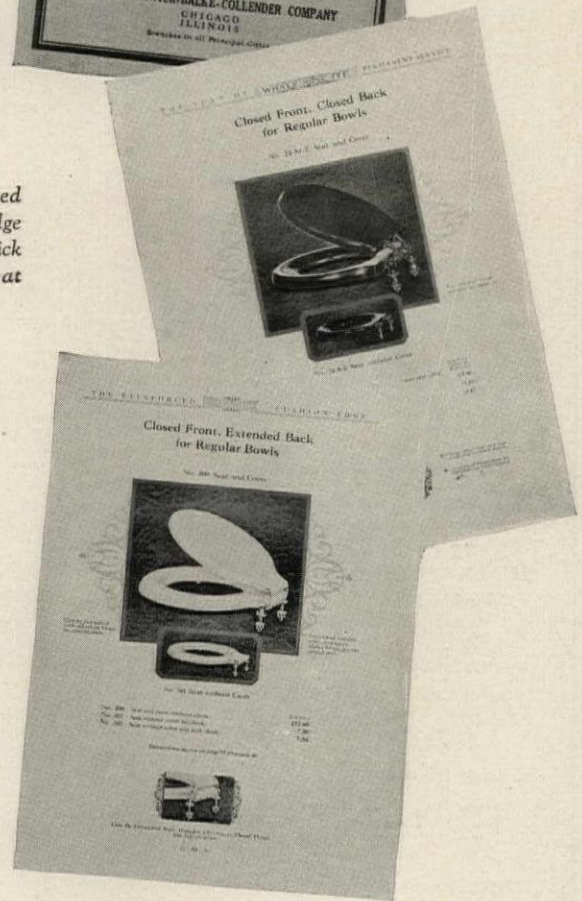
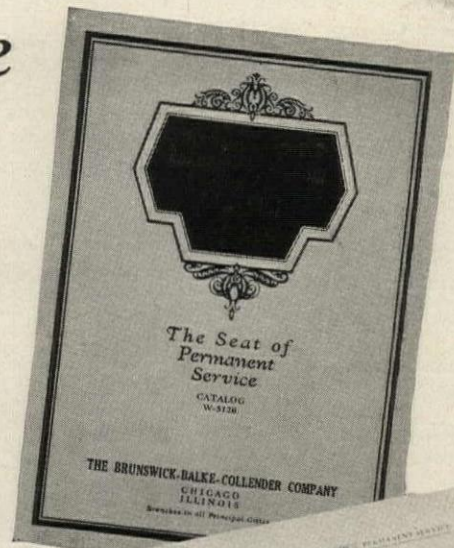
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THE BRUNSWICK-BALKE COLLENDER CO., 623 S. Wabash Ave., Chicago

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 166

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. $8\frac{1}{2}$ x $11\frac{1}{4}$ ins. Gives complete data and specifications for many details of roofing.
- Heinz Roofing Tile Co.**, 1925 West Third Avenue, Denver, Colo.
Plymouth-Shingle Tile with Sprocket Hips. Leaflet, $8\frac{1}{2}$ x 11 ins. Illustrated. Shows use of English shingle tile with special nips.
Italian Promenade Floor Tile. Folder, 2 pp., $8\frac{1}{2}$ x 11 ins. Illustrated. Floor tiling adapted from that of Davanzati Palace.
Mission Tile. Leaflet, $8\frac{1}{2}$ x 11 ins. Illustrated. Tile such as are used in Italy and southern California.
Georgian Tile. Leaflet, $8\frac{1}{2}$ 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, $8\frac{1}{2}$ 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., $8\frac{3}{4}$ x 11 ins. Important data on the subject.
Gypsteel Pre-cast Fireproof Roofs. Booklet, 48 pp., $8\frac{1}{2}$ 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, $8\frac{1}{2}$ 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. $7\frac{3}{4}$ x $10\frac{1}{4}$ 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, $9\frac{1}{2}$ x $11\frac{3}{4}$ 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, N. Y.
Window Shade Data Book. Folder, 28 pp., $8\frac{1}{2}$ x 11 ins. Illustrated.

SHELVING-STEEL

- David Lupton's Sons Company**, Philadelphia, Pa.
Lupton Steel Shelving. Catalog E. Illustrated brochure, 40 pp., $8\frac{3}{8}$ x 11 ins. Deals with steel cabinets, shelving, racks, doors, partitions, etc.

SOUND DEADENER

- Cabot, Inc., Samuel**, Boston, Mass.
Cabot's Deadening Quilt. Brochure, $7\frac{1}{2}$ x $10\frac{1}{2}$ 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 $6\frac{3}{4}$ ins. Data for steel for dwellings, apartment houses, etc.
- Steel Frame House Company**, Pittsburgh, Pa. (Subsidiary of McClellin-Marshall Corp.)
Steel Framing for Dwellings. Booklet, 16 pp. $8\frac{1}{2}$ x 11 ins. Illustrated.
Steel Framing for Gasoline Service Stations. Brochure, 8 pp. $8\frac{1}{2}$ x 11 ins. Illustrated.
Steel Frame Standard Gasoline Service Stations. Booklet, 8 pp. $8\frac{1}{2}$ 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., $8\frac{1}{2}$ 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, $8\frac{1}{2}$ 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.
Volume 1, Series B. Indiana Limestone Library, 6 x 9 ins., 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.

STONE, BUILDING—Continued

- Volume 4, Series B. Booklet. New Edition. $8\frac{1}{2}$ x 11 ins., 64 pp. Illustrated. Indiana Limestone as used in Banks.
- Volume 5, Series B. Indiana Limestone Library. Portfolio. $8\frac{3}{4}$ x $11\frac{1}{2}$ 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. $8\frac{1}{2}$ x 11 ins., 80 pages, illustrated.
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- Brasco Manufacturing Co.**, 5025-35 South Wabash Avenue, Chicago, Ill.
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Brasco Copper Store Fronts. Catalog No. 32. Series 202.
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- The Kawneer Company**, Niles, Mich.
Store Front Suggestions. Booklet, 96 pp., 6 x $8\frac{1}{2}$ ins. Illustrated. Shows different types of Kawneer Solid Copper Store Fronts.
Catalog K. 1927 Edition. Booklet, 32 pp., $8\frac{1}{2}$ x 11 ins. Illustrated. Details of Kawneer Copper Store Fronts.
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- Modern Bronze Store Front Co.**, Chicago Heights, Ill.
Introducing Extruded Bronze Store Front Construction. Folder, 4 pp., $8\frac{1}{2}$ 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. $8\frac{1}{2}$ x $10\frac{1}{2}$ ins. 60 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.
International Store Front Construction. Catalog. $8\frac{1}{2}$ x 10 ins. 70 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.

TELEPHONE EQUIPMENT

- New York Telephone Co.**, 195 Broadway, New York, N. Y.
Planning for Home Telephone Conveniences. Booklet, 51 pp. $8\frac{1}{2}$ x 11 inches. Illustrated.
Planning for Telephones in Buildings. Brochure, 73 pp. $8\frac{1}{2}$ x 11 inches. Illustrated.

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. $8\frac{1}{2}$ 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, $9\frac{1}{8}$ x $12\frac{3}{4}$ 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. $8\frac{1}{2}$ 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. $8\frac{1}{2}$ 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.

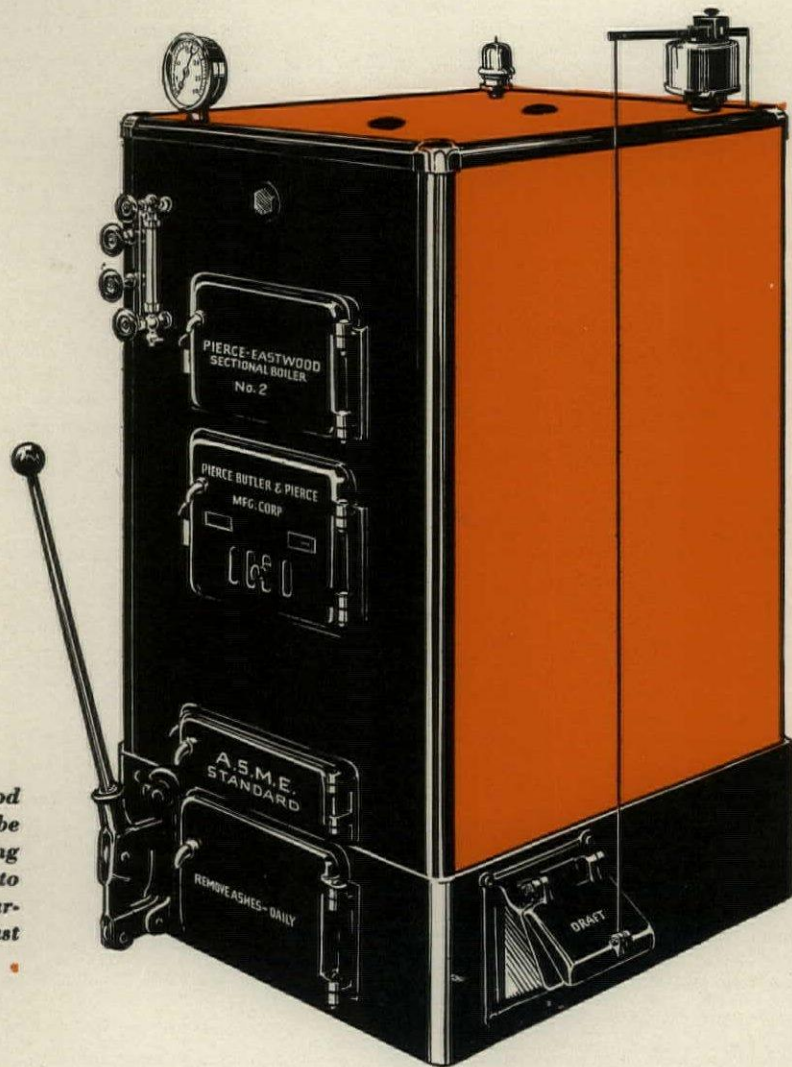
TILE, HOLLOW

- National Fire Proofing Co.**, 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. $8\frac{1}{2}$ x 11 ins. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Standard Fireproofing Bulletin 171. $8\frac{1}{2}$ 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.
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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 168

TILES

- Kraftile Company, Niles, Calif.**
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.

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, Ill.**
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, N. Y.**
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.
- 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

- 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, Ill.**
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.

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.
- Hope & Sons, Henry, 103 Park Ave., New York, N. Y.**
Catalog, 12¼ x 18½ ins. 30 pp. Illustrated. Full size details of outward and inward opening casements.
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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.
- 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, N. Y.**
Window Shade Data Book. Folder, 28 pp., 8½ x 11 ins. Illustrated.

WINDOWS, STEEL AND BRONZE

- 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.**
American Walnut. Booklet, 7 x 9 ins. 45 pp. Illustrated. A very useful and interesting little book on the use of walnut in Fine Furniture with illustrations of pieces by the most notable furniture makers from the time of the Renaissance down to the present.
- "American Walnut for Interior Woodwork and Paneling." 7 x 9 ins. Illustrated. Discusses interior woodwork, giving costs, specifications of a specimen room, the different figures in Walnut wood, Walnut floors, finishes, comparative tests of physical properties and the advantages of American Walnut for woodwork.
- 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, D. C.**
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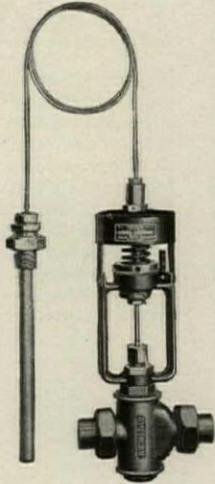
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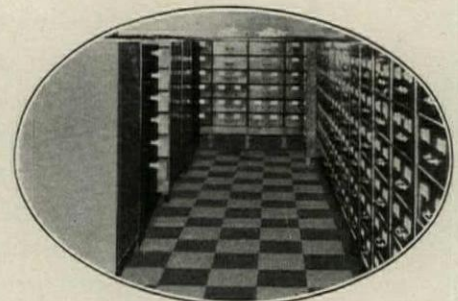
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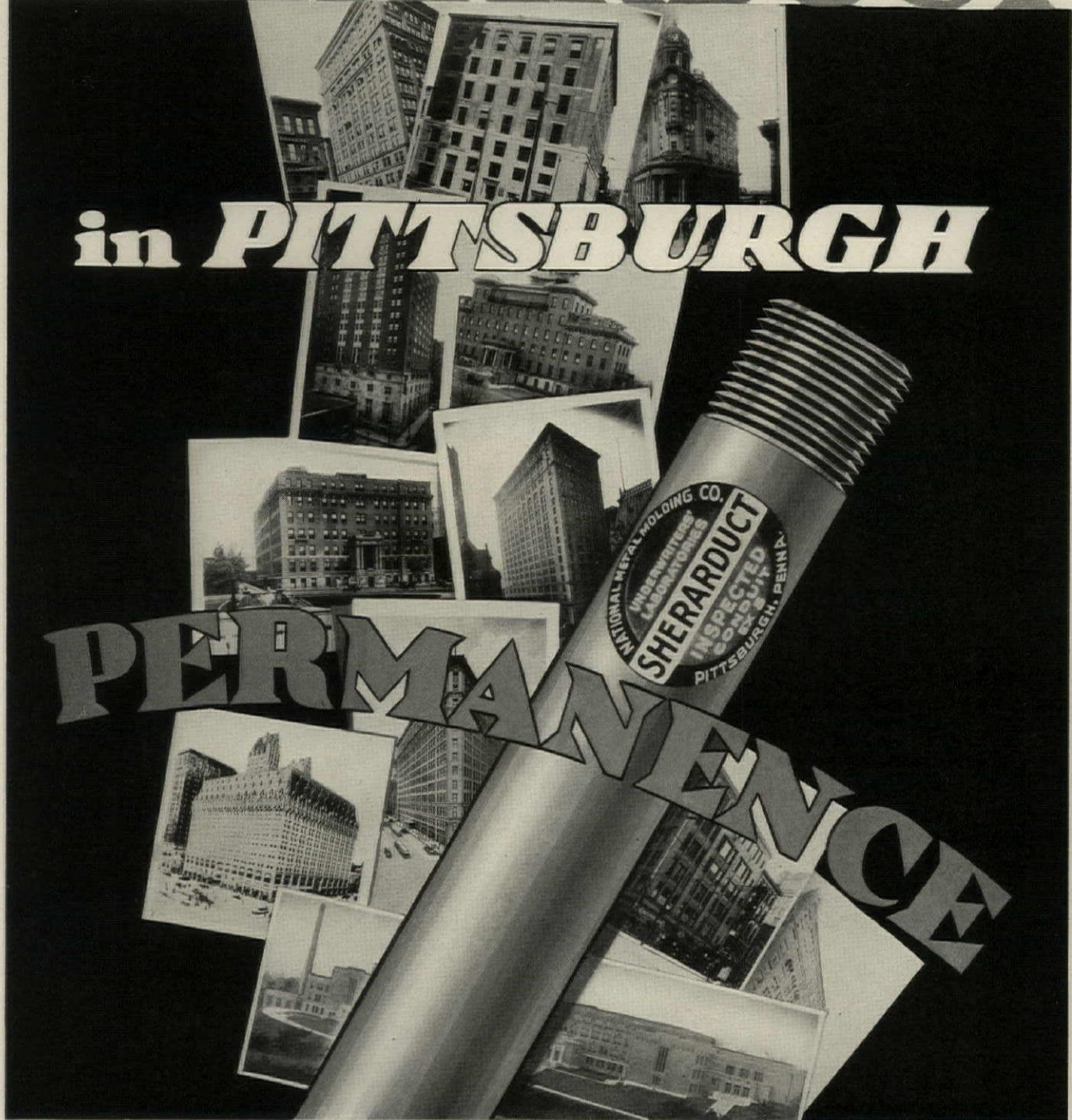
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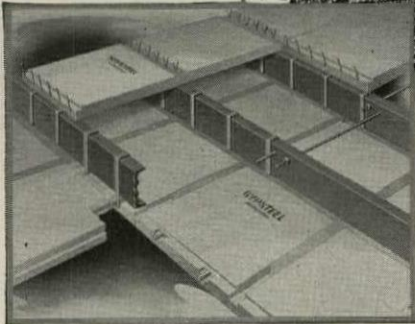
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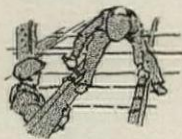
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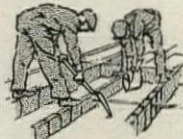
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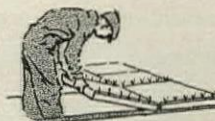
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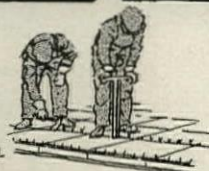
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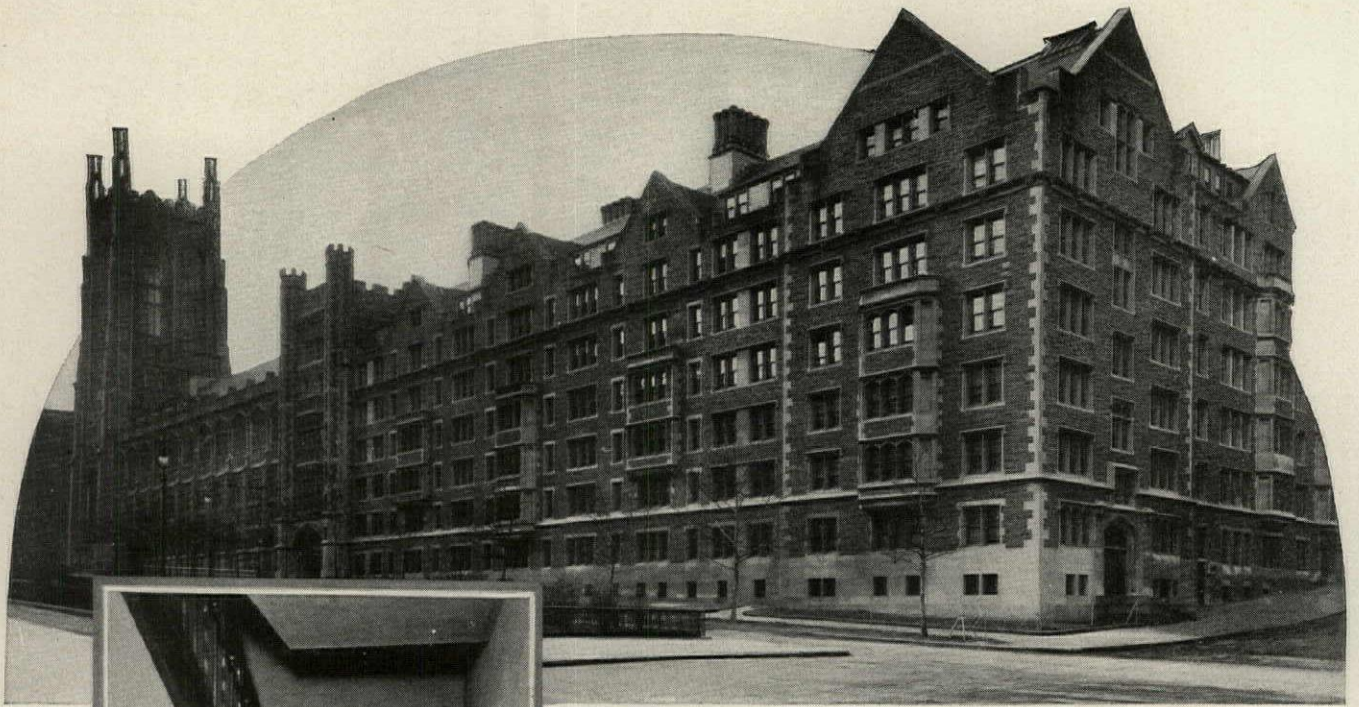
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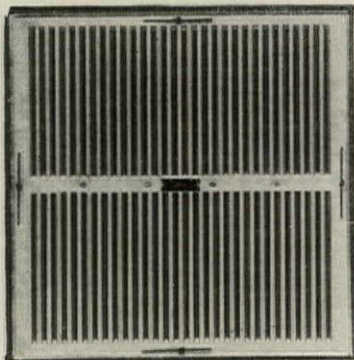
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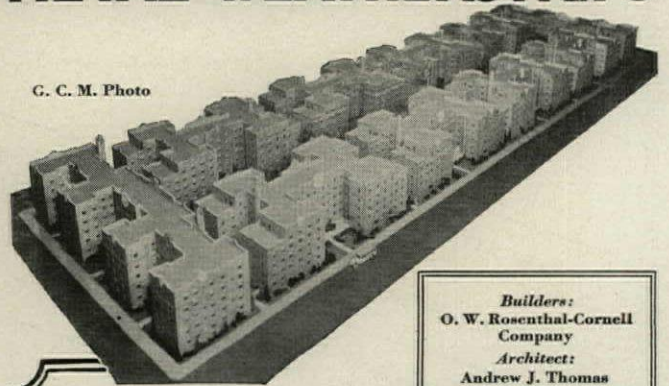
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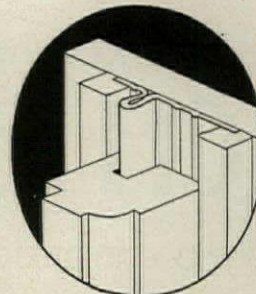
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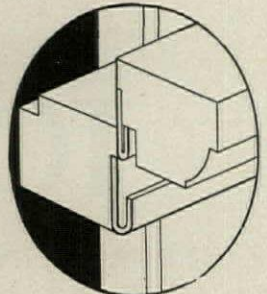
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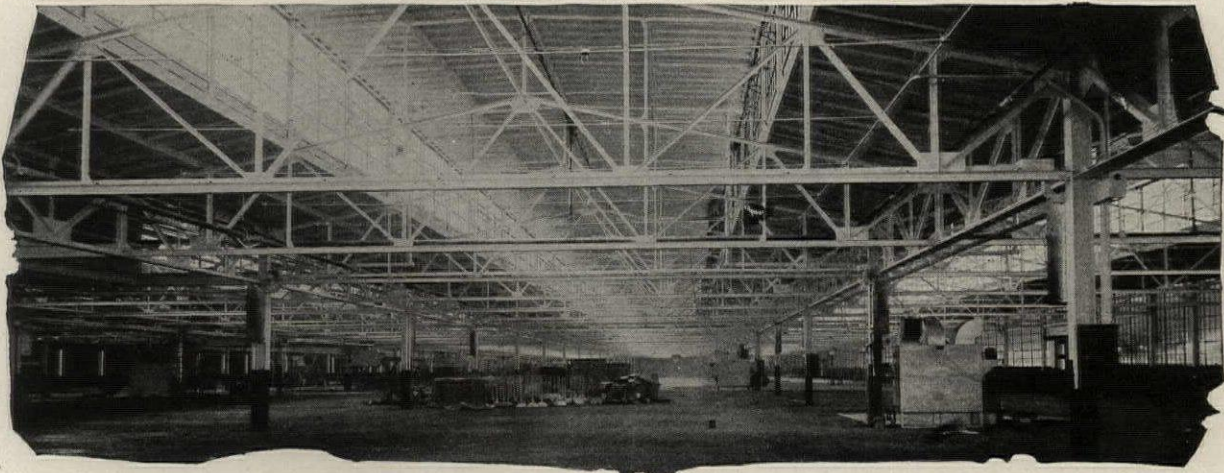
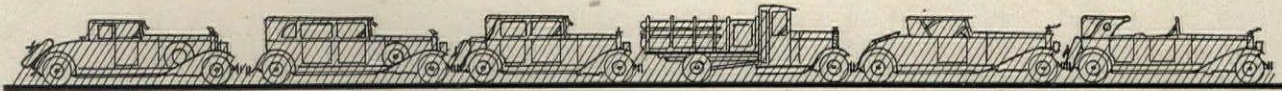


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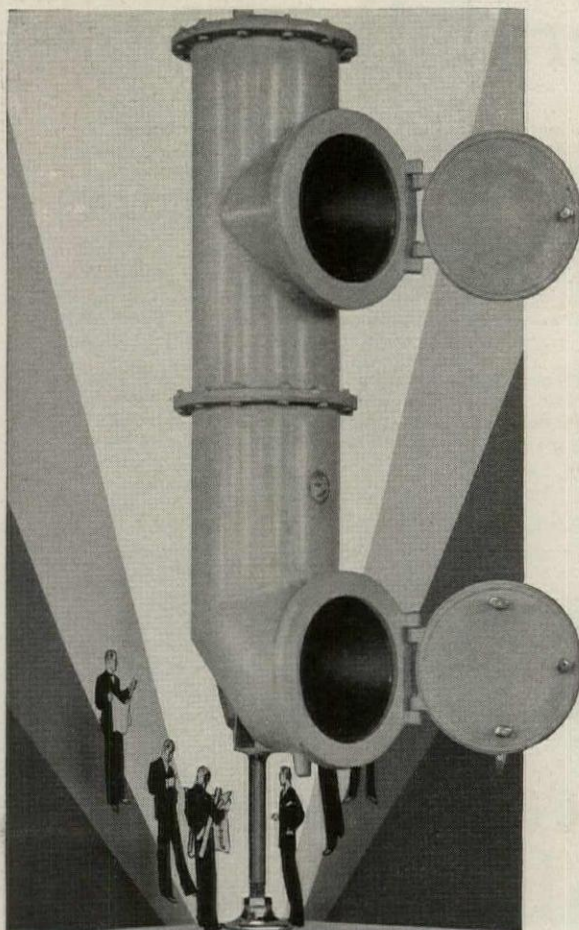
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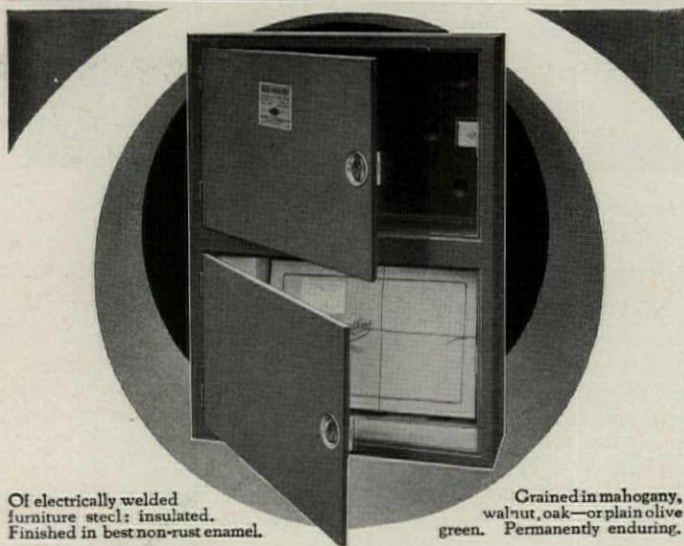
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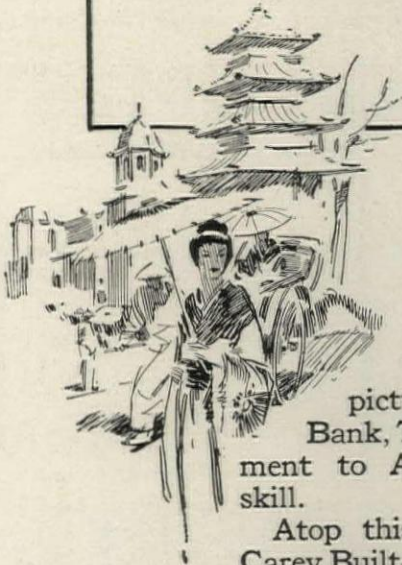
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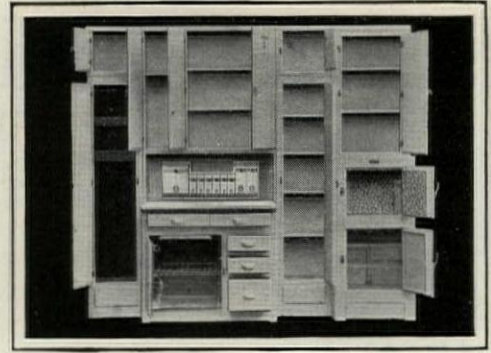
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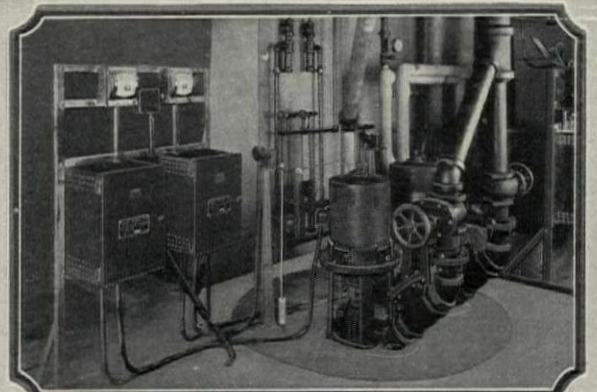
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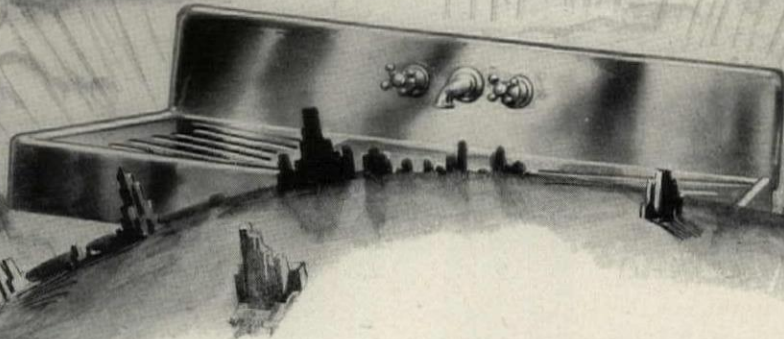
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IN this volume two well known writers on Spanish architecture and decoration review the various forms which are given to the small or medium sized house in Spain. To render the work as helpful as possible to architects, the authors have included many plans and drawings of different kinds, details of such exterior parts of buildings as friezes, cornices, windows, timber overhangs, soffits and balconies, or of such interior parts of the structure as ceilings, fireplaces, doors and stairways. Part of the work deals with the tiles, pottery, ironwork, plaster in relief and the other forms of craftsmanship which contribute so much to the excellence of domestic architecture in Spain. It is a work likely to be invaluable to the designer.

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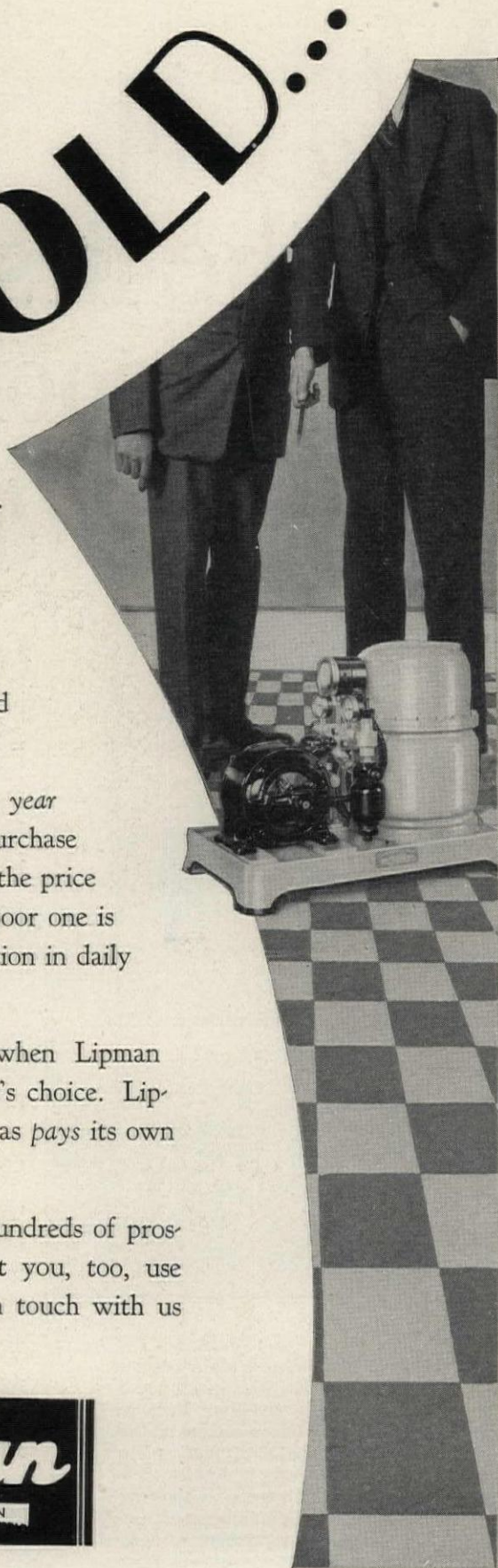
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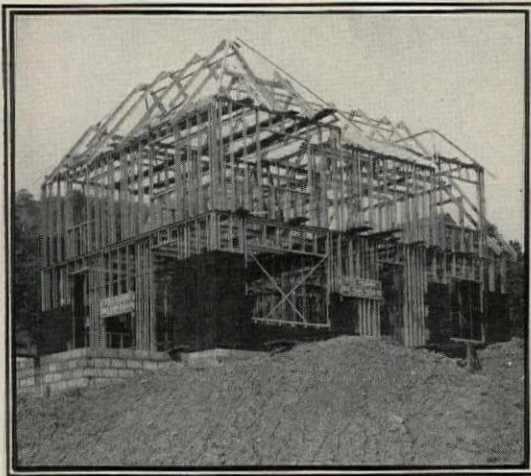
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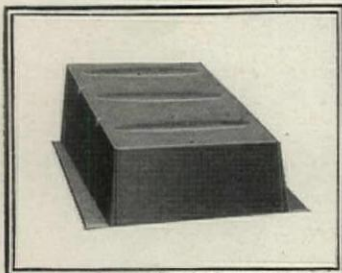
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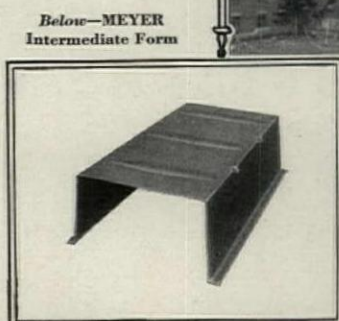
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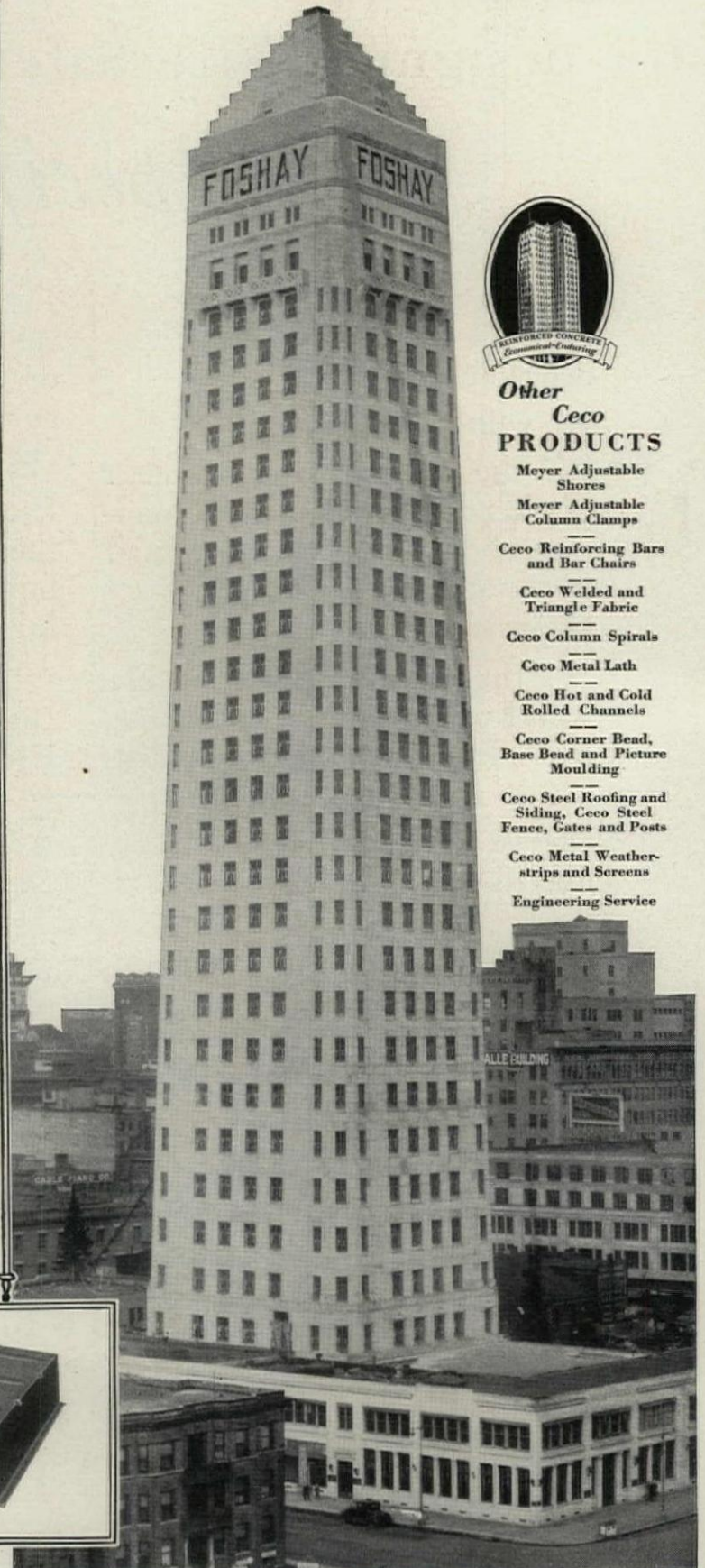
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- Ceco Corner Bead, Base Bead and Picture Moulding*
- Ceco Steel Roofing and Siding, Ceco Steel Fence, Gates and Posts*
- Ceco Metal Weatherstrips and Screens*
- Engineering Service*

In MINNEAPOLIS

Bethlehem Wide-Flange Structural Shapes—known as Bethlehem Sections—were used in the Steel framework of these Minneapolis buildings.

Many prominent buildings, the world over, have Bethlehem Sections in their steel framework.

BETHLEHEM STEEL COMPANY

General Offices: Bethlehem, Pa.

District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Detroit, Cincinnati, Chicago, St. Louis, San Francisco, Los Angeles, Seattle, Portland and Honolulu.

*Bethlehem Steel Export Corporation, New York
Sole Exporter of our Commercial Products*

Bethlehem Sections are not a new development in the structural field. For years their economy in weight and cost of fabrication has been recognized by architects, engineers and contractors everywhere.

Foshay Tower

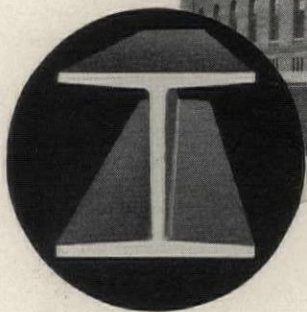
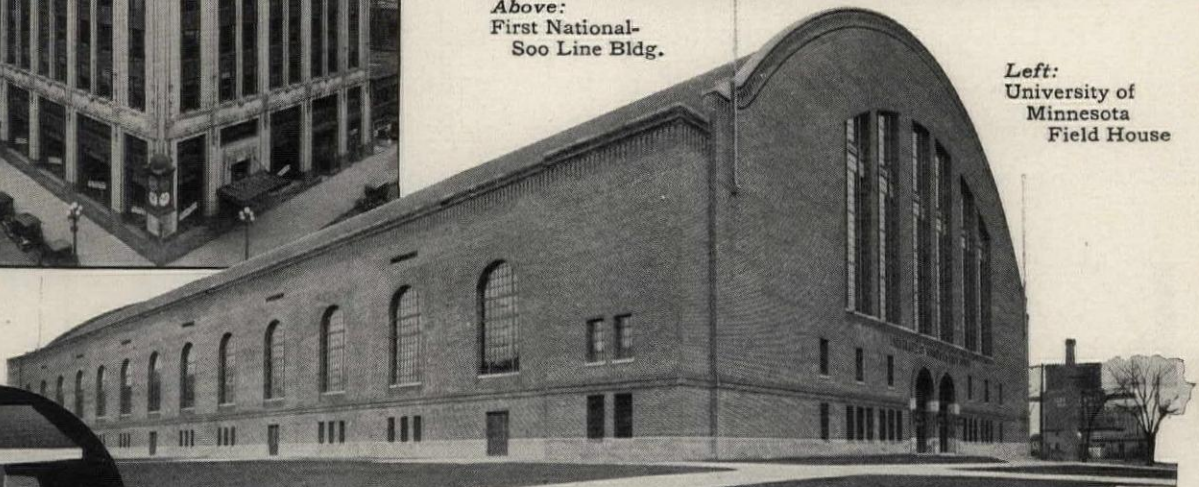


Above:
First National-
Soo Line Bldg.



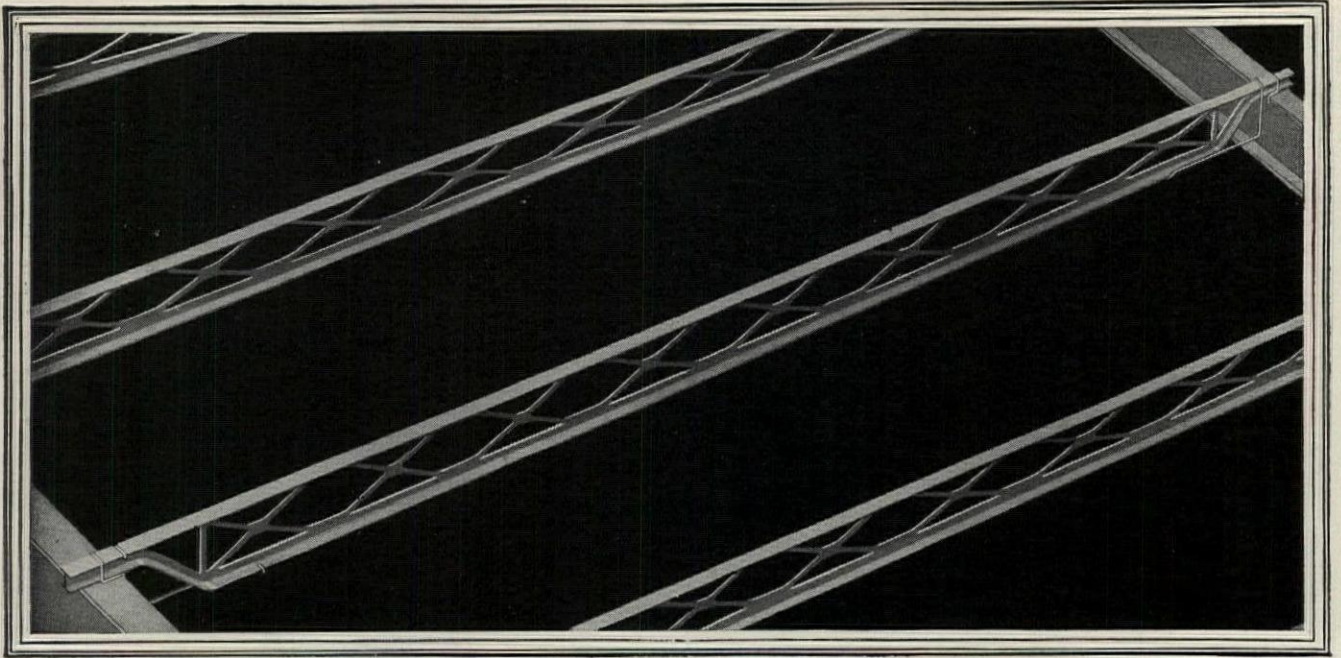
Above:
Metropolitan
Bank Bldg.

Left:
University of
Minnesota
Field House



BETHLEHEM

Wide-Flange STRUCTURAL SHAPES



A New Building Product

—made by a new and different method

Here is a new Kalman product for safe and economical fire-resisting floor construction. This advanced type of joist gives you a joist which meets the requirements of modern construction methods, and is built according to accepted principles of sound engineering. A new and different method of manufacturing

gives you the chords and web members which are formed from one piece of steel. There isn't a bolt, rivet or weld in tension. You can see the Kalmantruss joist — can read about it — and you can get lots of other valuable information from the new Kalmantruss catalog. Write for it.

KALMANTRUSS

J O I S T S

KALMAN STEEL COMPANY

CHICAGO
NEW YORK
BUFFALO
DETROIT
WASHINGTON, D. C.

BOSTON
BALTIMORE
PITTSBURGH
SYRACUSE

MILWAUKEE
PHILADELPHIA
ST. PAUL
ATLANTA
NEWARK

HOUSTON
KANSAS CITY
DAYTON
MINNEAPOLIS

COLUMBUS
YOUNGSTOWN
CHARLOTTE
NILES

Export Office—NEW YORK

The Koppers Building Pittsburgh, Pa.

Graham, Anderson, Probst & White—Architects
Mellon-Stuart Company—Contracting Engineers
McClintic-Marshall Construction Co.—Fabricators
Bass Construction Company—Steel Erectors

And again Carnegie Beams were selected



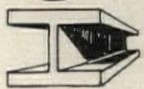
“A MAN IS NOT without honor save in his own country” has been disproved in Pittsburgh, the home city of Carnegie Beams. The magnificent Koppers Building is one of many imposing structures now under construction in this city of steel, in which these beams form the framework. Here, as well as all over the country, architects, engineers and builders have been quick to recognize the many advantages offered in this modern series.

The Carnegie Beam Series offers two unique features. First, the flanges are of uniform thickness without taper—a factor which permits of simple connections and facilitates fabrication and erection. Second, a complete series of 10" and 12" sections are included, designed for column purposes, in which the various weights have a constant depth. In tier or apartment house construction, constant depth is especially valuable. The details of splices, girders, floor beams, spandrels, stairwells, elevator shafts, etc., for one floor are identical for successive floors. The economy afforded by this uniformity presents an opportunity for substantial savings. The new Carnegie Beams merit your investigation.

Our handbook "Carnegie Beam Sections" will acquaint you with complete details. We will gladly send a copy at your request.

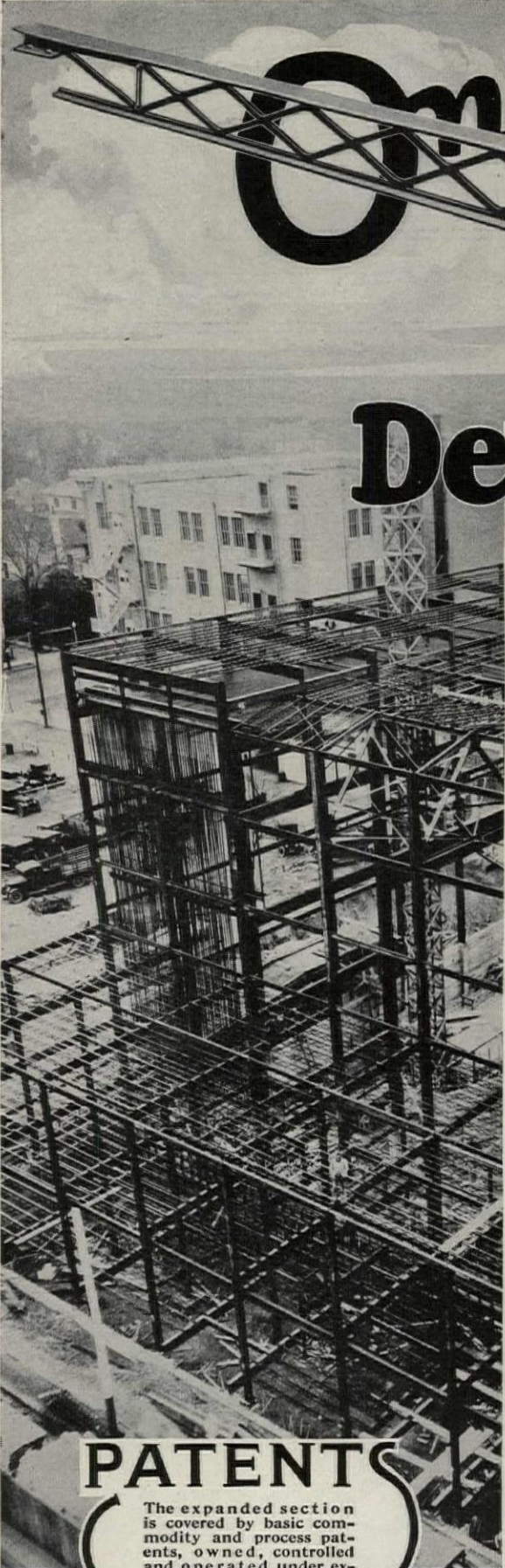
1951

CARNEGIE STEEL COMPANY



Subsidiary of UNITED STATES STEEL CORPORATION
CARNEGIE BUILDING ... PITTSBURGH, PA.





One-piece
Gives

Dependability

NO WELDS IN STRESS—one piece of steel—expanded—without rivets, bolts or welds in shear or tension—these are the features responsible for the rapid gain in Bates-Truss Joist popularity.

A simple I-beam section is expanded into a lattice truss web. The expansion increases the depth of the beam—the truss materially increases its strength. The points of contact of the lacing and flange members are simply unshered portions of the original plain web. By this process, all defective beams are automatically eliminated.

Contractors, engineers, builders should all know about the Bates Expanded Steel Truss. We have prepared a book giving complete information. A copy will be mailed to you upon request.

Bates Expanded Steel Truss Co.

PATENTS

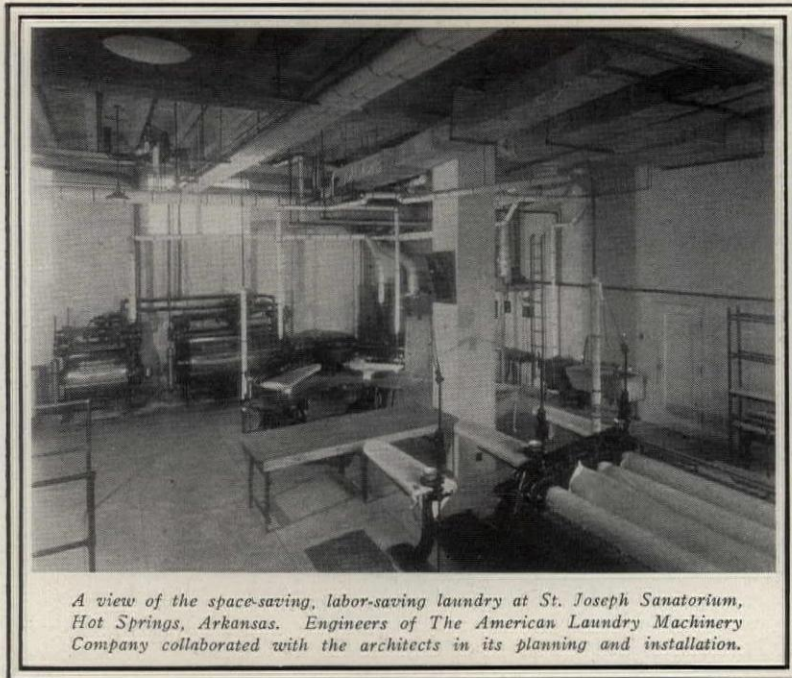
The expanded section is covered by basic commodity and process patents, owned, controlled and operated under exclusively by this company.

PANTAGES THEATRE, Fresno, Cal.
B. Marcus Priteca, Archt.
Earl B. Newcomb, Eng.

BATES-TRUSS JOISTS
Sales, Engineering and Executive Offices EAST CHICAGO, IND.

No. 53 of a series of advertisements featuring prominent laundry installations

“AMERICAN” service played a part in planning this laundry, too—



A view of the space-saving, labor-saving laundry at St. Joseph Sanatorium, Hot Springs, Arkansas. Engineers of The American Laundry Machinery Company collaborated with the architects in its planning and installation.



*Architect, Henry P. Hess,
St. Louis, Missouri*

THE photograph was taken in the modern laundry at St. Joseph Sanatorium, Hot Springs, Arkansas. This indispensable department, operated under the direct supervision of the institution's own officials, was planned and installed with the cooperation of The American Laundry Machinery Company.

It has been the privilege of “American” engineers to collaborate with

architects in the original planning of a great many such up-to-the-minute departments. Laundries for hospitals, hotels, schools, and clubs, office buildings, factories and apartment buildings. In the United States, in Canada, in many countries abroad.

You will find “American” knowledge of laundry practice helpful in drawing up floor plans, estimating power requirements, allotting space for equipment. The services of our engineers are at your disposal at all times, without obligation.

THE AMERICAN LAUNDRY MACHINERY COMPANY

Norwood Station, CINCINNATI, OHIO

THE CANADIAN LAUNDRY MACHINERY CO., LTD.
47-93 Sterling Road, Toronto 3, Ont., Canada

Agents: BRITISH-AMERICAN LAUNDRY MACHINERY CO., LTD.
Underhill St., Camden Town, London, N. W. 1, England



—and Reinforced Concrete Scores Again!

There is no better building of its kind in all Cincinnati than the Queen City Club.

This Georgian structure is 4 stories, with basement and sub-basement. It has a total floor area of 66,000 square feet, a total content of 1,000,000 cubic feet.

In previous advertisements we have shown you work examples featuring the speed and economy of reinforced concrete construction.

The Queen City Club further demonstrates the versatility of reinforced concrete—particularly as to permanence and beauty.

Architect: Harry Hake
Associate: C. H. Kuch

Structural Engineers: Euphrat & Hanly
Contractors: J. & H. Harig Company

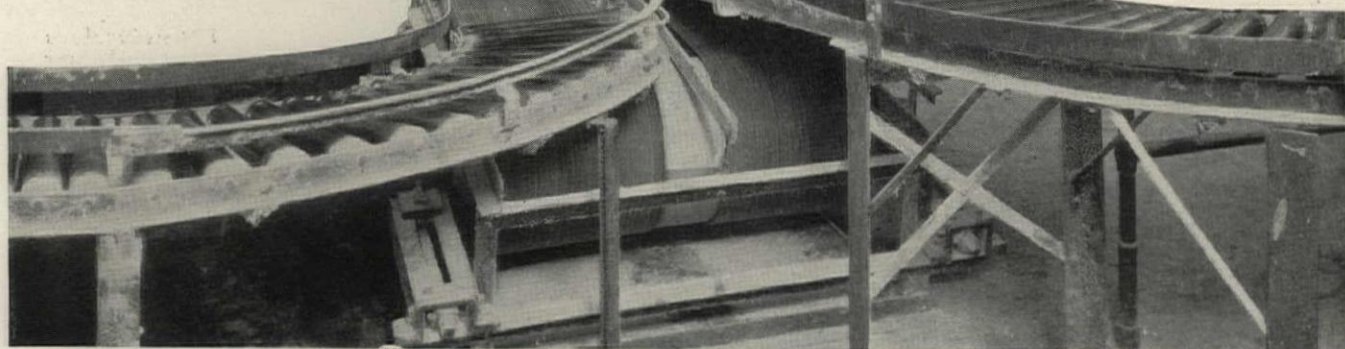
REINFORCED CONCRETE

Concrete Reinforcing Steel Institute
Tribune Tower
Chicago

Rail Steel Bar Association
Builders Building
Chicago

Strength

all the way through



*for such reasons
as this*

In Belt Conveyors the drive mechanism is enclosed in dust-proof and grease packed cast-iron housing with head shaft and countershaft revolving in self-oiling, ball and socket type brass bushed bearings.

NATURALLY, the purpose of a Conveying System is to speed up production and increase the net earnings. Standard Conveyors, all types, because of sound construction stand up under the grind of daily service, thereby fulfilling in every sense the purpose for which they are installed.

Because of a wealth of experience in designing conveying systems for every type of handling you will find the advice of Standard Conveyor Counselors valuable in planning an efficient layout for your clients.

Probably some of the facts and figures they have on production economy, low maintenance, more valuable man power, greater net earnings, etc., will interest you. Sent gladly on request to any reliable architect.

STANDARD

CONVEYOR COMPANY

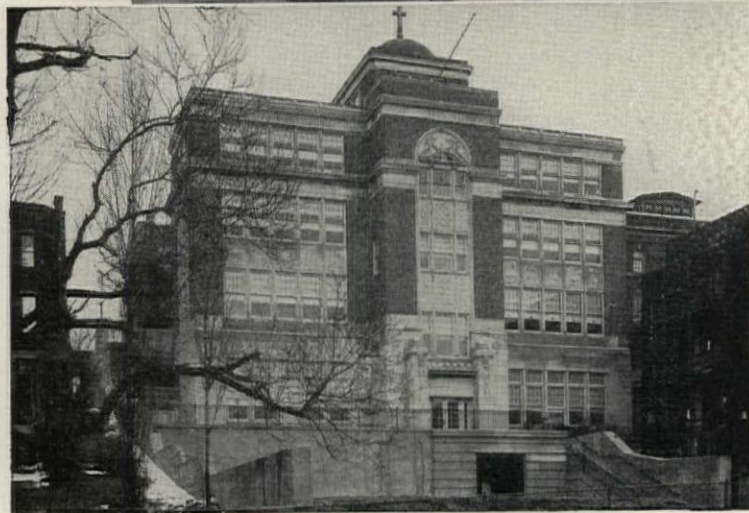
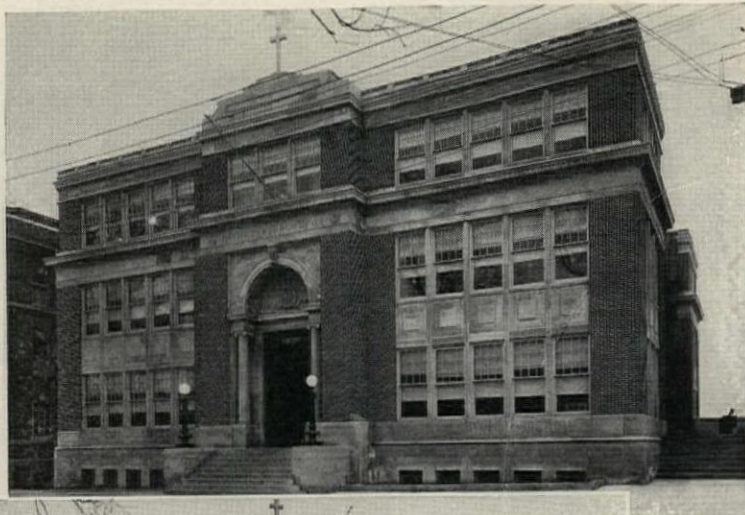
NORTH SAINT PAUL, MINNESOTA

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 Ellicott Square

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

CATHEDRAL ACADEMY
Albany, N. Y.

*Architect, Thomas L. Gleason
of Albany, N. Y.
General Contractor
Feeney & Sheehan Bldg. Co.
of Albany, N. Y.
Par-Lock Applied by The
Par-Lock Appliers of Albany*



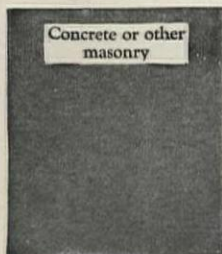
Upper view shows front and lower view rear perspective of Cathedral Academy

Par-Lock Appliers

- ALBANY,
425 Orange Street
- ATLANTA
Bona Allen Building
- BALTIMORE,
613 West Cross Street
- BUFFALO,
958 Ellicott Square Bldg.
- CHICAGO,
111 West Monroe Street
- CLEVELAND,
218 Hunkin-Conkey Bldg.
- COLUMBUS,
751 South Cassingham Rd.
- DETROIT,
2457 First National Bldg.
- KANSAS CITY, MO.
2035 East 19th Street
- MINNEAPOLIS,
434 Builders Exchange
- NEWARK, N. J.
24 Commerce Street
- NEW YORK CITY,
50 Church Street
- PHILADELPHIA,
1700 Walnut Street
- PITTSBURGH,
614 Bessemer Building
- SCRANTON, PENNA.
Cedar Avenue
- ST. LOUIS
1011 Telephone Building
- TORONTO,
2258a Bloor Street, West
- TRENTON,
339 Broad St. Bank Bldg.
- YOUNGSTOWN,
503 City Bank Building
- WILKES-BARRE, PA.
904 Second Nat'l Bank Building

Par-Lock
PLASTER KEY

protects interior surfaces in this beautiful Cathedral Academy of Albany, N.Y., all concrete areas that are plastered direct, being treated with Par-Lock Specification B, by the Par-Lock Appliers of Albany, insuring adequate key and safeguarding the plaster against moisture, stain and cleavage. Par-Lock is a service offered through expert, responsible Par-Lock Appliers. Communicate with the Applier in your territory.



P-30

Johns-Manville Corporation

Announces

a new line of Built-up Roofing

BY the addition of a line of slag or gravel surfaced roofings to their well known smooth surfaced Asbestos built-up roofings, Johns-Manville Corporation is now in a position to offer to Architects and Contractors built-up roofings suitable to any type of building and to any condition.

Together with this addition to their line of roofings, Johns-Manville is also prepared to offer surety bonds guaranteeing the performance of these roofings when laid under the supervision of their inspectors. Depending upon the type of roofing used, and upon the conditions, these bonds run for periods of ten, fifteen and twenty years. In connection with the bonding of these built-up roofs, a periodic inspection service is also supplied.

As in the past, all Johns-Manville built-up roofs will be laid only by Roofing Contractors approved by Johns-Manville Corporation. This will insure to the Architects that the workmanship will be handled in a satisfactory manner, and that the proper specifications will be followed.

The Johns-Manville line of built-up roofings now includes the following: *Smooth surfaced Asbestos Roofings*. These can be laid on roofs of any pitch . . . Super Class A. Underwriters' Laboratories Classification. Bonded for twenty years. . . . Class A. Underwriters' Laboratories Classification. Bonded for fifteen years . . . *Combination roofing*. Can be laid on roofs of any pitch. Bonded for ten years . . . *Slag or gravel surfaced roofings*. These can be laid on any pitch up to six inches per foot. Bonded for ten years.

Architects are urged to avail themselves of the free services of Johns-Manville Architects' Service Section for consultation and assistance on all roofing problems. This service is offered to any who are using or considering the use of any Johns-Manville product.



Johns-Manville
BONDED ROOFS

When You Specify Sterling Lifelong Blackboard

This 46 Year Old Institution Stands Squarely Behind You

Architects who are interested in having the *best* blackboard installed in their schools, can specify "Sterling" without qualification. Warp and buckle proof—strictly fire proof—it will not shrink, expand or twist. And it seasons and improves with age. Here, too, is a finer, velvety, jet black writing surface . . . easier to write upon, easier to read from, easier to erase. A blackboard proved in service in thousands of schools.

Sterling Lifelong Blackboard has qualities built into it that make it a blackboard without equal or comparable substitute. Its dependable service makes it an economical purchase—a real investment.

Before you prepare specifications, read all the interesting facts about Sterling. See what our 46 years of specialized experience have put into it.

Free to Architects A. I. A. File No. 35-b-12

Prepared for you by Architects—ready for your files—15 pages of plans, elevations, and detailed specifications for installation of *any* blackboard. Write for free copy and sample. Address
Department Z 2.

*Fergus Falls High School, Fergus Falls, Minn.,
2415 square feet Sterling Lifelong Blackboard
Architect, Walter R. Dennis*



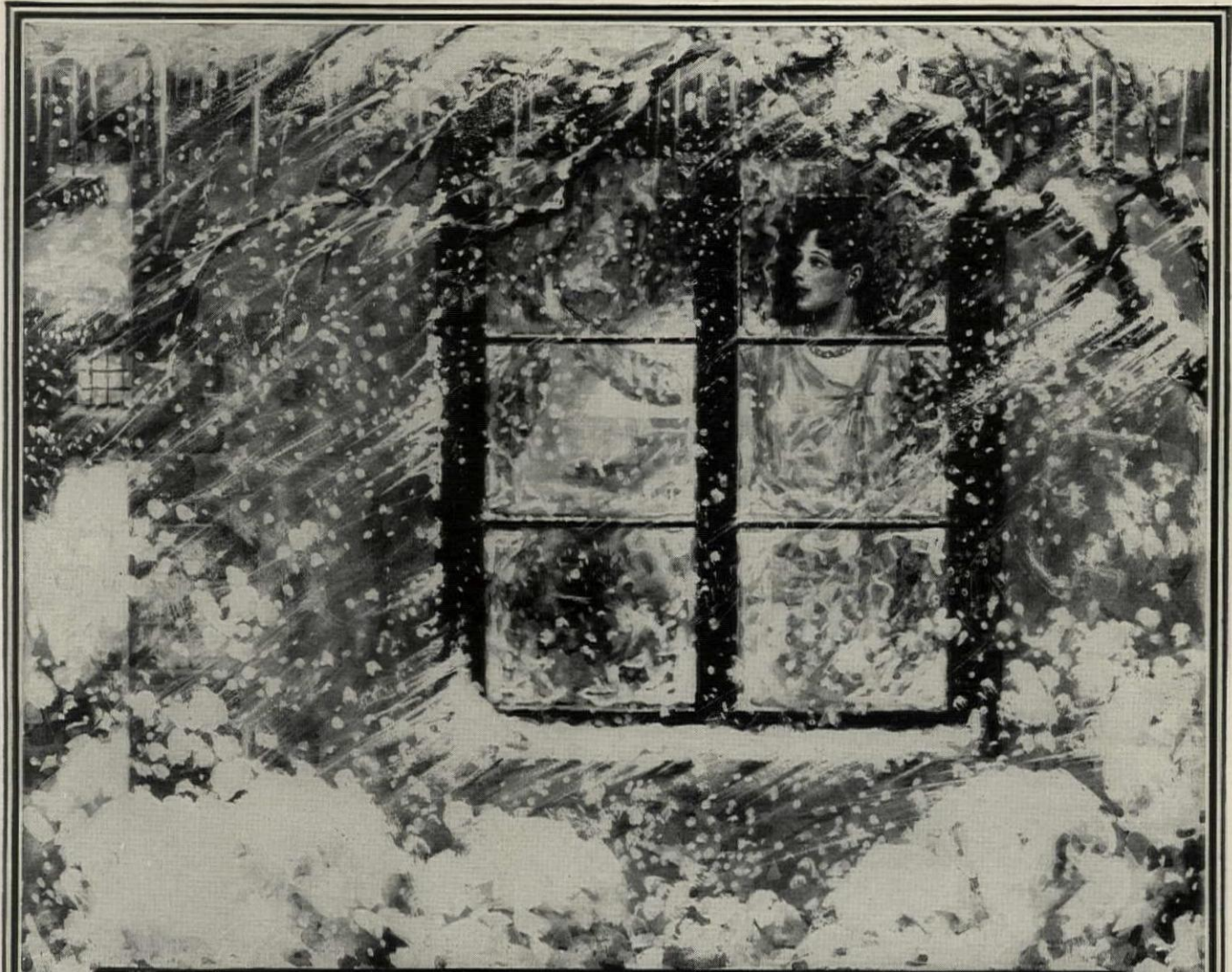
Weber Costello Co.

CHICAGO HEIGHTS ILLINOIS



Makers of

Sterling Lifelong Blackboard · Old Reliable Hyloplate · Globes · Maps · Erasers · Crayon



"It's nice and warm in here!"

Houses insulated with INSULITE dare the weather at its worst. Less fuel consumed—yet there's complete comfort even on the coldest days.

And the same houses are cool in the hottest summer weather. Moisture condensation is prevented—sounds do not pass so readily from room to room. True shelter. Genuine year-round comfort.

Good construction and efficient insulation are assured when you specify—

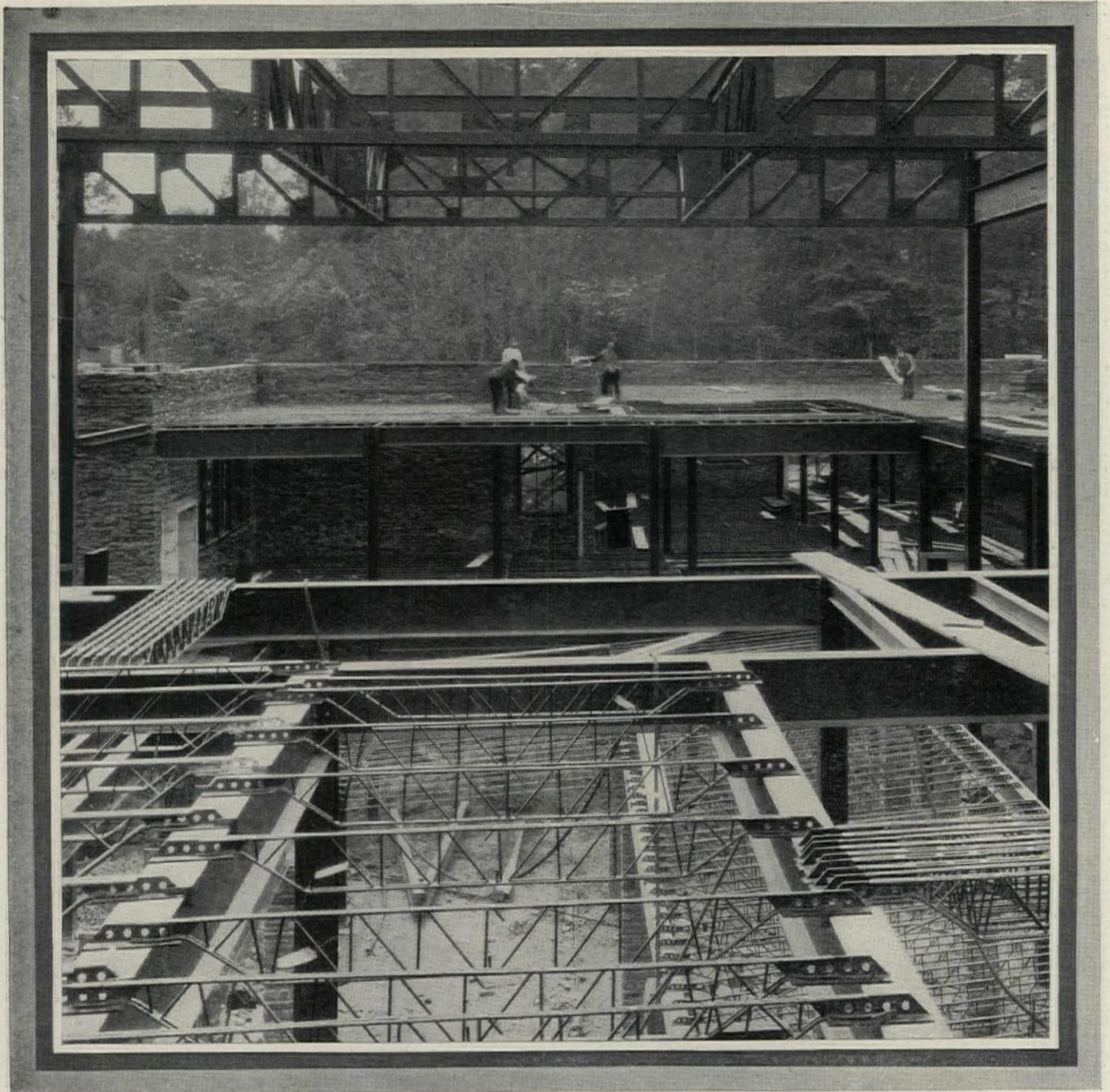
—INSULITE Plaster Base; INSULITE Building Board for sheathing or for use as wall board; INSULITE for lining attics and garages; INSULITE roof insulation; INSULITE for acoustical correction and sound deadening.

The service of our engineering department is available at any time. We invite you to take advantage of it. Please write for Specification Portfolio and other material, including free samples.

THE INSULITE COMPANY
1210 Builders Exchange, Dept. 6, Minneapolis, Minn.

INSULITE
the Wood-Fiber Insulating Board

RODONES



NO CUTTING

The truck drives up to the job from the nearby Concrete Steel Company warehouse. Out come the Havemeyer Trusses, exactly right for length and ready to lay in position as fast as a man can carry them. There is no fabricating on the job, no special labor required.

Any spans up to 30 feet can be covered direct from stock. Floors take form as if by magic. Everyone saves time, temper and money.

Because of the demand for comprehensive data on the various uses of Havemeyer Trusses, Concrete Steel Company has produced a complete folio of 32 pages and 3 data sheets giving the most recent information. In requesting this book "Structural Economies for Concrete Floors and Roofs," please address Executive Offices.



HAVEMEYER TRUSS

Concrete
Steel
Co.

Executive
Offices

42 Broadway
New York

DISTRICT OFFICES: Birmingham, Boston, Chicago, Detroit, Milwaukee, Minneapolis, Philadelphia, Pittsburgh, St. Paul, Syracuse, Washington.



Troy Advisory Service

*analyzes microscopically
institutional laundry needs*

THE next time you are planning an institutional laundry, let TROY ARCHITECTS' ADVISORY SERVICE cooperate with you.

Let Troy engineers study the floor-space available, the number of rooms, single and double beds, seating capacity of restaurants, provision to be made for future expansion, etc., and then submit a layout with exact estimates and specifications for the laundry equipment recommended.

This service is offered architects without cost or obligation. Feel free to take advantage of it.

TROY LAUNDRY MACHINERY CO., INC.
Chicago → New York → San Francisco → Seattle → Boston → Los Angeles
JAMES ARMSTRONG & CO., Ltd., European Agents: London, Paris,
Amsterdam, Oslo. Factories: East Moline, Ill., U. S. A.

TROY

LAUNDRY MACHINERY

Insured Forever *against* Cracks, Breaks or Spalls



First Unit
Fisher Bldg.
Detroit

Albert Kahn, Inc.
Architects

[The great marble facade of the Fisher Building, like that of many other famous buildings, using the Cowing Joint, is safeguarded against cracks, spalls and breaks.]

COWING Pressure Relieving JOINT

Patented September 1, 1925

Insure *your* next building against the plague of cracks, spalls and breaks which has so frequently marred beautiful buildings. The Cowing Pressure Relieving Joint offers such insurance—it has proved its merit in many world famous buildings.

The Cowing Joint zones a building into story heights—it compresses and compensates for any destructive stresses thrown on the facing material by compression of steel, temperature changes, or imposed loads. It saves mortar joints and eliminates frequent tuck pointing.

The Cowing Joint is neat—it will not squeeze out—it lasts as long as the building.

Write for our Illustrated Booklet

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

Bayway NEW YORK'S GIANT COTTON WAREHOUSE



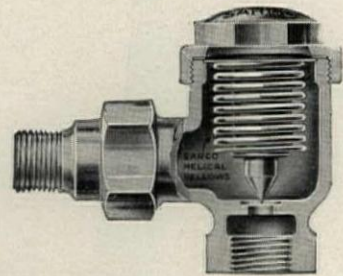
Equipped with **SARCO RADIATOR TRAPS**

Bayway Terminal, Bayway, N. J., Geo. F. Bial, Architect,
Raisler Heating Co., Heating Contractors

THIS giant five-story cotton warehouse—780 ft. long, 160 ft. wide, containing 28 acres of floor space—is modern in every detail and built from specifications designed to effect highest warehousing efficiency.

Steam heated throughout. The efficiency and noiseless operation of every radiator is assured by the installation of Sarco Radiator Traps. These traps are non-freezing and self-cleaning. Won't air-bind or cause water hammer.

Write for Booklet AK-110.



SARCO CO., Inc.

183 Madison Ave., New York, N. Y.

Boston	Cleveland	Pittsburgh
Buffalo	Detroit	St. Louis
Chicago	Philadelphia	
Peacock Bros., Ltd., Montreal		

A Good Heating System

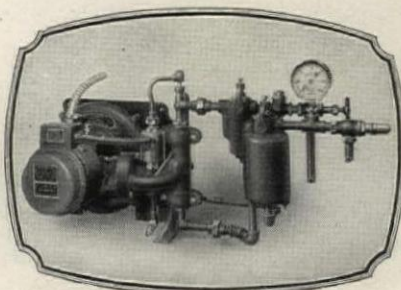
Johnson Oil Burners, for every heating and power purpose

YOU will find *complete* information about Johnson oil burning equipment on pages 3190 to 3193 in Volume "C" of the new 1928-29 edition of Sweet's Architectural Catalogue.

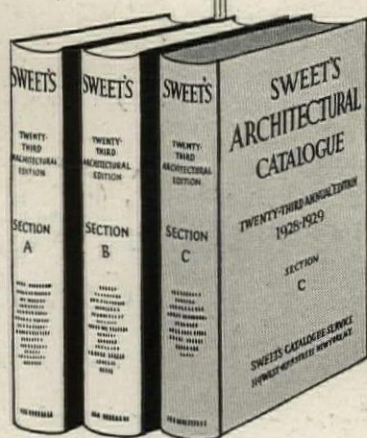
There is a Johnson oil burner for every heating and power purpose. . . Rotary Burners, *with either manual, semi-automatic or full automatic control, made in three styles and six sizes and providing a range of from 250 to 27,800 square feet of steam radiation or the equivalent. Also natural draft, whirlwind, low pressure air and steam atomizing oil burners; and electric or steam driven oil pumping and preheating equipment.

You can recommend and use Johnson oil burners with the assurance that they will give enduring satisfaction day in and day out, year after year. For behind every Johnson Burner lies the experience of more than 23 years in the exclusive manufacture of oil burning equipment.

This experience is reflected in the dependable, economical and trouble-



*Awarded Gold Medal, Sesqui-Centennial Exposition, Philadelphia, 1926, for "Excellence of workmanship and completeness of design."



COMPLETE
INFORMATION
NOW IN SWEET'S
ARCHITECTURAL
CATALOGUE

the correct solution of your more difficult oil heating problems.

From operating data of thousands of oil burners under various conditions, may be obtained information regarding the cost of installation and operation of all types of oil burning equipment.

You may also secure wiring diagrams and blue prints of typical oil burner installations. We invite you to avail yourself of this engineering service and will welcome the responsibility of appointment as your "headquarters" for oil heat and power data.

Separately bound copies of our catalogue in Sweet's for drafting room use may be obtained upon request.

free operation of Johnson oil burners in homes, large buildings, factories and industrial plants from coast to coast.

Oil Heating Engineering Service for Architects

The accumulated data of our long experience is at your disposal. Our engineering service bureau will be glad to assist you in the preparation of oil burner specifications and in

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

YOU WILL FIND OUR LOCAL



REPRESENTATIVE'S ADDRESS IN YOUR TELEPHONE DIRECTORY



The Source of Genial Heat is Hidden

Only an inconspicuous grille, and a small air inlet near the floor, can be seen. Yet a flood of warmed air pours thru the grille, *circulating throughout the room*. No bulky, unsightly radiators to clutter up the floors and mar the beauty of rooms.

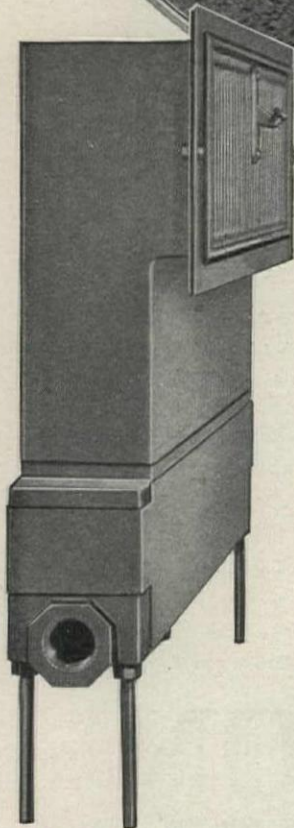
The front of the steel cabinet is plastered over, keeping the wall surface unbroken.

This continuous flow of air, entering the radiator from the floor, and passing into the room thru the grille above, provides the circulation so necessary to comfortable, efficient heating.

McQUAY

Concealed

RADIATOR



McQuay Concealed Radiator — *without* intermediate stack.

Made complete, as shown, in 20, 23 and 25 inch heights (from floor to top of warm air outlet).

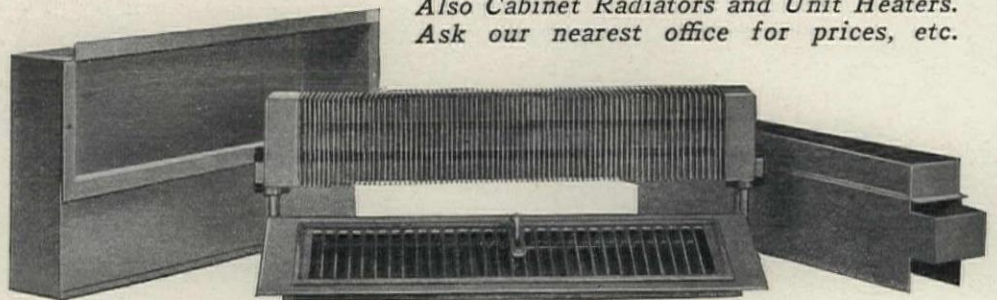
For air outlets higher than 25" intermediate stacks can be furnished.

The complete radiator consists of the copper heating unit; bonnet; boot and grille, pictured below.

The heating unit consists of a series of horizontal tubes, held in place by copper fins, and nested in bronze metal headers that act as manifolds. The tubes are tin coated inside, *giving them a glass-smooth surface that prevents corrosion or clogging*.

Accessibility is a conspicuous feature—the entire heating unit being easily removed. Remove the section of baseboard at the air inlet and disconnect the pipes. Because of a $\frac{3}{8}$ inch clearance, between the bottom of the bonnet and the shoulder on the heating unit, the ends can be raised and the legs removed. With the legs removed the heating unit can be lowered and taken out.

Also Cabinet Radiators and Unit Heaters. Ask our nearest office for prices, etc.



McQUAY RADIATOR CORPORATION

New York: 2148 Graybar Bldg.
Newark, N. J.: J. F. McLaughlin Co., 738 Broad St.

Boston: 10 High St.

Pittsburgh: Bushnell Mach. Co., Century Bldg

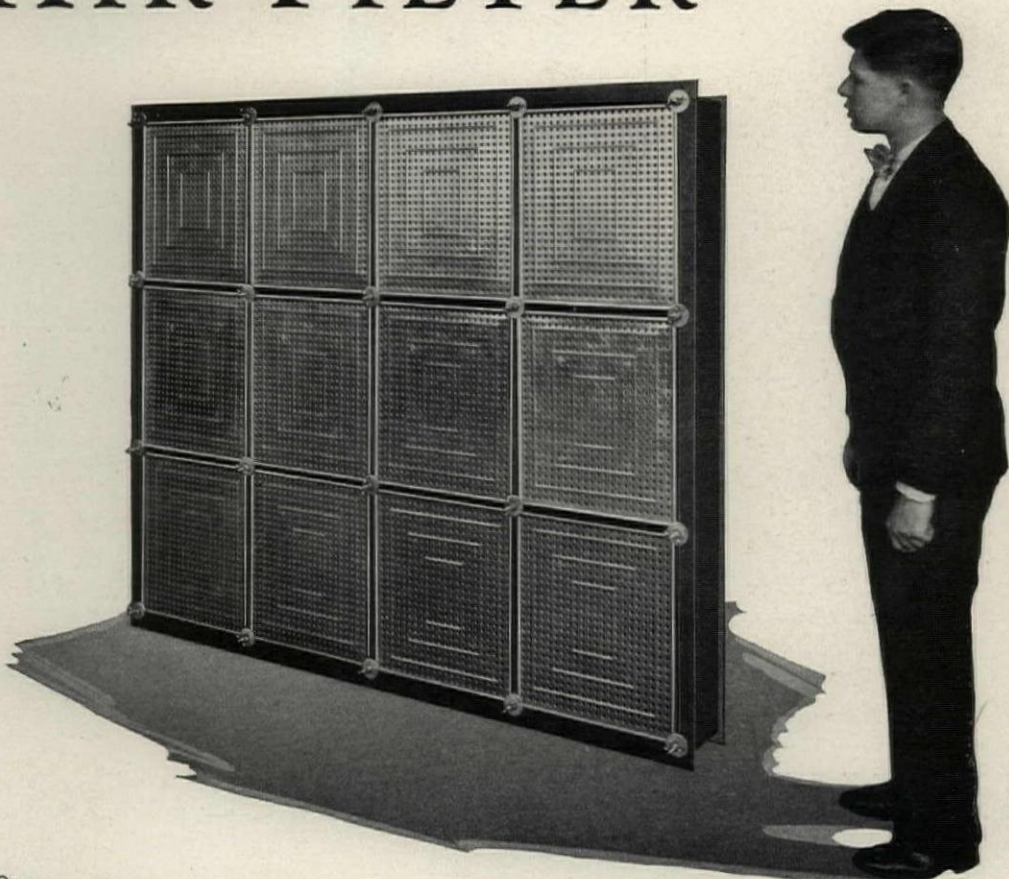
General Sales Office:
Pure Oil Building, Chicago

Cleveland: 291 E. 149th St

The American Blower Dry Plate Constant Effect AIR FILTER

For—

Schools
Auditoriums
Theatres
Hotels
Public Buildings
Office Buildings
Factories
Generator Rooms



The American Blower Corporation will gladly furnish you with complete information on any of the following listed subjects:

1. Industrial Heating
2. Ventilating
3. Air Conditioning
4. Air Washing
5. School and Public Building Heating and Ventilating
6. Mechanical Draft

Write direct to the factory or get in touch with the nearest American Blower branch office.

THE American Blower Dry Plate Constant Effect Air Filter is a compact, light weight and durable unit employing three principles. 1—centrifugal, by air reversal; 2—dry hair-like tentacles for arresting and retention of dust; 3—the cohesion of dust for dust. This filter is of the latest design and is widely used in both Europe and America. No complicated cleansing apparatus, washing liquors, recharging fluids or oils are required and the airways are unaffected by dust accumulation or continuous operation. Aside from an occasional unloading, which varies in time from 6 to 12 months, this filter requires no attention whatever. Send for Architects and Engineers Data Book No. 2523.

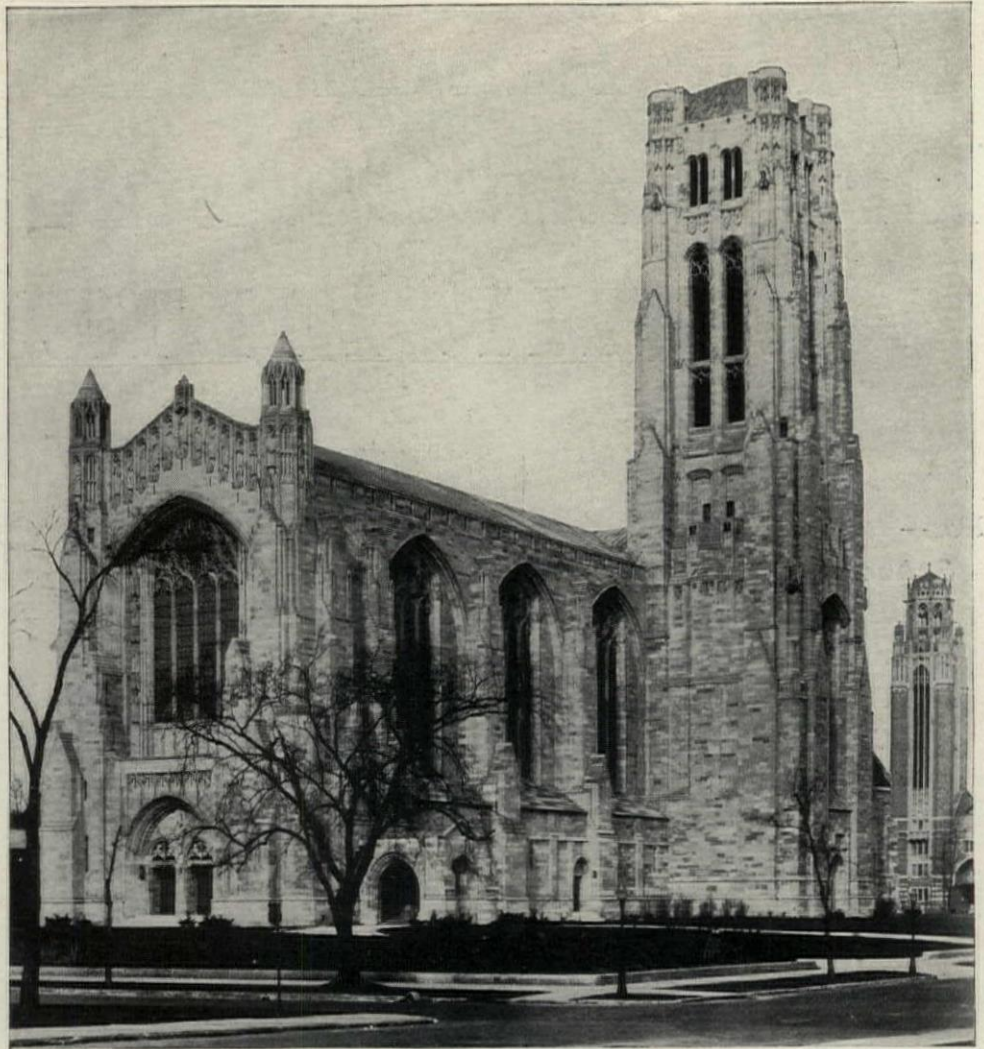
AMERICAN BLOWER CORPORATION, DETROIT, MICH.
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONT.
BRANCH OFFICES IN ALL PRINCIPAL CITIES

(781A)

American Blower

VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT

MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881



UNIVERSITY of CHICAGO CHAPEL

— a Rockefeller Foundation contribution to the University of Chicago, which realizes the original intention of including for this institution a building devoted solely to religion and its exercises.

Bertram Grosvenor Goodhue, New York, was the architect commissioned to create the design and supervise its completion.

Mr. Goodhue visited the notable Cathedrals of Europe for proper inspiration, and embodied for this chapel the fundamental features distinguishing those renowned works of ecclesiastical architecture.

The wood carving, stone cutting and figure work, and likewise the huge organ, are all of European artistry and workmanship.

Unlimited scope for originality and accomplishment was provided and allowed. Old world character thus united with new world modern ingenuity and vigor have obtained and established a newly beautiful and expressive edifice of prayer and devotion in America.

Visitors are permitted each day to enter and view the imposing interior; likewise at services on Sunday and evenings during the week when it is especially impressing and soul inspiring.

A monument indeed to endowment kindness, and the consummate of church thought and architecture

JOHNSON SERVICE CO., MILWAUKEE, WIS.

JOHNSON HEAT & HUMIDITY CONTROL

IS INCLUDED IN THE EQUIPMENT OF
UNIVERSITY OF CHICAGO CHAPEL

The All Metal
System

The All Perfect Graduated Reg-
ulation Of Valves And Dampers

The Dual Thermostat
(Day & Night) Control

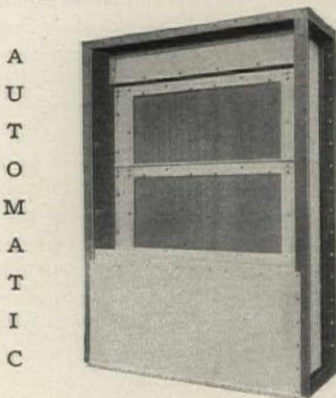
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The flow of air through the new Midwest Sinuous Filter Cell is not split up by a maze of metal baffles into innumerable uncontrolled eddies, but is directed or controlled in one sinuous bend which effects maximum dust removal at a minimum expenditure of power. By scientifically controlling the flow, one efficient baffle is made to do the work of many, with resultant savings in space, power and cost of operation.



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Announcing the~

MIDWEST
TRADE MARK

Sinuous Vertical Self-Cleaning Air Filter

HERE is an air filter of half the size, double the capacity, performing at an efficiency heretofore unknown in the field of building ventilation. The discovery by Midwest engineers of the new sinuous filter medium makes clean air available at vastly reduced cost to many additional types of buildings. Write for bulletin S-2 describing this new development in detail.

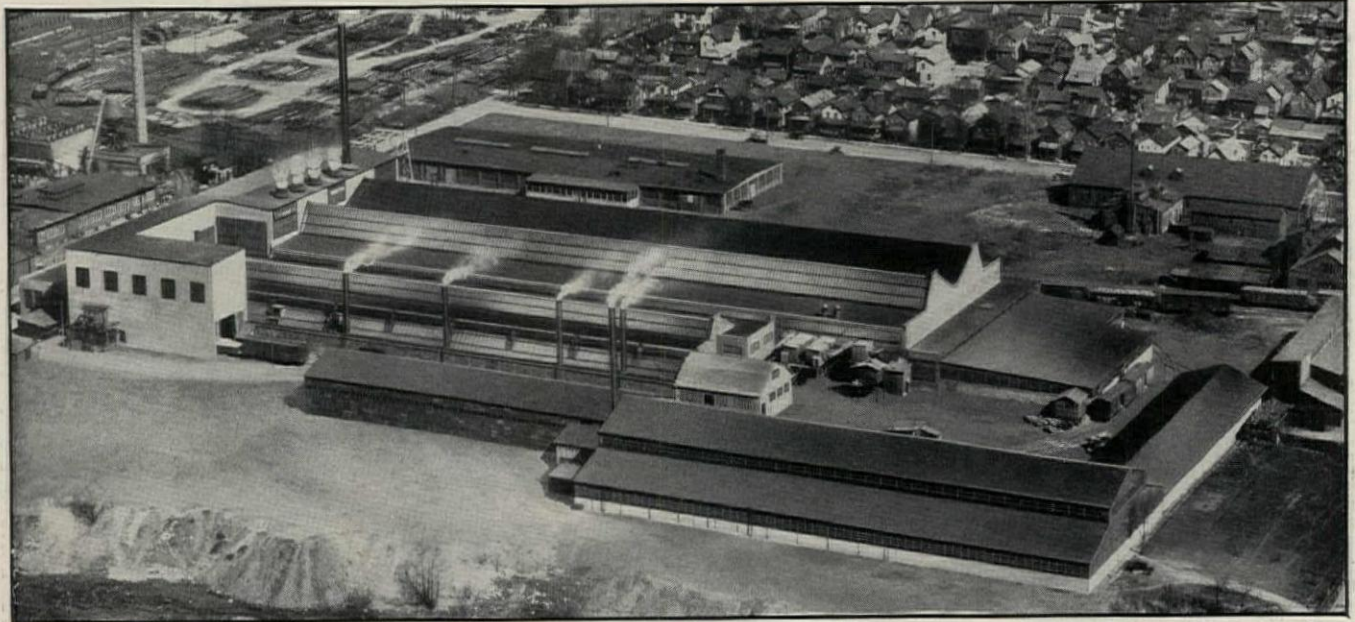


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NOW THAT THE COST OF CLEAN AIR HAS BEEN BROUGHT SO LOW THE USE OF FORCED AIR VENTILATION WITHOUT FILTRATION IS **WASTE!**

*This great material success must PROVE
the SPENCER scientific principle correct!*



The great modern factory where the Spencer Heater is made

ACRES of modern factories—greater and greater sales each year—lower and lower prices—millions of dollars saved each year for anthracite users alone! What can all these be but evidence that the Spencer Heating principle is correct and always was?

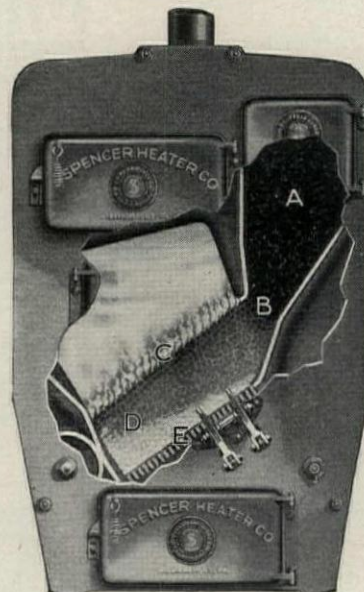
The Spencer was the first magazine feed heater. After thirty-two years of daily public use, it still stands first! It is today, and has been for years, the only complete line of magazine feed heaters, made both in cast iron sectional and steel tubular types, for every building from bungalow to skyscraper.

Men who know magazine feed heaters build the Spencer. As it was improved by these experienced engineers, it grew in popularity. Today, the tremendous factory equipment required to build the volume of Spencers demanded by the public is one proof that the public appreciates better heating methods.

When the Spencer was invented thirty-two years ago, its magazine feed and sloping grate marked the only fundamental improvement in heating since the first primitive stove. Architects were quick to realize its value. Today it is specified and installed everywhere, for it will burn any small size, low cost fuel—No. 1 Buckwheat anthracite, coke and graded

The Spencer scientific principle

Once a day, fuel is put into the magazine (A). It fills the sloping grate to the level of the magazine mouth (B). The fire bed always stays at the level shown at (C), for as fast as fuel burns to ash (D), it shrinks and settles on the Gable-Grate (E). As the surface of the fire bed (C) is lowered, by this shrinking process, more fuel feeds down automatically, over the top of the fire. This combination of magazine, correct depth of fire bed, and Gable-Grate makes fire burn up-hill and permits the use of inexpensive smaller sizes of fuels that save as much as half the annual fuel bill.



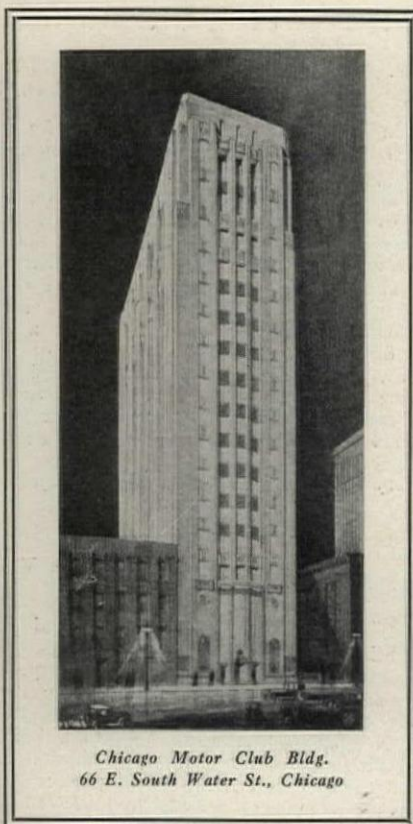
bituminous coal—with no blowers, no moving parts, nor outside power. It saves fuel cost and gives a better, more uniform heat with attention only once or twice a day.

Men who build and sell the Spencer have had more years of training and experience in this heating field than can be found anywhere else. So expertly is the Spencer tested and designed, so precisely is it built, that its heating capacity can be and is guaranteed. So tremendous is the volume of sales and manufacture in recent years, that the Spencer starts its thirty-third year with the lowest prices in history.

Architects know the Spencer for its saving in the cost of fuel. They specify it for homes and business buildings where uniformity of temperature is essential—for the Spencer self-feeding principle gives steady, even heat day and night at a minimum of attention. New Spencers, more efficient, lower in price than ever before, appeal to architects for their simplicity, as well as their efficiency. Write for illustrations and guaranteed capacities of Spencer cast iron sectional and steel tubular heaters,

for use in any home or business building, from a bungalow to a skyscraper. Spencer Heater Company (Division of Lycoming Manufacturing Company), Williamsport, Pa.

SPENCER
steam, vapor
or hot water
HEATERS



Chicago Motor Club Bldg.
66 E. South Water St., Chicago

Another one of Chicago's splendid new club buildings equipped with Hardinge

Architects and engineers can point to prominent buildings in every big city that are being efficiently and economically heated with the Hardinge fuel oil burner. The magnificent new Chicago Motor Club—equipped with Hardinge model 1, Combination 14—is but more evidence of the ever-growing trust to which leading architects and engineers have placed in the all-around dependability of this unrivalled oil burner. The nationwide recognition of the Hardinge fuel oil burner is the result of 38 years of endeavor and experience in the manufacture of precision-built instruments. Architects who specify Hardinge fuel oil burner are specifying 10 years of *absolutely guaranteed* oil heating efficiency.

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HARDINGE FUEL OIL HEAT

REVIEWS OF MANUFACTURERS' PUBLICATIONS

DAVID LUPTON'S SONS CO., Philadelphia. "Lupton Residence Casements of Steel."

Wider use might be made of casement windows, particularly for structures of a residence nature, if designers and draftsmen were more familiar with their operation. The extensive use of the "double-hung" window has necessitated familiarity with its rather simple principles of weights, pulleys, etc., but the operation of the casement is simplicity itself, and with greater familiarity with its demands there will undoubtedly come its more extensive use. This booklet, issued by a well known manufacturer of casements, goes into just this. It describes and illustrates by means of sections and other diagrams the correct installation of casements in residences of half-timber construction, brick, brick veneer, etc., and it dwells upon the correct designing of casements with which wire window screens are to be used. Probably for the benefit of builders and contractors, several pages of the brochure are devoted to describing the Lupton Basement Windows and windows of various other very useful types.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY. "Airport and Floodlighting Equipment Catalog."

There has come a new department of lighting, known as "floodlighting." A few years ago the owners of certain large buildings in New York and Chicago hit upon the plan of so reflecting light upon the exteriors of their structures that their architectural merits were conspicuously displayed at night. With the way thus made plain, floodlighting was taken up by the owners of other buildings and then extended into other fields. Floodlighting has now become so generally used that the supplying of the necessary equipment has become systematized, and this publication lists and illustrates the details for floodlighting supplied by the Westinghouse firm. "In developing floodlighting equipment Westinghouse anticipates the many new applications that each year brings forth, and in each new field Westinghouse Chromilite Floodlights are found to fit themselves to the work to be done. The increasing demand for facilities to make airports safe for night use resulted in the development of Westinghouse Chromilite Landing Field Floodlights that make landing-fields as safe by night as by day, because they give the pilot complete knowledge of landing conditions over a wide area. More and more, floodlighting is being used to give distinction to buildings that otherwise would be lost in darkness. Enterprising merchants identify their buildings with floodlighting. Owners of office structures make their property landmarks that are seen and recognized from afar and thus become more desirable business addresses. Even smaller businesses, such as filling stations and barbecue stands, find floodlight a profitable means of increasing sales. Signs and billboards attract the attention of night traffic when floodlighting brings them into prominence. In industry, floodlighting plays the dual rôle of increasing production and decreasing danger. Where industrial yards are floodlighted at night, men work with greater speed and in greater safety. Police efforts are more effective, too, when light helps the guarding watchmen. For general application floodlighting has almost endless uses. Monuments and memorials gain beauty and prominence when floodlighted against a background of night, and under the same treatment the period of use and enjoyment of playgrounds, parks, swimming pools and beaches can be lengthened greatly. Floodlighted fountains become sprays of jewels. The use of Aqualux Underwater Lights, in addition to or in place of Chromilite Floodlights, transforms and enhances the appearance of fountains as well as swimming pools. Westinghouse Chromilite Floodlights will serve wherever illumination by floodlighting may be desired. In addition to their staunch construction of non-corrosive aluminum and the ease with which they may be focused and adjusted, these projectors are all equipped with chromium-plated reflectors. Chromium makes an ideal reflector. It takes a high polish which makes the reflecting surface most efficient, and at the same time it is non-corrosive and unaffected by fumes, smoke or heat. It is so hard that any ordinary method of cleaning cannot scratch it or damage the highly important reflecting surface."

DIEBOLD SAFE & LOCK CO., Canton, O. "The Victory Line of Modern, Fire-resistive Vault Doors."

In buildings for banks, trust and insurance companies, and in structures for other forms of business, the designing of burglar-proof vaults for the keeping of valuables constitutes an extremely important detail. One can easily understand that one of the relatively vulnerable points of even the strongest vault that human ingenuity could invent or skilled engineering construct is the door, and because of this fact the highest type of engineering genius has been devoted to designing doors for such vaults. This booklet deals with doors for quite a variety of vaults. It presents the results of the efforts of three generations of vault door builders and describes and illustrates doors for vaults in private residences or for large business and commercial structures. To aid the designer there are included sections and other diagrams which show the actual construction of vaults, and for the benefit of the specification writer there are given all the data on the subject which he would be at all likely to need.

W. L. EVANS, Washington, Ind. "Evans Vanishing Door Wardrobes."

Architects and designers who have to do with planning the interiors of schoolrooms, business offices, and other places where large numbers of people must be provided for, fully appreciate the necessity of having such adjuncts as hat and coat closets, lavatories, etc.—details which of course are important, but which are likely to interfere with the orderly and ship-shape appearance of such places. This excellent publication does more than suggest a remedy. It illustrates, describes and lists the "Evans Vanishing Door Wardrobes" which provide space for the proper keeping of hats, coats and other outer wraps, overshoes, umbrellas, etc., and all this in connection with the lavatories which are often needed. The planning of the wardrobes has been done with the utmost economy of space; the exteriors are attractively designed with paneling, and where they are to be used in schoolrooms, the door panels are made into blackboards, which the booklet is careful to point out may be of either fiber or genuine slate. Probably to provide for use of these wardrobes in business offices, telephone booths are provided in addition to coat closets and lavatories, and since the doors are of light weight and fold back into the wardrobes, they do not clutter up valuable area; in fact, the booklet says that the economy in floor space which the wardrobes make possible more than pays for the equipment required to build them.

HYDE-MURPHY COMPANY, "Takapart Division," Ridgeway, Pa. "Portable Partitions for Better Business Homes."

Partitions to subdivide large offices or lofts into small areas are now so widely used that to enumerate their advantages would be unnecessary. In very few instances are such partitions of solid construction, dependence being generally placed upon divisions which are light and, so to speak, "portable," since it is possible to move them. This portability, however, is in most instances more or less relative, since to move or even alter their position requires considerable effort, with attendant confusion. Architects as well as the owners and superintendents of office buildings have long desired partitions which would be really and actually readily portable. Partitions of exactly this type are described and illustrated in this booklet. The cuts show how easily "Takapart" partitions may be shifted to make an area smaller or larger, to create new areas in private offices, or to divide or subdivide showrooms or show windows, and the partitions themselves are of excellent architectural design and attractive finish. "Takapart Partitions in office buildings make it easy to meet the desires of prospective tenants and do away with the usual dilly-dallying over details between renting men and prospects. This convenience has been the means of closing leases that otherwise would not have been made. Changes, however small, are always important. This fact must not be overlooked and should be thoroughly considered when partitions are chosen as standard equipment. Changes are desired immediately after occupancy and also later on.



Architects: — Funk and Wilcox, Boston, Mass.
Associate Architects: — Fellheimer and Wagner, New York City. Engineers & Contractors: — Dwight P. Robinson Co. Heating & Ventilating Contractors: — R. H. Baker Co.

NORTH STATION AND ARENA.

BOSTON

Fanning 18,000 People in Boston's new "Madison Square Garden" and ventilating an important terminal at the same time!

THE new North Station and Arena in Boston is an innovation in architecture. It houses the Boston & Maine R.R. with its network of connecting lines and has an arena seating capacity of 18,000. Here you can purchase tickets for a train journey, a hockey match, a flower show or a prize fight.

To keep this huge building healthful and comfortable, 24.5 tons of fresh, outdoor air must be circulated every minute. An un failing and efficient ventilating system

is of the utmost importance.

Twenty-three Sturtevant fans keep the whole building air-pure at all times. They provide the same kind of dependable and economical service that made Sturtevant Ventilating Equipment the choice of the engineers of the great Holland Vehicular Tunnel connecting New York and New Jersey; the George A. Posey Tube between Alameda and Oakland, California; the New York Life Building and many other notable projects.

B. F. STURTEVANT CO., Hyde Park, BOSTON, MASS.

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HEATING-VENTILATING AND
POWER PLANT EQUIPMENT

REVIEWS AND ANNOUNCEMENTS

KING CONSTRUCTION COMPANY, North Tonawanda, N. Y., "King's Greenhouses."

Very few architects regard the addition of a greenhouse to a residence of any type with a great degree of enthusiasm. It has generally proved to be extremely difficult to give a greenhouse a design which does not quite spoil or at least mar architecture of any type, and the result is generally a structure which is rather "monumental." For this reason a greenhouse is likely to be either placed somewhere entirely apart from the residence or to be "planted out" with shrubbery or trees sufficiently tall and dense to conceal its architectural shortcomings. That this need not necessarily be true is proved by the illustrations which come in a folder or portfolio issued by the King Construction Company. A number of the greenhouses illustrated are so designed as parts of country or suburban houses that they agree with them architecturally and improve rather than injure them. Several of the views are of interiors and demonstrate the possibility of so handling the greenhouse problem that the building may become in effect a highly acceptable addition to the house proper. The inclusion of plans adds considerably to the value and interest of the publication.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, "Westinghouse Lighting Equipment."

Extremely high operating cost in business of all kinds has brought about the most critical analysis of overhead and has made abundantly worth while every economy which could aid in its reduction. The item of lighting, for example, has been subjected to the keenest scrutiny, and every effort has been made to obtain the most economical use of electrical current and to so use and direct the light that the employes concerned may do their most effective work. "The correct lighting of industrial interiors calls for a greater diversity of equipment and for the overcoming of more special conditions than are met with in domestic or commercial lighting practice. Experience has proved that the Westinghouse Industrial Lighting Equipment listed in this brochure is adequate for furnishing correct lighting under the many varying conditions that the special problems of different industries present. By referring to the instructions and tables, and by following the instructions in installing the Westinghouse equipment that will best serve under the existing conditions, anyone can make a lighting installation that will meet the requirements for correct lighting within the accepted standards of lighting specialists." The brochure is replete with every suggestion or item of data which could aid an architect, engineer or business executive in obtaining lighting of the highest excellence. It should be filed in every office.

DRIWOOD CORPORATION, 11 E. 37th St., New York. "Driwood Period Mouldings in Ornamented Wood."

Architects and interior decorators well know the necessity of obtaining mouldings of the proper architectural character for exterior work, and of even greater importance, perhaps, is the use of correct mouldings where interior work is concerned. Paneling, for example, can easily be made highly successful at no great cost where use is made of mouldings of the proper sort, but the same work can be either quite spoiled or made only moderately pleasing where use must be made of mouldings of the wrong kind. This brochure, richly illustrated, has been prepared for architects, builders, wood workers, interior decorators and home owners. It shows mouldings, ceiling cornices, picture mouldings, chair rails, door and window casings, bases and other details of woodwork of all the architectural styles most likely to be used. "Driwood Period Mouldings are not composition. They are not plaster. They are wood,—ornamented wood. For the first time they make available for all, the use of wood mouldings with all the depth and beauty of hand carving. Unlike hand-carved mouldings, which are prohibitive in price, Driwood Period Mouldings are for use in the average home. At the same time, their beauty recommends them for more elaborate decoration, as in theaters, public buildings, hotels, etc. Impressive effects have also been had through their use in lobbies and stores, for theatrical scenery, etc."

FRANK ADAM ELECTRIC CO., St. Louis. "Wiring the Home for Comfort and Convenience."

The correct method of wiring a structure for the use of electricity is a matter that can be mastered with so little effort that it is surprising to find so many mistakes being made by draftsmen and the writers of specifications. Generally, of course, these errors are rectified by builders and contractors, but this fact does not lessen the responsibility to owners of the architects who should correctly design the details of equipment, just as they do the designing of the buildings' architectural details and attend to the planning of their floors. This brochure or booklet deals with the problem as far as it concerns the wiring of a small house containing a basement and three floors upon which there are eight rooms, five of the rooms being bedrooms. The plans show the location of every outlet necessary for lighting, heating, power or bells and indicate the proper routing of the wires, not only for the interior of the house but likewise for the porches, front and rear, a light for what is probably a yard for drying clothes, and the entrance to the garage. One of the wires for the front porch or veranda is planned to light a tablet bearing the house number.

Horace Ginsberg announces the opening of new offices at 205 East 42nd Street, New York.

Norman N. Kandl announces the opening of new offices at 7905 Cottage Grove Avenue, Chicago.

Edwin A. Horner, formerly of Kewanee, Ill., is now to be addressed at 48 Lee Avenue, Yonkers, N. Y.

Cyril Bennett and Fitch H. Haskell announce the opening of new offices at 311 First Trust Building, Pasadena.

Graven & Mayger, 100 North La Salle Street, Chicago, would appreciate receiving catalogs and other publications.

George Marshall Martin announces his change of address from 1624 Grantwood Avenue, Evanston, Cincinnati, to 3801 Country Club Place, Hyde Park, Cincinnati.

Paul W. Hofferbert, of Florence, Ala., announces the opening of a branch office at Gadsden, Ala., where he would be glad to receive samples and publications of manufacturers.

John Noyes, landscape architect and town planner, and Consulting Landscape Architect to the Missouri Botanical Garden, announces the opening of new offices in the Railway Exchange Building, St. Louis.

Howard Greenley, formerly of 129 E. 54th Street, New York, has virtually retired from the active practice of architecture, and he requests that manufacturers remove his name from their mailing lists.

Required at Once, Services of a high class architectural designer in Gothic work; one familiar with the planning and equipment of churches. The remuneration will be commensurate with his ability. Address M. M., THE ARCHITECTURAL FORUM.

VAN RENSSELAER P. SAXE, C.E.

Consulting Engineer

STRUCTURAL STEEL
CONCRETE CONSTRUCTION

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Specify Hydrocide Mastic (Plastic) and Semi-Mastic for waterproofing foundations and dampproofing inner surfaces of exposed walls above grade, and for bonding plaster and protecting it from staining.

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Hydrocide No. 633 for damp-proofing inner surfaces of outside vertical walls above foundation. Saves expense of furring and lathing. If furring and lathing are used, walls and furring should be coated with Hydrocide No. 633. Use Hydrocide Semi-Mastic where conditions are more severe.

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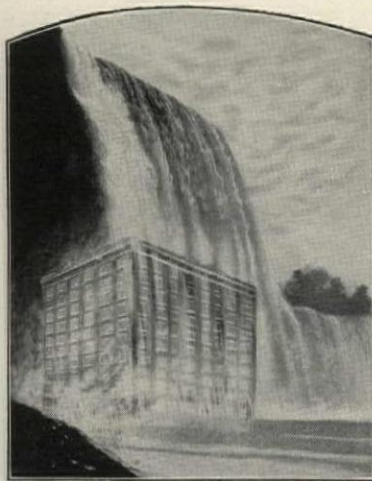
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Use our colorless brick-filler, an amber-colored preparation.

Kaukit, an elastic caulking and glazing compound, adheres to any surface. Caulks around window and door frames, mortar joints, etc.



Again we say:
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Your Buildings
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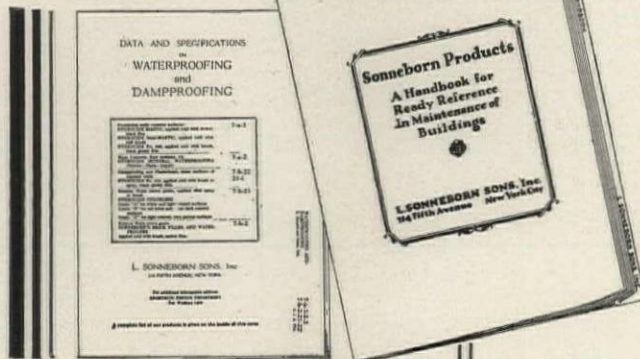
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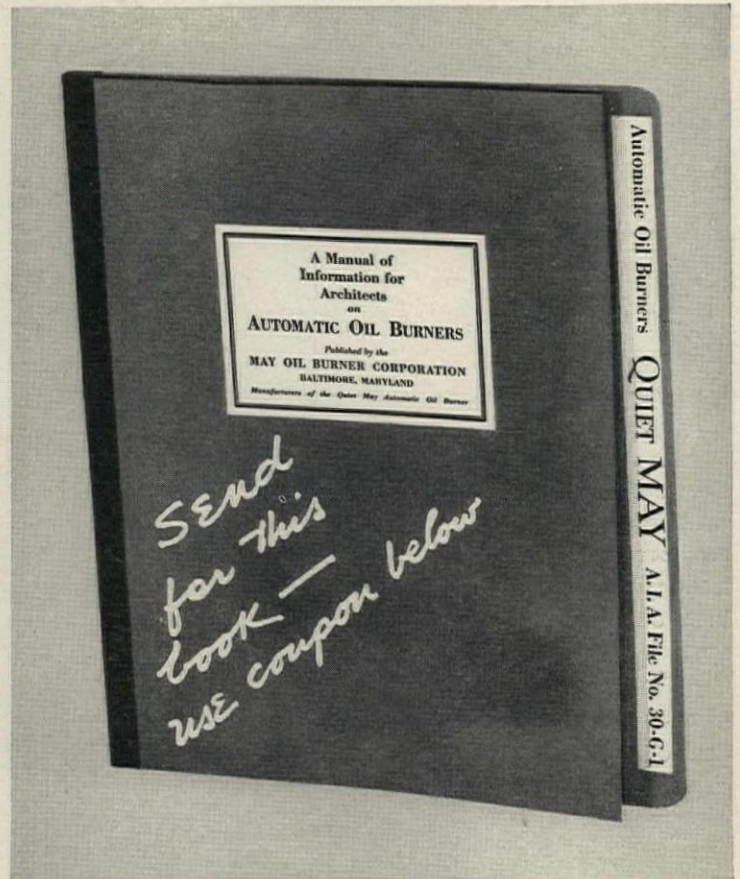
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