THE ARCHITECTURAL FORUM

IN TWO PARTS

PART TWO

ARCHITECTURAL ENGINEERING

&

BUSINESS

TRANSPORTATION BUILDING REFERENCE NUMBER

DECEMBER 1930

PRICE $3.00
The quietest thing we know (next to a cat stalking a mouse!) is a Rich-Wil Elevator Door Hanger in operation.

It is because the suspended weight of the elevator doors is equally distributed throughout their full travel. That is because the Rich-Wil hanger rides on over-size ball bearings extending the full width of the door, providing perfect alignment.

Extreme quiet and long service are thus assured. Friction is reduced to a minimum. Adjustments are quickly and easily made by simply loosening two nuts.

R-W equipment meets every elevator door requirement. R-W closers pay for themselves in valuable space saved. Standardize on R-W hangers, closers, checks, interlocks, the PowR-Way elevator door operator, and R-W signal systems of all modern types.

Consult an R-W engineer at any time without obligation. Send for R-W catalog No. 44.

Richards-Wilcox Mfg. Co.

“A HANGER FOR ANY DOOR THAT SLIDES”

AURORA, ILLINOIS, U.S.A.


Illustrating Rich-Wil Elevator Door Hanger No. 827 for single doors
Aluminum Paint made with Alcoa Albron Powder meets many "specialized" paint conditions

Architects, more than any other professional men, perhaps, will appreciate these paint facts. Gallon for gallon, aluminum paint costs no more than any other high grade paint; but the similarity ends there. The pigment of aluminum paint, made with Alcoa Albron, is pure aluminum.

When this paint is brushed or sprayed on, the tiny flat flakes that comprise its pigment, "leaf" to form a coat of metal protection. Retarding the penetration of moisture, this coat of metal protection checks the formation of rust and prevents the warping of wood. It holds in check the sulphurous fumes of smoke, the fumes of hydrogen sulphide gas, the action of the ultra violet rays of the sun. Being pure Alcoa Aluminum it is non-poisonous. It reflects light. It is durable. It can be washed down.

Aluminum Company of America does not sell paint. But aluminum paint made with satisfactory vehicles and Alcoa Albron Powder may be purchased from most reputable paint manufacturers, jobbers and dealers. Be sure the pigment portion is Alcoa Albron and is so designated.

Let us send you the booklets, “Aluminum Paint, the Coat of Metal Protection”, and “Aluminum Paint Specifications”, A.I.A. File No. 25-B-252. ALUMINUM COMPANY of AMERICA; 2412 Oliver Building, PITTSBURGH, PENNSYLVANIA.
VOGEL Number Ten and Ten-A Closets meet the requirements of the modern school and the efficient plant.

The Lacey School, in Chattanooga, installed Number Ten-A Closets with tanks concealed behind the wall, while Pusey & Jones, one of Wilmington's largest industrial plants, installed the Number Tens, with enameled tanks, which are exposed.

A typical installation of Vogel Number Ten Closets. Photograph taken in the Pusey & Jones plant, at Wilmington, Del. A closet similar to these on an endurance test has flushed 250,000 times without even a washer being renewed.

A bulletin has been prepared especially for architects and will be sent promptly to those requesting it.

JOSEPH A. VOGEL COMPANY
Wilmington, Delaware                  St. Louis, Mo.

Products
preference continues for RAYMOND

Because Raymond Concrete Piles meet every demand for safety and certainty no matter what the subsurface conditions . . . because each pile is protected by a reinforced sheet steel shell that wholly maintains the driving resistance, retains the moisture in the concrete and insures perfect, uniform length, taper and setting.

RAYMOND CONCRETE PILE CO.

NEW YORK: 140 Cedar St. CHICAGO: 111 West Monroe St.

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

The Speech that Teamwork Built

Architect and Acoustic Engineer help speaker put it over...

The speaker rises. Every word he says carries—to every part of the room. People in the rear seats hear with front row ease.

Teamwork does it. Teamwork between the architect and an acoustic engineer in planning rooms where every person can hear, and in the proper installation of Public Address equipment.

The Western Electric Public Address System acts as a miniature interior broadcasting station. It widens the hearing circle, transmits speech, music and entertainment. It is included in specifications for schools, hotels, hospitals, clubs, auditoriums, and public buildings.

Western Electric acoustic engineers are always ready to consult with architects at the planning stage and at the stage of actual installation.

Western Electric
PUBLIC ADDRESS AND MUSIC REPRODUCTION SYSTEMS
Distributed by GRAYBAR Electric Company
Turn back the pages a few years and we find fences of wood rails. Then came steel fencing and farmers soon learned that even though it cost a bit more initially the extra years of life made it a better investment.

It Costs Less to OWN a Kewanee
$17,500.00

for men

who best utilize
the advantages
offered by
ARC WELDING

This amount of money will be awarded as prizes in the Second Lincoln Arc Welding Prize Competition for the forty-one best papers describing the redesign of any product or the design of any proposed product to be fabricated by the arc welding process. The forty-one winners will be rewarded as follows:

FOR FIRST PRIZE PAPER . $87,500.00
FOR SECOND PRIZE PAPER . $3,500.00
FOR THIRD PRIZE PAPER . $1,500.00
FOR FOURTH PRIZE PAPER . $750.00
FOR FIFTH PRIZE PAPER . $500.00
FOR SIXTH PRIZE PAPER . $250.00
FOR SEVENTH TO FORTY-FIRST PRIZE PAPERS . $100.00 each

This is your opportunity not only to gain a substantial monetary award but win nation-wide recognition of your ability.

In order that you may have sufficient time to prepare a prize-winning paper write today for complete information.

THE LINCOLN ELECTRIC CO.
P. O. Box 683     Cleveland, Ohio
Architects are invited to Consult freely with Bell Company representatives

The telephone company is constantly studying ways to improve its service. It has much data of interest to architects, particularly in view of the increasing importance of complete telephone convenience in the modern home. A call to the Business Office will bring a representative to discuss with you and your clients any questions that may arise in planning for the telephone arrangements in new and remodeled residences.

An important feature of this telephone convenience is the building in of conduit and outlets within the walls and floors during construction or remodeling. This gives improved appearance, by concealing the telephone wiring, and affords protection against certain types of service interruptions. Telephone outlets should be provided in all the important parts of the house. The home owner can then utilize just those which best meet his immediate needs, and he can readily rearrange or expand the service in the future.

Modern telephone convenience is provided for in the residence of Mr. Tom C. Gooch, 3724 Armstrong Avenue, Dallas, Texas, by six telephone outlets, including one in the garage. Lano & Wyche, Architects, Dallas.
IF Kinnear Rolling Doors are a superior product, and it is generally conceded by those who specify, install and use equipment of this type that they are—it is simply a reflection of the ideals of their maker. Kinnear has the courage, the financial resources, and the engineering ability to maintain the standards instituted 35 years ago when the idea of a rolling steel door first was conceived. Kinnear Doors cost a trifle more, but the years always prove their worth.

THE KINNEAR MANUFACTURING CO.
400-44 Field Avenue, Columbus, Ohio, U.S.A.

Boston  Chicago  Cincinnati  Cleveland  Detroit  New Orleans
New York  Philadelphia  Pittsburgh  Kansas City  Washington
Why go down like a fish!
A Jennings Sewage Pump has only the suction pipe submerged

You can inspect or clean a Jennings right out on the floor

Convenience is the outstanding feature of a Jennings. There is nothing awkward about getting at this sewage pump. The entire assembly is installed on the floor, outside the pit. Nothing is submerged except the suction pipe.

With every working part so accessible, easy work is made of inspection and cleaning. Opening up the pump and even removing the impeller takes only a few minutes. Neither pit cover, piping nor shaft alignment need be disturbed.

Jennings Suction Sewage Pumps are furnished in capacities and heads to meet all the usual requirements. All sizes are equipped with non-clog impellers. No screens are required.

Write for Bulletins 113 and 124.

NASH ENGINEERING COMPANY
33 Wilson Road, South Norwalk, Conn.

Note these 10 features of Jennings Design.

1. Motor is commercial, ball-bearing type selected for dependability, always available from stock.
2. The only two moving parts are mounted on a single heavy shaft requiring but one stuffing box, eliminating flexible coupling.
3. A rugged supporting bracket, integral with motor end shield, makes pump and driving motor a single compact assembly in perfect alignment.
4. The non-clog impeller is accurately balanced, liberally proportioned, readily reached.
5. There are only two bearings to lubricate.
6. Suction elbow is fitted with hand hole plate to permit cleaning suction pipe and impeller without dismantling pump.
7. Priming unit is a simple, sturdy Nash Hytor.
8. Iron catch basin has gas tight cover.
9. Controlling float switch is totally enclosed and oil immersed.
10. Ball float has adjustable stop.
Would a Client of Yours ASK for USELESS EXIT LIGHTS?

ANY unprotected light is useless when electric current suddenly fails. This seldom happens, but once may be too often . . . especially when you think of the possible results in a hospital, a theatre, a bank, an auditorium—any building where the public may gather.

Exide Emergency Lighting Batteries are absolutely reliable protection against current failure. The instant power goes off, Exides automatically take over the emergency load . . . without a hand touching a switch. Many architects specify Exide protection for exits, corridors, important rooms and for sufficient general illumination in case of power failure.

Exides are not expensive. The first cost is reasonable and the upkeep is merely a routine matter for the regular personnel.

One of our engineering representatives will gladly call on you and discuss any phase of emergency lighting. There’s no obligation. Or if you prefer, we’ll send you our Emergency Lighting Bulletin. Write today. For immediate reference see 1931 issue Swee’s Architectural Catalogue, pages D 5810-11.
DOING things by halves is uneconomical—whether you are advising clients, drawing up plans, or specifying roof insulation.

In the past it was necessary to buy two half-inch layers (either separate or laminated) to get one inch of roof insulation.

But now, with the introduction of Armstrong's Temlok, you can avoid this. Temlok, low-cost insulation fabricated from the heartwood of Southern pine, is made in one solid-inch thickness. It is laid in a single operation that cuts labor costs. Without joint or lamination it provides the economical method of safeguarding roofs.

**Temlok's solid-inch gives you low-cost roof insulation in one layer!**

**DOING** things by halves is uneconomical—whether you are advising clients, drawing up plans, or specifying roof insulation. In the past it was necessary to buy two half-inch layers (either separate or laminated) to get one inch of roof insulation.

But now, with the introduction of Armstrong's Temlok, you can avoid this. Temlok, low-cost insulation fabricated from the heartwood of Southern pine, is made in one solid-inch thickness. It is laid in a single operation that cuts labor costs. Without joint or lamination it provides the economical method of safeguarding roofs.

**Gives more—costs the same**

Actual tests prove the insulating efficiency of this new low-cost board. The conductivity of Armstrong's Temlok is .31 B. t. u., per square foot, per inch thickness, per degree Fahrenheit temperature difference, per hour, at 60° Fahrenheit mean temperature. Its moisture absorption is less than that of other well-known fibre boards. It provides a strong, protective base for roofing.

Your building contractors will like the easy handling that Armstrong's Temlok gives. Made in standard sizes, 22" x 47", it is shipped in bulk carloads or in securely wrapped bundles of seven boards. It is structurally strong and easy to handle. Your clients appreciate that, despite its exclusive features, it costs no more than other fibre insulations.

Let us send you the complete story of Armstrong's Temlok. You'll find the booklet, "Temlok, the Solid-inch of Roof Insulation," full of interesting facts. It includes the story of the quest for this golden fibre board. We also suggest that you write for samples. Armstrong Cork & Insulation Company, 900 Concord Street, Lancaster, Penna.

You'll find Temlok provides an efficient, low-cost roof insulation for all types of buildings—factory, office building, hotel, apartment house, or any public building.

**Armstrong's Temlok**

Low-cost, Efficient Insulation for Roofs
FOR TRANSPORTATION BUILDINGS

- RAILROADS • AIRPORTS • STEAMSHIP OFFICES • BUS TERMINALS • GARAGES

G&G Atlas Pneumatic Tube Systems can speed service by saving time

In transportation terminals, general offices and repair shops all kinds of written messages, forms, tickets, weather reports, passenger lists, claim checks, etc. must be handled between scattered departments in the building. Investigate the saving in time and the elimination of foot and elevator traffic possible with this modern method that at 30 feet per second gives each transaction individual service by the shortest route through walls and ceilings.

G&G ATLAS SYSTEMS, Inc.
544 West Broadway • New York, N.Y.
Also Chicago and Toronto

MECHANICAL MESSENGERS ARE FASTER AND MORE DEPENDABLE THAN FOOT MESSENGERS


London Terrace Apartments, New York City—The Henry Mandel Company, Owners and Builders; Farrar & Watsmough, Architects

Where Construction Speed Was Imperative — All Wood Floors in London Terrace are Finished by The

MINWAX METHOD

In the world's largest apartment house development, where the speed of erection was outstandingly important, Minwax Flat Finish was successfully used. This new, Quick Drying form of the Minwax Method makes it possible to have lustrous, beautifully finished floors well within the limits of the most rapid construction program.

The significance of this fact lies in its manner of selection. For over two years, Mandel & Co. have used the Minwax Method in other operations. Their decision to use it here was based on actual satisfactory experience. It was also recommended by Builders Wood Flooring Company, the flooring contractors, based on their use of it in several important contracts.

Today it stands, proven by time, as a material perfectly adapted to modern requirements. It is applied to any natural wood, floor or trim, either in colorless or pre-colored form... It penetrates deeply into the wood, filling the pores with a tough protective gum and depositing on the surface sufficient mineral wax to allow of an easily produced lustrous polish. This finish in no way hides the natural beauty of the wood, is simple to maintain, and actually improves with use and age.

We have prepared a pamphlet that describes Minwax Flat Finish and the Minwax Method of wood finish in detail. You are welcome to a copy.

All exterior walls above grade are protected with Minwax Dampproofing and Spandrel Waterproofing

MINWAX CO., Inc.
A complete service for waterproofing, dampproofing, and preservation of masonry and wood.
11 West 42nd Street, New York City

BRANCH: 232 East Erie St., Chicago, Ill.
FACTORY: Delawanna, New Jersey
In the fifty-story Irving Trust Company Building, simplicity and beauty are achieved by an unusual feature of design—the angled walls. Large blocks of stone are so joined and fitted as to form a series of slight angles in and out from the street. These, catching sunlight and shadows, make a new picture in the narrow gallery of famous Wall Street views.

And so also Walworth, by supplying fire-line fittings and brass fittings and all of the valves for both plumbing and heating, makes another notable contribution to the development of New York's outstanding new buildings.

WALWORTH COMPANY

General Sales Offices: 60 East 48th St., New York
Plants at Boston, Mass.; Kewanee, Ill.; Greensburg, Pa.
and Auburn, Ala.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

IRVING TRUST COMPANY BUILDING, ONE WALL STREET

Architects: Voorhees, Gmelin & Walker
Mechanical Engineers: Meyer, Strong & Jones
General Contractor: Marc Eidels & Son, Inc.
Plumbing Contractor: John Wall Plumbing Co.
Heating Contractor: Baker, Smith & Co.

Copyright by Irving Trust Company

WALWORTH VALVES - FITTINGS - AND TOOLS
Heating and Ventilating
Industrial Buildings

For architectural offices not receiving
"Heating and Ventilating," this summary of the December issue is presented.

Material to which the architect and his engineers can refer, covering the heating, ventilating and air conditioning of industrial buildings, is scattered through various engineering magazines and, to some extent, through technical magazines covering specific fields. In no single publication are there comprehensive data and articles covering this class of buildings. For this reason HEATING AND VENTILATING will devote its second Reference Number to articles covering all phases of heating, ventilating and air conditioning of various types of industrial buildings.

Developments in heating and ventilating have been particularly rapid during the past few years in the industrial field. The unit heater revolutionized design of the systems and made necessary the development of new lines of accessory equipment. The necessity for increased production, with its resultant demand on the workers, resulted in an increase in the installation of air conditioning systems. A later development, the gas-fired unit heater, changed still further the engineering involved in designing the heating systems. These are only a few of the developments which have taken place.

Among the subjects to be included in the December Industrial Building Reference Number of HEATING AND VENTILATING are:

- The Design and Layout of a Unit Heater System.
- Selection of Air Filters.
- Design of a Boiler Service Plant for an Industrial Building.
- Analysis of the State Laws Relating to the Heating and Ventilating of Factories.
- Design and Layout of Sprinkler Systems.
- Heating Industrial Buildings with Gas.
- Heating Industrial Buildings with Oil—with Coal.
- HEATING AND VENTILATING has developed the Industrial Degree-Day unit for measuring and estimating fuel consumption in the heating system of buildings where inside temperatures lower than 70° are maintained. This unit has been accorded considerable recognition, as evidenced by the Report of the Committee on House-Heating of the American Gas Association, presented at the annual convention during October, 1930. The subcommittee on unit heaters reported that:

"The April, 1930, issue of HEATING AND VENTILATING contains Data Sheet Number 6, page 104-A, which presents an Industrial Degree-Day map of the United States relative to heating loads for buildings heated only when outdoor temperatures are below 55° and 45° respectively. Considerable interesting information may be secured from that sheet."

HEATING AND VENTILATING brings to the architectural office regularly each month the complete résumé of current developments in this important field. It presents the vital information regarding heating and ventilating. It is suggested that you enter your order immediately.

HEATING AND VENTILATING
321 Fifth Avenue, New York, N. Y.

Gentlemen: Please enter my order for Heating and Ventilating. I want it to include the December number.

☐ $2. for 1 year’s subscription.
☐ $3. for 2 years’ subscription.

Name

Address


He's a six-footer... "Measured which way?"

Can figures be facts if they are wrongly arrived at?

In considering performance of heating systems, no analysis or comparison based on hasty acceptance of inaccurate measurements or of incomplete facts, can be safe, or useful.

Unless all the factors which may influence the result have been checked, to speak of, for example, "lbs. per sq. ft. per season" means just as little as to say "twice as long as a piece of string."

Altogether there are 45 of these variable factors,—each of which may affect the requirements and results for better or worse. To allow any one of them to be forgotten or disregarded may lead to faulty conclusions.

Engineers, architects and heating contractors will find the related subjects of heating steam consumption analysis, estimating and heating cost accounting, as presented by Warren Webster & Company, of vital interest.

A request for further details will bring a Webster steam heating specialist to discuss this vitally important subject.

A Heating System for Every Need and Every Purpose

Heating requirements vary so widely that no one type of heating system can be expected to provide the greatest return on the dollar invested in the heating equipment for all types and sizes of buildings. Realizing this, Warren Webster & Company have consistently developed an entire group of Webster Systems of steam heating to provide a heating system for every need and every purpose.

Webster MODERATOR System provides "Controlled—by the Weather" heating and makes possible new methods of operation and new standards of economy. Can be applied to any existing steam heating system of sufficient size.

IMPROVED Webster Vacuum System provides distribution balanced from the start—the supply of steam to each radiator is so equalized that all radiators get steam at the same time and in substantially the same proportion, regardless of distance from the boiler. May be supplemented by HYLO Vacuum Variator, permitting manual control by building operator. Applicable to new or existing installations.

IMPROVED Type "R" System for residences and larger buildings as well, combines advantages of steam heating with advantages of hot water, but without limitations. Meets fully the operating requirements of newer fuels, newer types of radiation and newer thermostatic controls. Also provides better-than-ever heating service with old radiation and old controls.

Full details of any or all of these systems will be furnished on request.

Warren Webster & Company, Camden, N.J.

Pioneers of the Vacuum System of Steam Heating Branches in 60 Principal U. S. Cities Darling Bros., Ltd., Montreal, Canada

-since 1888

Webster Systems of Steam Heating

This is one of a series of advertisements discussing the factors affecting heating steam consumption. The purpose of the series is to call attention to the methods of heating steam consumption analysis, estimate and heating cost accounting developed by Warren Webster & Company to provide a reliable basis for comparing heating system efficiency. Actual detailed facts and figures of steam consumption of a number of Webster Systems of Steam Heating, prepared in accordance with these methods, are available for your examination.
Protects COLD LINES

like bark does a tree

Novoid Cork Covering holds cold line loss to a minimum

TAKE the best insulation nature was able to devise for her trees and place it on your cold lines in the form of close-structured Novoid Cork Covering.

Because... Novoid Cork Covering is composed of large and small granules of pure cork—taken from the outer bark of the cork tree—the most effective insulation ever devised to protect against heat and resist moisture. These cork granules are compressed tightly together, then accurately molded to fit line and fittings so as to leave no air spaces between pipe and covering where moisture might accumulate, penetrate, spread, and cause costly deterioration.

That's why Novoid Cork Covering offers permanent freedom from expensive replacements of cold line insulation. It stays dry and efficient, retaining its insulating value indefinitely.

Novoid Cork Covering is made for all sizes of pipe and fittings and is available in thicknesses suitable for all kinds of cold lines from below zero brine to drinking water.

Write for samples, prices. There's no obligation. Cork Import Corporation, 345 West 40th Street, New York City.

Novoid Cork Covering

For Cold Lines, Coolers and Tanks
OUR CONTRIBUTION TO THE ART OF HEATING AND VENTILATION

The Herman Nelson Wedge Core Radiator is an exclusive feature of all Herman Nelson Heating and Ventilating Products and accounts for their satisfactory performance.

THE HERMAN NELSON CORPORATION

MOLINE ILLINOIS
BEHIND THAT GRILLE IN THE WALL

In Herman Nelson Invisible Radiators, the architect has found the solution to many of his client's most difficult problems.

The problem of space ... with the Herman Nelson Invisible Radiator installed within the wall, every inch of floor space is made available.

The problem of furniture arrangement ... each piece of furniture may be placed precisely where the client wants it, with no extraneous object to detract from its beauty.

The problem of draperies ... the Herman Nelson Invisible Radiator permits them to hang straight to the floor, in the manner that modern good taste demands.

The problem of heat control ... a tiny knob at the grille permits instant regulation of the heat supply.

The Herman Nelson Invisible Radiator comes in a sturdy steel case which fits in any standard wall or partition. For multistory buildings, where access to control valves is required, a special removable panel is provided.

If you are planning a residence or any building that will have a steam, hot water, vapor or vacuum heating system, you will insure your client's satisfaction and the security of his investment by specifying Herman Nelson Invisible Radiators. Do you have our catalogue? A request will bring it to you.

THE HERMAN NELSON CORPORATION, Moline, III.

**HERMAN NELSON INVISIBLE RADIATOR**

*Makes of the Herman Nelson Invisible Radiator, for residences, apartments, hotels, offices and monumental structures—the element, for the ventilation of schools, offices, churches and all buildings having an acute ventilating problem—the Herman Nelson Wall Heater, for economical distribution of heat in factories, mills, garages, warehouses, and smaller buildings.*
Elevators for passengers . . .

Dumbwaiters for inter-office services

In the Kopper’s Building, Pittsburgh, vertical traffic—in passenger and in merchandise—has been raised to a high point of service. By keeping messengers out of the passenger elevators and substituting a full automatic dumbwaiter mail dispatching system, better service between floors without inter-floor messengers has been achieved.

Kopper’s dumbwaiter system consists of three dumbwaiters having twelve stops each. Mail, blueprints, etc., are sent to their destination quickly, safely, surely.

The operation is simple. Each dumbwaiter car is divided into compartments for each floor served. When a car is loaded, the dispatcher presses buttons designating the floors to be served. The door is closed and a starting button pressed. The car moves to the first stop, a floor bell rings and a light at the floor over the dumbwaiter doorway announces its arrival. The floor attendant opens the door and unloads whatever is routed there and reloads. Doors are then closed and the car proceeds automatically to its next predetermined stop.

Should an attendant delay twenty seconds, a buzzer sounds for the next twenty seconds and if not answered, the car automatically proceeds on its trip. When all stops have been made, the car automatically returns to the dispatching floor.

Any floor can signal the Dispatcher for a car by pushing a button. An indicator dial above each dumbwaiter entrance indicates the car position at all times.

Dumbwaiter installations quickly pay for themselves. Our engineers will gladly help you solve your specific problem.

ELEVATOR SUPPLIES COMPANY, Inc.

MAIN OFFICE AND WORKS
HOBOKEN, N.J.

BOSTON CINCINNATI DETROIT DALLAS PHILADELPHIA
CHICAGO CLEVELAND LOS ANGELES PITTSBURGH SAN FRANCISCO
Since coffee is the most important single item on the menu . . . you really should recommend the

PETERSEN URN

Pyrex Glass Lined and Equipped with "Tomlinson" Faucets

The "Petersen" Coffee Urn makes perfect coffee, according to the newest scientific principles of coffee-making. Fresh coffee is available for a much longer period due to the patented air chamber between the coffee jar and water jacket, which maintains an even temperature of approximately 200° Fahrenheit.

The "Petersen" Urn is easy to operate—cannot overfill the coffee water compartment. It extracts the maximum coffee flavor, with the least amount of tannin. It saves space—does the work of a two urn battery! Fitted with "Tomlinson" No-Drip Faucets.

There is no repouring with the "Petersen" Urn. It saves time and labor, and at the same time produces better coffee!

We make no extravagant claims for the "Petersen" Urn. Instead, we refer you to its many enthusiastic users.

The "Petersen" Urn is of the very heaviest and finest construction, presenting a handsome appearance in any service. The body is extra heavy cold rolled copper, heavily nickel-plated. The bottom is even heavier. The cover is hinged, which prevents it from being thrown around and possibly dented. The spray head is silver plated and may be swung out of the way or removed and cleaned. Made with Pyrex glass liner and fitted with "Tomlinson" No-Drip Faucets. With each urn is included filter and filter cloth.

The "Petersen" Urn is also offered in a two-jar size—does the work of a three-urn battery.

The "Petersen" Urn may be purchased through your equipment jobbers, or direct from The John Van Range Co.

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SIZES AND PRICES OF THE FAMOUS "PETERSEN" COMBINATION COFFEE URN

<table>
<thead>
<tr>
<th>For Glass</th>
<th>For Steam</th>
<th>Coffee Capacity</th>
<th>Width incl. faucets</th>
<th>Height of Urn</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>14E1075</td>
<td>14E1075</td>
<td>4 gal.</td>
<td>16&quot; 21&quot;</td>
<td>48&quot;</td>
<td>8300.00</td>
</tr>
<tr>
<td>14E1076</td>
<td>14E1076</td>
<td>6 gal.</td>
<td>17&quot; 22&quot;</td>
<td>52&quot;</td>
<td>335.00</td>
</tr>
<tr>
<td>14E1077</td>
<td>14E1077</td>
<td>8 gal.</td>
<td>18&quot; 23&quot;</td>
<td>55.5&quot;</td>
<td>375.00</td>
</tr>
<tr>
<td>14E1078</td>
<td>14E1078</td>
<td>10 gal.</td>
<td>19&quot; 24&quot;</td>
<td>55.5&quot;</td>
<td>425.00</td>
</tr>
</tbody>
</table>

"Petersen" Urns with Electric Heating Units — When ordering electrically heated urns state voltage of your electric current and whether alternating or direct current.

<table>
<thead>
<tr>
<th>For Electricity</th>
<th>Coffee Capacity</th>
<th>Diam. Width incl. faucets</th>
<th>Height of Urn</th>
<th>Cover closed</th>
<th>Cover open</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>14E910</td>
<td>4 gal.</td>
<td>16&quot; 21&quot;</td>
<td>48&quot;</td>
<td>48&quot;</td>
<td>8360.00</td>
<td></td>
</tr>
<tr>
<td>14E911</td>
<td>6 gal.</td>
<td>17&quot; 22&quot;</td>
<td>48.5&quot;</td>
<td>58&quot;</td>
<td>400.00</td>
<td></td>
</tr>
<tr>
<td>14E912</td>
<td>8 gal.</td>
<td>18&quot; 23&quot;</td>
<td>50&quot;</td>
<td>55&quot;</td>
<td>445.00</td>
<td></td>
</tr>
<tr>
<td>14E913</td>
<td>10 gal.</td>
<td>19&quot; 24&quot;</td>
<td>55.5&quot;</td>
<td>55.5&quot;</td>
<td>500.00</td>
<td></td>
</tr>
</tbody>
</table>
A SLIGHTLY HIGHER FIRST COST IS TRUE ECONOMY IN COMMONLY ABUSED PARTS OF PUBLIC BUILDINGS.

STONE
ALBERENE
CONSTRUCTION
STANDS THE GAFF

PUBLIC buildings . . . open all day . . . and all night . . . available to everyone . . . throngs of people coming and going — many careless — and not a few abusive.

Urinal stalls and toilet partitions in these places must be staunch or upkeep costs will be tremendous.

Alberene Stone has unusual structural strength and is absolutely sanitary. It is moisture and odor resisting, and is unaffected by acid or alkali.

The Alberene Stone "Ventilating Urinal" (shown above) is particularly suitable for public buildings where economy of first cost and ease of cleaning are primary considerations.

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7. Valve is attractive and substantial, nickel-plated, and polished on certain parts.

4 Pages in Sweet’s

The 1931 Edition of Sweet’s, just out, carries four pages on the Cryer Radiator Control Valve—pages D 5526 to 5529. There you will find complete information on this unique heating device.
BOOK DEPARTMENT
METAL CRAFTS IN ARCHITECTURE
A REVIEW BY
CLIFFORD WAYNE SPENCER

If one were to seek for a single word in which to express the spirit of the new architecture, it would probably be found that the word is “material,” since all modern building is the direct result of the adaptation of old materials to new uses and the discovery of new materials. The ornament that give work of this class its distinction. And so it is possible of the countless other little tricks of the trade. It is now possible for the architect to know all the minute details of the processes of fashioning a material in order to be able to design it successfully. There is no need, for instance, of his knowing just how to hold the hammer or how hard to strike, although such knowledge is always helpful and an excellent training for a designer in these materials. It would include a short period spent in the actual working of metals. It is desirable, however, that he should know something of the properties of the raw materials and how they will react to the different processes of their manufacture, and as much as possible of the countless other little tricks of the trade that give work of this class its distinction. And so it may be said that the outstanding feature of this work is its sound practicability. It goes into the subject to just the right depth to satisfy the needs of the architect without dwelling too long on the strictly technical and unessential features of the crafts being described. As Mr. Geerlings points out in his foreword, it would be impossible to discuss, within the covers of a single volume, all the ramifications and problems connected with the manufacture and design of a large number of metals in anything like a complete manner. He proposes rather to produce a book that will chart “a number of routes in Architecture,” Mr. Geerlings has undertaken to bring the different phases of the subject together. It is now possible for the architectural reader not only to find precedent for his work in metals in the illustrations of this volume but by reading the text he may gain that understanding of the actual working of the metals which is so essential to securing the best possible results in this field of design where so much depends on the bringing out of the inherent characteristics of the materials. Naturally, it is not necessary for an architect to know all the minute details of the processes of fashioning a material in order to be able to design it successfully. There is no need, for instance, of his knowing just how to hold the hammer or how hard to strike, although such knowledge is always helpful and an excellent training for a designer in these materials. It would include a short period spent in the actual working of metals. It is desirable, however, that he should know something of the properties of the raw materials and how they will react to the different processes of their manufacture, and as much as possible of the countless other little tricks of the trade that give work of this class its distinction. And so it may be said that the outstanding feature of this work is its sound practicability. It goes into the subject to just the right depth to satisfy the needs of the architect without dwelling too long on the strictly technical and unessential features of the crafts being described. As Mr. Geerlings points out in his foreword, it would be impossible to discuss, within the covers of a single volume, all the ramifications and problems connected with the manufacture and design of a large number of metals in anything like a complete manner. He proposes rather to produce a book that will chart “a number of routes which the interested layman, architect, and craftsman can pursue more leisurely if they find the scenery to their liking. It is a road map of arterial highways with the main milestones and sign posts marked rather than a detailed contour map with every footpath plotted. The contents are so arranged that if the reader be interested

A Ledaled Skylight at Evanston, Ill.
Childs & Smith, Architects
The Linden Company, Craftsman

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American Church Building of Today—1930

By Ralph A. Cram

The development of good architecture in the United States during the past generation has been astounding, but nowhere has it been more complete than in the realm of church building. This new volume contains a splendid representation of the best and most recent churches, both large and small, of all denominations throughout the country. They were selected from the work designed by architects specializing in church architecture. There are over 350 illustrations of exteriors, plans and details. 284 full page plates, 9½ x 12½ inches, 350 figures, cloth. Price $16.50.

English Church Woodwork

By Howard and Croxley

Here is a book that should be in the library of every designer of churches, for it contains more helpful information on church interior design and construction than can be found in any other source. The illustrations, which are extremely sharp and clear in their reproduction, cover 325 examples of the best work of England. These examples have been carefully selected from all sections to show the whole range of English Gothic woodwork. The author presents a brief but concise historical sketch of the subject of bronze. As a background for an appreciation of the metal he should observe and study in design confronting him he can turn to the next part of metal specifications in particular. These specifications should fill a very definite need in the average architect's practice. The information as to the processes employed in the working of the metals was obtained by visiting the shops of especially skilled craftsmen in and near New York, watching the progress of the work itself, and interviewing the master craftsmen. It is interesting to note that no two cases were the methods employed by the various craftsmen quite the same, each having developed to a greater or less extent his own manner of working. The statements made in the book are given additional authenticity from the fact that several of the craftsmen read and approved of the text before publication.

Tudor Homes of England

By Samuel Chamberlain

This new volume on Tudor architecture with its measured drawings will be welcomed by every designer of artistic homes. The three hundred illustrations from photographs, 30 full page measured drawings, with dimensions, 12 x 16 inches in size, and 60 reproductions of the author's delightful pencil sketches and dry points, are the result of an exhaustive search for new details and examples of smaller houses of the Tudor period. The homes of the Tudors were in the majority of the Tudor mansions of importance in central and southern England, and sketched and photographed many remote and unknown halls of unique interest. The stone houses of the Cotswolds, the plaster cottages of Essex, the timbered work of Cheshire and Herefordshire, the brickwork of Norfolk, all of these pure types, and innumerable variations of them are fully treated.

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development in the heyday of the Roman Empire. Its use in all parts of the ancient world is briefly sketched, and there is some discussion of the metallic content of the alloy as found in the various great centers of antiquity. A valuable feature of this historical sketch is that the author has included a classified list of the 64 pairs of ancient bronze doors in existence,—those which have survived from the early period of civilization. This table gives the probable date of each piece; its origin, whether Roman, Greek, Frankish, German, Italian, Spanish, Russian or English; the location and the name of the maker (if known); and the page of the work on which it is illustrated. Having covered the general historical background, each country having an important bronze tradition is taken up separately and the development and quality of its bronze work discussed in some detail.

The section devoted to bronze craftsmanship should be of absorbing interest to the lay reader as well as to the professional, since it describes the interesting processes of casting and traces the development of a piece of work from the time the client has "signed on the dotted line" to the point where the bronze has been finally installed. The descriptions of casting methods are accomplished by diagrams and scale drawings which, together with several illustrations showing action, help to make clear the processes described in the text. Under the heading of "Some Practical Aspects," the author presents some information which will help the architect in answering the numerous questions with which he is constantly being confronted, such as those pertaining to the length of time that should be allotted to the separate steps of preparing shop drawings, measuring the work, making the models, making patterns, making moulds and pouring castings, finishing, and delivery and erection. The time allotments given for these processes are necessarily only approximations, but they form a basis upon which to form an idea of the time that will be required for carrying out any particular project. Other considerations involved in practical bronze work discussed here include the relations between the architect and the bronze worker and the difficulties under which the metal contractor is forced to work. All this is invaluable, as it promotes a feeling of understanding which is quite essential for the fullest cooperation and most successful performance of the work.

Another interesting sidelight is found in the section devoted to the so-called "extruded bronze," which isn't really bronze at all but brass with a certain proportion of lead. This is generally of lower cost than genuine bronze and imposes a great many more limitations on the designer. It tarnishes when exposed to the elements in much the same manner as brass does. The remainder of the section devoted to bronze is given up to plates presenting outstanding examples of ancient and modern bronze work in full-page illustration. While the work cannot be expected to cover this subject in anything like a complete manner, the selection has been well made, and the examples are typical of the best in ornamental bronze work. Each of the other metals is treated in a similar manner, but as many of the points taken up under bronze apply also to the other cast metals, not nearly as much space is required.


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BUILDINGS are an essential adjunct of railroad transportation, perhaps much more so than we realize without investigating the subject. The reading of the two works by Mr. Droge is convincing of the essentiality of buildings. The titles are comprehensive in the terms "terminals" and "trains," the former always involving buildings of some kinds. The great mileage of railroad tracks and the numberless switches, signals, bridges and tunnels are essential to railroad transportation, but they do not require buildings as a detail of their particular service.

Terminal buildings are of two kinds,—passenger and freight. The most important in respect to architectural design are passenger terminals and stations. This results from their close association with human beings and the provisions which are made for their convenience and comfort. Usually located in conspicuous places, some real attempt is generally made to attain a pleasing architectural effect. The design of a passenger terminal is governed somewhat by its relation to the railroad tracks which place them in either of two general classes,—(1) through or side stations, and (2) head or stub stations. The architect's skill is engaged in providing the proper facilities for rapid and convenient passenger circulation through the building to and from the trains. The architectural design should logically evolve from these requirements.

Freight terminals of the modern type usually involve large storage facilities for all kinds of merchandise; in some instances cold storage has been provided. The most modern economic demand is for light manufacturing space in such structures. These are the larger and more complicated freight terminals. The usual inbound and outbound freight houses merely provide protection to merchandise in its loading and unloading. With the tremendous increase in freight traffic of various kinds, there have been developed types of express, mail and produce terminals, all of which require specialized architectural design and equipment. The grain elevator is another type of railroad building which is well worthy of the best architectural treatment because of its conspicuousness.

Utility buildings, such as roundhouses, coaling stations and numerous other structures that contribute to railroad operation, also claim architectural consideration. Mr. Droge has explained in a concise manner the function of all these types of buildings that are associated with railroad transportation,—and better understanding is acquired through his lucid explanation of their association with trains. There is nothing mysterious in the railroad technique involved in the writing of these books, and they are easily understood by those readers who have had no practical experience with railroads. Railroad buildings, aside from passenger terminals, have been, as a rule, designed by engineers who have developed high standards of efficiency and durability. The wide range of uses and types of railroad buildings offers a splendid field for architectural exploitation of the finest kind.
The Logic of Modern Architecture
By R. W. Sexton

Modern Architecture does not mean to the progressive architect a Modern Style, but rather an opportunity to give expression in architectural design to ideas characteristic of this day. Tenday, however, the aim of the architect is work- ing to attain Modern or Progressive Architecture in the broadest sense. Among the illustrations are a court house in North Dakota and an ice storage plant in Maryland; a schoolhouse in Arkansas and a hotel in Arizona; a shop in Illinois and a house in New York; an office building in Texas—all modern buildings and all embodying in their designs certain lines which we may now designate as characteristic of today.

There are one hundred and thirty-eight pages to the book, divided into five chapters as follows: Modern or Progressive; The Psychology of Architecture; Applying the Fundamentals of Architecture in Solving Our Modern Problems; Our Architecture Today; and Furnishing the Modern Interior. The illustrations, which are in many cases full page plates, are peculiarly related to the text. Many of the buildings are shown in sketches by the architects and others are accompanied by floor plans and detail drawings. In other words the story of Modern Architecture in this country is told in a way that is sure to appeal to every architect.

138 pages, 9 x 12 inches, illustrated, cloth. Price $8.00.

The Domestic Architecture of England During the Tudor Period
By Garner and Stratton

"Garner and Stratton," with its large size measured drawings, invariably comes into use when an architect is working in Elizabethan or Jacobean styles. Its brilliant illustrations of old buildings may be depended upon to afford precedent for modern work and to supply inspiration for adapting these marvelous styles to present-day use. A new, enlarged and improved edition of this important work is now available. The page size of the volumes has been slightly reduced, their contents much enlarged, and the additions to the book deal largely with work of the simpler, more moderate character which is adaptable to use in America today. The two volumes abound in illustrations of exteriors and interiors of domestic buildings, and these illustrations are supplemented by countless drawings of details: half-timber work; chimneys; wall paneling; doors; door and window surrounds; mantels and chimney pieces; ceilings; stairways; interior vestibules, and the other details which mean so much to the designer and aid so powerfully in creating the atmosphere belonging to these English styles.

2 volumes, 210 full page plates, 257 pages of text, 12 x 15 inches, cloth. Price $65.00.

Little Known Towns of Spain
By V. H. Bailey

This book consists of a collection of sixty-seven plates, from water colors and drawings by Vernon Howe Bailey. Twenty-four of the plates are reproduced in full color. They were engraved and printed in France by a new process, and are notable for the fidelity with which the originals are reproduced. All the qualities of brush, pencil, and pen are faithfully preserved. The fact that they cover a portion of the country that is well off the beaten track for the usual traveler, adds to their value. 67 plates, 10 x 13 inches, paper covers. Price $15.00.

The American Architecture of Today
By G. H. Edgell

America is responsible for developments the envy of the world over, which are here explained. Modern American architecture includes all that has recently been built or is being built today. It is well illustrated with sketches, plans, drawings.

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RAILS AND RISING TOWERS

FROM A CHARCOAL DRAWING BY TABU
RAILROAD STATION MATERIALS
AND MAINTENANCE

BY

JOHN C. FISTERE

THE unusual abuse to which railroad stations
and terminals are subjected, combined with
uninterrupted operation, requires more than cus-
tomary consideration from the architect in
specifying materials for use in stations, and ter-

The average life of a railroad terminal is about
27 years, barring, of course, unforeseen radical
expansion. In any case, a station should be
planned and constructed to allow for normal
growth over a period of 20 or 25 years. A ter-

While it is impossible to say definitely, despite
the experience of 50 years or more, just what
materials are advisable for use in all cases, we
can draw some general conclusions which should
be of benefit to the architect who is planning a
railroad station. As in all other instances, the
location, the appropriation, and the materials
available are the final considerations upon which
specifications are determined.

FLOOR MATERIALS

By virtue of their importance and basic
position, floor materials should receive primary
consideration. Immediately the main concourse,
the hub of passenger terminal life, comes to mind.
For large stations with huge concourses, choice
has been narrowed down to two or three materials,
—marble, tile and terrazzo (monolithic or tile).
In both cases, 7/8-inch is the minimum thickness.

The theoretical charge against them,—that is, that
they are slippery,—is not borne out in practice.
If this were so, their widespread use would not
be permitted by the accident insurance companies.
The only disadvantage is their tendency to crack,
but the introduction of metal strips has reduced
the possibility to a large extent.

Vitrified tile, concrete and certain durable com-
position materials have been employed extensively
in suburban stations, moderate-sized through sta-
tions, and small stub terminals. The first has
received the endorsement, for instance, of the
Lackawanna Railroad engineers, who have used
it in many of their suburban stations which have
been held up as models of small station design
and construction. Easy cleaning, simple replace-
ment, and adaptability are some of the factors
which determine its choice. Where cost is more
important than architectural unity or beauty, con-
crete is serviceable, provided it is treated for dust-
ing. The range of composition flooring is so wide
that only a few suggestions can be made as to the
factors to be considered, which are: adaptability
of form; color and texture; initial and replace-
ment costs; and the facility with which it can be
kept clean. There are a few patented products
which meet all these requirements, but each should
be tested before it is specified.

RAMPS AND STAIRWAYS

No other detail of a railroad station causes
such diversity of opinion, perhaps, as stairways
and ramps. One architect will use nothing but
bluestone; another will consider nothing but a
patented abrasive tile, while still a third will
uphold metal safety treads against the field. All
three are recommended for stairways, but for

Economy not a deterrent in design or durability; checkered tile floor with cove base; wood wainscot; textured plaster walls; space under seats difficult to clean. Depot, Marysville, Kan., Union Pacific R. R. G. S. Underwood & Co., Ltd., Architects.

ramps the abrasive tile is probably to be preferred. It is warmer in color, as a rule, than bluestone, and can be laid in patterns appropriate to the desired architectural effect, which is always an advantage. For heavy-duty stairways, the metallic strips are best, provided they are spaced closely enough to prevent the catching of the heels of women's shoes. A closely woven pattern is preferred to strips running either longitudinally or transversely, because of the possibility of slipping in wet weather. Metal nosing is advisable in most cases, but it should not project more than 1 inch beyond the riser. It is possible, where architectural consistency is desired, to use non-slip terrazzo. This is reputed to be slightly less durable than the others, but its appearance is far more attractive.

PLATFORM FLOORING

Exterior platform flooring is selected chiefly according to the amount of money available for the purpose. Hardened concrete is the most popular and probably the most suitable material. Where the platform is uncovered, crushed stone supplies a cheap and efficient surface. If the platform is temporary, or subject to change with expansion, wood planking is the most desirable. The American Railway Engineering Association recommends these materials for transfer platforms: "Wood plank platforms should be laid preferably with the planks parallel to the line of trucking traffic. Metal plates should be used for a runway to produce easier trucking and to reduce wear on the plank. Concrete floors are used in some cases, and for extremely heavy traffic, a concrete base with creosoted wood or asphalt block or asphalt mastic wearing surface is used."

MISCELLANEOUS AREA FLOORING

If the station is of the type which combines waiting room and concourse, the flooring material may be chosen from any of the concourse floor recommendations given in a preceding paragraph. Vitrified tile has given a good account of itself for this purpose in the Union Pacific and the Canadian National Railroads stations. They have found it adaptable to the various styles of architecture which they employ, and it has shown up well on the maintenance cost sheet. Concrete, although if not properly treated may be untidy in appearance, is used in many instances, and in very small stations, wood flooring is popular. It might be well to recall the humorous but too-true comment of a certain well known railroad architect who said, when he was asked about flooring materials: "It doesn't make any real difference what I specify, for it will soon be chewing gum anyhow."
Ticket offices, and other offices of similar character, may be treated as individually as the architect desires; wood, composition materials, rubber tiling, and linoleum are suitable. There is no definite preference based on anything but taste and expense. For baggage rooms, concrete floors are satisfactory, and are in common use, but in locations where heavy materials are handled, wood blocks, asphalt blocks or mastic are to be preferred. In small stations at outlying points, use of wood planking is common.

WALLS

Wall materials offer as wide a variety as floor materials, and here again the type of station is the chief determinant in specifying. For the concourse of a huge terminal, marble or vitrified tile, and enameled brick have many partisans among station architects for wainscoting. The last is very pleasing when used with vitrified tile in a two-and-one pattern,—two courses of tile and one of enameled brick. Above the wainscoting, brick, clay and composition tiles, pre-cast cement and gypsum blocks or plaster are suitable. The extensive use of brick for interior walls by European architects has gained many converts in this country. One fine example of its use is in the Stuttgart station.

The preservative quality of paint is so important in railroad station work that specifications must be definite in this regard. Each railroad has its own formula, and the architect should consult with the engineering department of the road before specifying. The A. R. E. A. says: "Better results will be obtained by specifying rigid physical tests as a method of judging quality rather than by formulas based on chemical composition." In all cases, of course, the only thinners to be used are pure linseed oil and pure spirits of turpentine; benzine, naphtha, gasoline and coal oil are ruled out. The average length of life of a good paint should be four years. The flat surface is probably best, particularly in those sections where dust is likely to gather, or where engine soot is likely to cloud.

Acoustical treatment of walls is essential in some sections of railroad stations, and is advisable in others. For instance, telegraph and ticket offices should be as free from noise as possible; and in stations which accommodate steam trains the din in such places is likely to hinder efficient work. Waiting rooms which have direct access to train platforms will be made more comfortable for the company's guests if the walls are sound treated. Wall boards of various types of fiber, perforated metal backed up rock wool, cloth-covered felt, loosely pressed composition tile, and acoustical plaster may be used. None of these is

Large terminal using marble to advantage for floors, walls and columns, the darkest polished marble used for floor and base; sound-absorbing ceiling. Cleveland Union Terminal. Graham, Anderson, Probst & White, Architects

Small station interior showing straightforward use of inexpensive materials; terrazzo floor and cove base for ease in cleaning; simple details throughout; trusses and rafters exposed. Greely, Col., Station, Union Pacific R. R. G. S. Underwood & Co., Ltd., Architects
Concourse of utilitarian materials rather than decorative; concrete floor, brick wainscot, etc. Halifax Station. Canadian National R. R. John Schofield, Architect

ROOFING MATERIALS

In determining the type of roofing material best suited for a station, there are several factors to be considered, most of which obtain in other roofing jobs. These are:

1. Probable life, including possibility of damage by the elements and ordinary wear.
2. Possibility of leaks due to character of construction.
3. Initial cost.
5. Fire-resisting value.
6. Appearance and architectural value.

In the light of these considerations we may consider these materials. Slate gives an ornamental roof of long life and low maintenance, but it should not be used on a roof having a pitch of less than 6 inches per foot, nor should it be laid with less than a 3-inch headlap over the second course below. Clay tile, glazed or unglazed, falls in the same general class, having both long life and low maintenance cost. Being heavy, the clay tile roof demands, of course, special framing, which adds to the expense. Its use is restricted not so much by its ability to serve as it is by the architectural style of the building. Cement tile, either shingle or structural, is recommended by the A. R. E. A. with the reservation that the product is unsatisfactory if poorly manufactured or not carefully laid. Glass can be introduced into the latter to take the place of skylights.

Experimentation on built-up roofing has not ceased, but the railroad architect may accept what
Permanence and low maintenance due to simplicity of design and careful choice of materials. Tunnel in Buffalo, N. Y. Station. Fellheimer & Wagner, Architects

has been found satisfactory in past instances. There seems to be little to choose from between rag felt and coal-tar pitch, and asbestos felt and asphalt. The first is less expensive, but the second is reputed to be more durable, particularly when unprotected by a mineral covering. While the coal-tar pitch is affected by heat and cold, it has value as an insulator, and is to be slightly preferred under ordinary circumstances on a price basis, if for no other reason.

LIGHTING EQUIPMENT

An over-lighted station is just as unpardonable as a station under-lighted, and there is no reason for the occurrence of either circumstance. These foot candle intensities may serve as an accurate guide in the lighting of various sections of the station:

- Waiting rooms: 2 to 4 ft. candles
- Rest rooms, toilets: 1 to 3 ft. candles
- Ticket office: 6 to 10 ft. candles
- Concourse: 1 to 2 ft. candles
- Baggage room: 3 to 6 ft. candles
- Train platforms: 0.5 to 1 ft. candles

The lighting, of course, should be well diffused, and should not be glaring. The general acceptance of indirect and semi-indirect lighting for public spaces as well as for working areas indicates the advisability of using those types of fixtures in railroad stations. The concealed type of lighting for a ceiling arch has been found effective in large concourses. The built-in or sunken fixture, a product of modernism, is also appropriate. In waiting rooms, it is often desirable to place attached lamps on the tops of benches to provide adequate reading light for waiting passengers.
is possible, although little has been done as yet, that Neon tubing will become more popular for interior illumination. Daylighting, through the use of adequate windows and skylights, reduces the amount of artificial lighting required and therefore the cost of electricity. Skylights must be carefully designed and of the best materials or they will add to the maintenance and repair costs.

HEATING

Railroad station heating requirements are not uniform. The locality, character of the building, and other factors exert such an influence that generalities are not applicable in a great many cases. In large terminals, for instance, the heating of a huge concourse might offer an intricate problem, or on the other hand, it might require no heating at all. Most large concourses are at least partially heated from the rooms which surround them—the waiting rooms, the various shops, the ticket offices, and so on. There are occasions, however, when this type of heating must be supplemented by fan-blown heated air from grilles. They are usually placed about 8½ feet off the ground, above the heads of passengers. The exhaust grilles are at floor level.

Attempting to supply a heating formula for stations is impossible because of the continuous opening and closing of doors that upset all calculations. The only way an architect can be sure that he is supplying enough heat is to make sure that all vestibules and lobbies are well supplied with radiators or grilles to heat the incoming cold air. It was once thought that placing radiators between benches and beneath benches was the most effective means of heating waiting rooms. For extremely cold climates, this might still be desirable, but for the temperate and southern areas, this is likely to make the waiting room occupants uncomfortable.

Ventilation is seldom required except in large terminals with inside rooms and underground concourses. The traditional high ceiling concourse in large stations usually needs no artificial ventilation since the height of the room, and the constant opening and shutting of doors by passengers provide a sufficient change of air. The small rooms off the concourse, such as ticket offices, barber shops and other areas, are usually inside rooms, which means that provision must be made for recirculation, at least, and sometimes for fresh air from the outside of the building. Air cleaning, either by filtration or washing, may be necessary; in which case the architect must bear in mind the presence of engine soot.

SANITARY REQUIREMENTS

Toilet and washroom facilities should be deter-
mined by the type of the station and by the character of its occupants, but in all cases, they should be as durable as the appropriation will permit. The heterogeneous crowd of travelers and loafers who make use of station toilets makes it essential to have both attractive and sturdy fixtures. Two types of water closets have been found unsatisfactory,—one is the overhead tank type, and the other is the periodic automatic flush kind. The first is put out of order by the breaking of the chains, and the second is likely to remain out of order unnoticed by attendants. Although the A. R. E. A. recommends the seat-operating type that flushes after use, there are some superintendents of railway maintenance who hold that they are too subject to maltreatment. Black ribbon slate or imitation marble may be used for partitions, and "A" grade yellow pine is recommended for the doors.

For water faucets, the most popular kind is the type with a compression stop valve, which shuts off the flow of water with the release of the hand. Handle and foot flush connections have proved satisfactory for urinals.

For piping, the American Railway Engineering Association suggests the following: "Concealed soil, waste, drain, sewer and vent pipes should be extra heavy cast iron soil pipe. Supply pipes which are 2¼ inches or smaller, below ground, should be strong lead pipe. All exposed supply or waste pipes including connections to fixtures should be nickel, chrome or similarly plated brass."

These pipe sizes for water supply are standard:
- To toilet rooms ................. ¾-in.
- To individual sill cock ........... ¾-in.
- To sink .......................... ¾-in.
- To urinal ........................ ¾-in.
- To lavatory ..................... ¾-in.
- To closet ........................ ¾-in.

The minimum size of waste pipes are:
- From individual closets ........... 4-in.
- From lavatories .................. 1½-in.
- From urinals .................... 2-in.
- From slop sinks ................. 3-in.

The minimum sized vent pipes are:
- For closet traps ................. 2-in.
- For lavatory .................... 1½-in.
- For urinals ..................... 2-in.
- For slop sinks .................. 2-in.

References:
Utility door, ticket and parcel window to accommodate commuter traffic on rush days—cash drawer closed.

D. L. & W. R. R. Station, Paterson, N. J.

Roll screen shuts off grille when not in use. Back of drawer forms parcel shelf—cash drawer open.

"Railway Engineering and Maintenance Cyclo-pedia." 1929. Published by Simmons-Boardman Co.


Detail of Door Above
RAILROAD BUILDINGS FOR OPERATION,
SERVICE AND COMMERCE

BY
A. T. NORTH

TWO classes of buildings are required for the operation and service of railroad transportation. One class is essential in providing facilities for the housing and maintenance of motive power, freight and passenger cars; the receiving and delivery of freight, express and mail; the arrival and departure of passengers; and a large number and variety of minor structures that supplement the uses and operation of the principal buildings. The buildings which are used for the housing and maintenance of motive power and cars are located usually near large terminals or at division points. Express and mail buildings are located adjacent to passenger stations; large express terminals are sometimes located at great distances from the passenger terminals. Express and mail buildings are located also at division points, junctions and transfer yards for reassembling and distribution to branch lines or other railroads. The other class of buildings is commercial-transportation in character, and it is made up of freight storage warehouses, merchandise storage and sales structures, and manufacturing buildings, all directly connected with railroad transportation facilities. This commercial-transportation class of buildings is more architectural in character because of their greater size, class and diversity of occupancy and are, therefore, of greater interest to architects.

The class of buildings first mentioned, used exclusively for transportation service and its maintenance, excepting the large passenger terminals, is not of especial architectural interest beyond being of safe, durable and economical construction. As a rule, they are reduced to functions of absolute utility and durability without the least consideration for appearance. This is unfortunate. The public, railroad employees, everyone, is entitled to the privilege of looking at attractive buildings. They are a function of public welfare by contributing to the pleasure and culture of the people. By the application of the proper kind of skill, these buildings of mere utility can also be made buildings of interest and beauty with no additional cost beyond the employment of better designing talent. There is now a worldwide tendency toward improving the design of minor and structurally unimportant buildings.

Chicago Architectural Photographing Company

The Pennsylvania R. R. Chicago Freight Terminal. Price & McLanahan and McLanahan & Bencker, Architects. This structure, erected 1917-18, has an architectural quality unusual in railroad buildings. It is a freight storage warehouse, freight being received and shipped on the first and second floors.
Aerial Surveys, Inc

The Cupples Station Terminals have direct access to the Eads and the Merchants' Bridge tracks.

While railroads have developed a high standard of efficiency, they have neglected those qualities of building that produce an agreeable appearance.

The association, on a large scale, of merchandising, and later manufacturing, directly with railroad transportation, is a comparatively recent development. The first important project of this kind was the Cupples Station Terminals in St. Louis, started by Robert S. Brookings in 1889, and later donated to the Washington University of that city. The plant, now managed by Col. Isaac A. Hedges, consists of 50 buildings covering six city blocks of 500,000 square feet of ground area. The buildings are connected with the railroad track, loading and unloading platforms by subways and elevators. About 200,000 square feet of platform space, 5,000 trucks and 100 elevators are used for the handling of incoming and outgoing freight. Sixty freight cars can be "spotted" at one time for loading or unloading, and an average of 100 carloads of merchandise freight are handled daily, weighing about 1,000 tons each. For many years, Eames & Young were architects for this property.

The renting of storage space by railroads is a natural economic development which benefits both the railroad and the tenant. The railroad benefits by utilizing the otherwise unused space above the
Lackawanna Freight Terminal, Jersey City. George J. Ray, Chief Engineer. Designed for storage and light manufacturing occupancy. Convenient vehicular access to ship sides and New York by both the Holland Vehicular Tunnels and the Ferries freight yards. As the ground used by team tracks becomes more valuable and is taxed accordingly, the increased value is realized by improving the ground with an income-producing development. Aside from increasing the revenue from ownership of the ground, the railroad provides a service which is profitable for the tenant and insures a certain amount of freight tonnage to the railroad. It is a form of intensive ground utilization. The tenant benefits by not owning and operating an individual warehouse; by being able to re-ship merchandise by rail without the expense of trucking from and to the railroad, and with no obstacle to trucking merchandise to regional destinations.

One of the first important projects of this kind was the Pennsylvania R. R. Freight Terminal, Chicago (McLanahan & Beneker, architects, 1917-18). It is readily apparent from the window arrangement that this building is intended solely for the storage of merchandise. It is notable, however, for its effective and appropriate architectural design, and its tower was the forerunner of the modern type of towers that are used now so extensively on industrial buildings. Later constructed freight terminals have increased window areas very materially to accommodate light manufacturing occupancies, a more modern economic development. It is regrettable, however, that the element of architectural design has not been incorporated in the later railroad freight terminals.

The Delaware, Lackawanna & Western R. R. Freight Terminal (1930) in Jersey City, is located conveniently to the Holland Vehicular Tunnels and the Lackawanna Ferries in Hoboken, both affording direct vehicular connections with New York. A considerable amount of LCL package freight can be trucked from this terminal to ship side. Special provisions are made for the handling of LCL freight. The building can be utilized either as a dry storage warehouse or for light manufacturing for the assembling of parts received at the warehouse in bulk, the finished product to be stored, delivered direct, or reshipped. The building contains 1,180,000 square feet of storage space. Provisions are made for duplicating the building on the north side with but little additional cost for track facilities. The plant was designed and constructed under the supervision of George J. Ray, Chief Engineer.

The Lehigh Valley Freight Terminal under construction in New York further develops the scheme of providing light manufacturing and freight storage facilities to a greater extent than has formerly been done. In this case the air rights of the existing team track property are to be developed intensively. The tenants will have all of the facilities necessary for storage and light manufacturing located within the limits of elevator transportation to railroad and truck receiving and delivery platforms. The economic causes that compel the development of this type

First floor (street level) plan, and cross section of the Lackawanna Freight Terminal. The sawtooth shipping platforms permit reduction in width and area of the driveways.
Freight Station and Automobile Warehouse. New York. Owned by the New York Central Lines. Special occupancy warehouse for automobile storage and freight


The new Kingsbridge Freight Terminal and Automobile Warehouse of the New York Central Lines, located at 213th Street and Kingsbridge Avenue, New York, partakes of the nature of a special occupancy building. The building consists of two units. One half of the first floor of the first unit is a station for general freight, the remainder is for free automobile storage for 48 hours. The rest of the building is used for automobile storage, having a capacity of 2,300 cars. Cars are taken to all floors by elevators and can be taken out on ramps. The building is constructed of brick and steel and is provided with a sprinkler system. Of the 54,049 carloads of automobiles delivered to New York by the New York Central Lines in 1929, 7,361 carloads were delivered to this warehouse.

Another phase of merchandising in connection with railroad transportation is that of perishable products for which a type of building has been developed. The Baltimore & Ohio Railroad Company has put in operation (October 1, 1930) a perishable products terminal in Baltimore, L. P. Kimball, Engineer of Buildings. Its facilities consist of an auction sales building, an auction display platform, and a private sales platform. The building is located in a large team track delivery yard and adjoins a new express company shed. The produce terminal has railroad tracks on one side and a truck delivery platform on the other side.

The auction sales platform is 565 feet long and 90 feet wide, with an 8-foot platform on one side. There is adequate floor area for the contents of 90 cars, allowing ample aisle space for inspection and delivery. The building is served by four house tracks having a total capacity of 48 cars, unloading at one time. As the unloading of these cars is normally completed during the night, the track space on the west side of the building is paved, providing a driveway 83 feet wide, and on the east side a similar driveway 74 feet wide is provided. Both sides of the building can be used for daytime city deliveries when the maximum tailboard space is required. The platform foreman and his assistants check and approve all goods sold before they leave the platform; the office records are made in a booth suspended from the steel trusses and reached by stairs, thus conserving floor space. On the second floor is the auction room, which is provided with desks for a seating capacity of 200 persons. This room can be enlarged if necessary. Beyond the auction sales platform is the private
Baltimore & Ohio R.R. Fruit Exchange, Baltimore. L. P. Kimball, Engineer of Buildings. A new type of special railroad structure for shipments and sales platform used for the purpose of handling such perishable products as are not customarily sold at auction. A continuation of this platform, 70 feet wide and 343 feet long, having separate tracks of 30 cars capacity, will be used by the express company until such time as the fruit and vegetable trade requires additional space. The sales platforms are heated to a temperature of 40°—45°, and the auction sales room to 58°—63° Fahr. by thermostatically controlled steam unit heaters. The offices are heated to 70° Fahr. by direct steam radiators. Steam is supplied by a district heating system at a 140-pound pressure and reduced to four pounds.

A similar project is the Northern Ohio Food Terminal, financed and built by the Cleveland Terminal Improvement Corporation, a subsidiary of the Nickel Plate Railroad, with a contract by which each merchant eventually will own his unit. Wilbur Watson and Associates, Architects and Engineers. The plant consists of seven buildings. Buildings A, B and C contain stores. Building A has two stories and basement divided into 24 store units 20' x 75' in size, each with truck space 20' x 25' enclosed with rolling steel shutters on one side. The basement space for each unit is 20' x 90', and the second floor space is 20' x 100'. Each store is provided with a 3,000-pound elevator. Building B is similar to Building A and occupied by one owner. It has the equivalent of 21 store units and contains nine elevators. Building C is one story high, 261' 6" x 90', and is divided into 13 store units. Building D is 456' 6" x 90' in size, one story in height, with basement 296' 3" x 90'. It is divided into 20 store units and contains six elevators. Building E is the auction sales building, 462' x 110' in size, with a second story head house, 82' x 110', used for offices and an auction room having 286 seats. There is a small basement used for boiler room and cold storage only. This building is similar in occupancy to the Baltimore Perishable Products Terminal previously described. Building F is the dairy products building, 40' x 130', two stories in height and of mill construction. Building G is occupied by the Federal Cold Storage Company, a separate enterprise, and contains 2,880,000 cubic feet gross. This plant furnishes cold storage facilities to the Food Terminal and, also, its
refrigerator lines are connected with store units in the various buildings. In general, gas is used for heating the individual store units, and the floors are designed for 250-pound live loads.

The American Railway Express Terminal, Long Island City, N. Y., was erected by the Pennsylvania Railroad Company, W. H. Cookman, Architect. The structure is 280' wide and 1,017' long, with a second story 50' wide and 740' long. The second story is used for offices, lockers for 1,300 employees, and other purposes. A small third story adjoining the Harold Avenue Bridge provides an entrance and stairway for employees and has a spiral chute for small packages.

The first story has two wide receiving platforms which have 2,300 lineal feet of back-up space for trucks on three sides of the building, permitting more than 300 trucks to unload at one time. Adequate lighting is provided for illuminating the roadways and the platforms adjoining the truck ends at night. There are three pairs of railroad tracks within the building, with a capacity of 78 express cars, between which are two loading platforms. The loading platforms are wide enough to permit the “parking” of shipments beside the cars, before stowing is started, without preventing movement of the platform vehicles in both directions to reach other assigned cars. The edges of the track platforms overhang so that a walkway underneath permits wheel inspection and despatching of trains without delay.

In the afternoon the trains are set out by electric locomotives, of which one is assigned exclusively to the terminal, but across each pair of tracks there are two electrically-operated bridges, which are lowered just before the heavy movement starts. The cars, therefore, have to be carefully “spotted” so that the bridges can be lowered without setting the cars too far apart.
Northern Ohio Food Terminal, Cleveland. Wilbur Watson and Associates, Architects and Engineers. Typical stores for the sale of fruits and produce.

These track bridges greatly facilitate the loading operations, since electric trucks and platform tractors and trailers can make "short cuts" between the loading platforms. Without them it would be necessary to make a trip to the east end of the terminal around the end of the tracks to the proper loading platform, frequently a trip of more than one quarter mile.

Provisions are made for charging the electric street trucks, of which 488 are in service, while they are being unloaded; an incinerator and stack for burning rubbish is used; three sides of the building are equipped with rolling steel doors 16' x 8' in size; a room for valuable express shipments is provided; a heated room for perishable matter and a cold storage room are located on the first floor; by a system of fireproof rolling doors the interior can be shut off; billing booths each with two scales of 100 and 5,000 pounds capacity are placed at convenient intervals.

Express buildings, either one or two stories high, are built in connection with passenger stations. The express matter is received from and delivered to trucks on one side and the express cars loaded or unloaded on the opposite side. At union passenger terminals these buildings are used to separate and re-route the matter to the different railroads and destinations.

The ordinary mail buildings built in connection with passenger stations are usually one story high and are used to receive mail from mail wagons despatched from the general post office and substations. The mail bags are assorted and placed on platform trucks and despatched to proper positions on the station platforms. The incoming mail is transported by the platform trucks to the mail building, where the mail bags are distributed to the mail wagons. These buildings are very simple in character. In connection with a union passenger station a much more complicated mail building is required, which becomes to some extent a post office sub-station. These buildings have both street delivery by mail trucks and also mail car service on the opposite side. Carloads of mail are broken for distribution to other railroads and placed in the proper mail cars or delivered by platform trucks to the trains. Special provisions have to be made for the handling of parcel
post mail, and sometimes mechanical means are used to sort and distribute the mail for each particular railroad mail route. Buildings devoted exclusively to parcel post service have been constructed in several cities.

Several departments of a railroad organization require large clerical forces, and it is found desirable to house them in specially planned office buildings erected in the outlying districts on comparatively inexpensive land. These buildings are sometimes located so that in them can be incorporated some other feature of railroad operation. The Illinois Central R. R. office building in Chicago includes a very important suburban passenger station. The supply department for Pullman cars and commissary department for the dining cars of the New York Central Lines occupy the floors below the street grade in the New York Central Lines' office building located in the Mott Haven yards, New York. The ten stories above the street level are used for office building purposes.

The buildings used in connection with the production and maintenance of motive power and cars of various types are usually concentrated in groups called railroad shops. These groups include the roundhouses used for housing locomotives while they are being cleaned and prepared for service; small machine shops are usually built in connection for making minor repairs and replacements. The oil house and sand house are very minor buildings. The principal buildings are the locomotive and cars shops used for making major repairs, replacements and rebuilding. The locomotive shop contains the blacksmith, boiler or tank, heavy machinery and the erecting shops, all under one roof and not separated by partitions. Shops for the repair and rebuilding of passenger and freight cars are more simple in design in not requiring the use of traveling cranes and heavy equipment. They include blacksmith, light machine, sheet metal, carpenter, paint and upholstery shops.

Minor buildings of a miscellaneous character, included in the category of transportation buildings, are Pullman supply buildings; ice houses; coach houses for minor repairs; garbage buildings; cooling plants; fan houses; power houses; wash and locker houses; signal houses; telephone exchange buildings; yard masters' offices; and Y. M. C. A. buildings near passenger terminals, freight yards and railroad shops.

This important and widely diversified group of buildings associated with railroad transportation is well worth engaging the best architectural talent. Aside from their preeminent qualities of adequacy for their particular use and occupancy and durability required in many instances for hard and rough service, these buildings, including the smallest and most unobtrusive, are entitled to the same careful consideration from the standpoint of architectural design as are all other classes of buildings.
RAILROAD STATION DESIGN DATA

CARS AND TRAINS
1. Train length: 120 to 800 feet.
2. Average car length:
   a. Coach, 72 feet.
   b. Pullman, 74 feet.
   c. Diner, 80 feet.
3. Height of car floor from rail top, 48 inches.
4. Average car height, 14 feet.
5. Average car width, 9 feet, 6 inches.

PLATFORMS
1. Minimum width.
   a. For single-track service, 12 feet.
   b. For double-track service, 20 feet.
2. Distance from center to center of tracks.
   a. With shed-supporting posts, 28 feet.
   b. Without posts, 28 feet.
3. Height of low platforms above top of rail, 9 inches.
4. Height of high platforms, 48 inches (floor level).
5. Distance from track center to edge, 4½ to 5½ feet.
6. Pitch, 1 in 48 to 1 in 24.
7. Ramp and stair clearance from edge, 6 feet.

RAMPS
1. Passenger gradient, 10 per cent.
2. Trucking gradient, 8 per cent.
3. Minimum width for passengers.
   a. For three lanes, 8 feet.
   b. For two lanes, 5½ feet.
4. Minimum width for trucking.
   a. One lane, 6 feet.
   b. Two lanes, 10 feet.

STAIRS
1. Sum of riser and tread measurements, 18 inches.
2. Recommended measurements.
   a. Riser, 7 inches.
   b. Tread, 11 inches.
   c. Overhang, 1 inch.
3. Landing platforms, 10 or 12 steps apart.
4. Landing platform width in direction of travel, minimum, 4 feet.
5. Hand rails.
   a. 5 inches from wall on both sides.
   b. Center hand rail required on stairs more than 8 feet wide.
   c. Height, 34 inches above tread on line of risers.

TICKET OFFICES
1. Width per agent, 6 feet.
2. Height of counter, 3 feet, 8 inches.
3. Width of window, 2 feet, 3 inches.
4. Height of baggage rack beneath window, 18 inches.

BAGGAGE ROOM
1. Receiving platform height, 2 feet.
2. Convenient bag and suitcase compartment dimensions, 16½ x 12½ x 28½ inches.

PASSENGER MOVEMENT
1. On platforms, unrestricted by crowds.
   a. Through passengers, 4,2 feet per second.
   b. Suburban passengers, 5,5 feet per second.
2. On platforms, en masse.
   a. Through passengers, 3,7 feet per second.
   b. Suburban passengers, 5,1 feet per second.
3. Through turnstiles, 50 passengers per minute.
4. Through single swinging doors, 77 passengers per minute.
5. Through double swinging doors, 117 passengers per minute.
6. Through ticket gates, 46 passengers per minute.
7. Space utilized by passengers on platforms.
   a. Through passengers, 13 square feet per passenger.
   b. Suburban passengers, 10 square feet per passenger.
8. Rate of discharge from platforms.
   a. Through passengers, 15 per foot of width per minute.
   b. Suburban passengers, 30 per foot of width per minute.
9. Space occupied by passengers with hand baggage on stairs and ramps, 2.7 feet per person.
10. Carrying capacity of ramps with 10% gradients.
   a. Through passengers, 15 per foot of width per minute.
   b. Suburban passengers, 30 per foot of width per minute.
11. Carrying capacity of stairs, 20 feet high.
   a. Through passengers, 10 per foot of width per minute.
   b. Suburban passengers, 18 per foot of width per minute.

A. R. E. A. STANDARD PLANS FOR SMALL STATIONS

[Diagrams showing different plans for small stations, including general waiting rooms, ticket offices, and passenger movement.]
## Relations Which Should Exist Between Business Handled and the Size of Through Passenger Station Facilities

<table>
<thead>
<tr>
<th>Station Facility</th>
<th>Unit</th>
<th>Number or Size of Facility Required for the Normal Number of Rush Hour Passengers Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>1. Area of main waiting room</td>
<td>100 sq. ft.</td>
<td>30</td>
</tr>
<tr>
<td>2. Seating capacity of main waiting room</td>
<td>Number of seats...</td>
<td>143</td>
</tr>
<tr>
<td>3. Area of women's waiting room</td>
<td>100 sq. ft.</td>
<td>5</td>
</tr>
<tr>
<td>4. Area of men's waiting room</td>
<td>100 sq. ft.</td>
<td>5</td>
</tr>
<tr>
<td>5. Total area for waiting purposes</td>
<td>100 sq. ft.</td>
<td>55</td>
</tr>
<tr>
<td>6. Total seats in waiting areas</td>
<td>Number of seats...</td>
<td>190</td>
</tr>
<tr>
<td>7. Total area of lobby, conference and all waiting rooms</td>
<td>100 sq. ft.</td>
<td>80</td>
</tr>
<tr>
<td>8. Area of men's toilet rooms</td>
<td>100 sq. ft.</td>
<td>4</td>
</tr>
<tr>
<td>9. Number of men's water closets</td>
<td>Number...</td>
<td>6</td>
</tr>
<tr>
<td>10. Number of urinals</td>
<td>Number...</td>
<td>5</td>
</tr>
<tr>
<td>11. Number of men's lavatories</td>
<td>Number...</td>
<td>3</td>
</tr>
<tr>
<td>12. Area of women's toilet rooms</td>
<td>100 sq. ft.</td>
<td>3</td>
</tr>
<tr>
<td>13. Number of women's water closets</td>
<td>Number...</td>
<td>7</td>
</tr>
<tr>
<td>14. Number of women's lavatories</td>
<td>Number...</td>
<td>3</td>
</tr>
<tr>
<td>15. Area of ticket offices</td>
<td>100 sq. ft.</td>
<td>4</td>
</tr>
<tr>
<td>16. Number of ticket windows</td>
<td>Number...</td>
<td>3</td>
</tr>
<tr>
<td>17. Number of telephone booths</td>
<td>Number...</td>
<td>3</td>
</tr>
<tr>
<td>18. Area of telegraph facilities</td>
<td>Sq. ft.</td>
<td>100</td>
</tr>
<tr>
<td>19. Total area of dining and lunch rooms</td>
<td>100 sq. ft.</td>
<td>9</td>
</tr>
<tr>
<td>20. Total number of seats in dining and lunch rooms</td>
<td>Number...</td>
<td>34</td>
</tr>
<tr>
<td>21. Area of kitchen</td>
<td>100 sq. ft.</td>
<td>5</td>
</tr>
<tr>
<td>22. Area of newstand</td>
<td>Sq. ft.</td>
<td>115</td>
</tr>
<tr>
<td>23. Number of barber chairs</td>
<td>Number...</td>
<td>2</td>
</tr>
</tbody>
</table>

### Baggage and Checking Facilities

<table>
<thead>
<tr>
<th>Station Facility</th>
<th>Unit</th>
<th>Number or Size of Facility Required for the Indicated Number of Pieces of Baggage Handled Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>24. Area of baggage room...</td>
<td>100 sq. ft.</td>
<td>20</td>
</tr>
<tr>
<td>25. Baggage room tail-board frontage</td>
<td>Lin. ft.</td>
<td>38</td>
</tr>
<tr>
<td>26. Area of parcel check room...</td>
<td>100 sq. ft.</td>
<td>4</td>
</tr>
<tr>
<td>27. Area of hand baggage facilities...</td>
<td>100 sq. ft.</td>
<td>4</td>
</tr>
</tbody>
</table>

**Courtesy, American Railway Engineering Association**
THE considerations influencing airplane hangar design are:

1. **Specific Use**, which may include one or more of the following purposes.
   a. Storage.
   b. Overhaul and light repairs.
   c. Heavy repairs and light manufacturing.
   d. Storage and field office.
   e. Storage and flying school.
   f. Exhibition hall.
   g. Spectators' gallery.

2. **Cost**, in relation to the total cost of the airport, the maintenance, and the probable return in the case of a commercial project.

3. **Location**, in relation to the other buildings on the airport and to limiting topographical conditions.

The specific uses of hangar buildings include many of the items above. The airport as it exists today,—especially that operated as a commercial enterprise,—is a combination transportation terminal, factory site, amusement resort, and private garage. In some cases it exists as merely a service station along an established airway; in others it assumes the proportions of an important transport and industrial center. Hangar types become, therefore, special problems requiring solutions in direct relation to the governing factors of the airport organization.

In any case, certain general requirements of planning should be noted. They are: (1) freedom from interior space obstructions; (2) daylighting and artificial illumination, dependent upon detailed operations; (3) susceptibility to alteration or addition with minimum expense; (4) protection from fire damage; (5) heating in relation to exterior climate and interior use; and (6) economy of maintenance.

No standard dimensions can be set for a hangar building. On the contrary, spans, lengths and clearances should be considered in view of the airport needs at the time of building, and the probable future development of its facilities. The heavier-than-air ship is capable of great expansion; with an increase in practical lift comes an increase in span, height and weight, and airports that are to keep pace in facilities with the progress of aircraft must be prepared to alter their existing buildings in accordance with the forthcoming changes in ship design.

**GENERAL PLAN TYPES**

1. **Rectangular.** This is the type most used and most adaptable to the majority of airport needs. The layout may be varied within wide limits of size and space needs, dependent upon cost and use. In general, the airplane hangar is a combination of garage and industrial plant. Due to the necessity for constant motor overhauls, much work is performed on planes within the same space that serves as storage. Repairs usually require equipment in the form of machines, which should be housed in a lean-to separate from storage or working areas, yet easily accessible thereto.

When hangars are built in series of two or
A common type of storage hangar, with sliding doors recessed into buttresses. Abilene Air Terminal, Abilene, Texas. B. Russel Shaw, Inc., Airport Engineers

A private storage hangar with shop and office in conjunction. This type is usual in small airports. Albert Kahn, Architect

A large single-unit hangar with large shop and office space adjoining. An efficient arrangement for flying schools, air-taxi lines, and small transport lines. Tulsa Municipal Airport, Tulsa, Oklahoma. The Austin Co., Architects
more, a lean-to may be built between two hangars, serving both at once. For fields where hangar space is leased this offers several advantages; it lessens the cost of two hangars by removing one interior wall of each; it provides independent units with complete facilities, and at the same time provides an economy of mechanical equipment and maintenance.

In many commercial fields storage is rented for private planes; repairs, overhauls, checking, etc. being done at another building. In such cases,—since private planes are usually small and rarely exceed in size the four-place class,—small plane units may be grouped under one roof. Clear openings should range from 30 to 50 feet in width and from 10 to 15 feet in height. The higher figures will give greatest renting flexibility for a wide range of plane types. Where the airport layout permits, economy may be effected by alternating individual hangar entrances in a plan shown in Fig. 1. This type of hangar is used at Portland, Ore., and application has been made for a design patent by its inventor, Carey Bundy.

2. Ramped. A two-story hangar with an exterior ramp to the second floor would be considered only in ports handling many large planes, and though space economy might be effected, it is doubtful whether the implied advantages would balance the cost necessary to provide structurally for planes of the transport type, weighing in many cases well over five tons. The increased height of such structures would cut down the effective area of a landing field, even with a climbing ratio higher than the accepted 7 to 1. It is conceivable that in special instances of topography a two-floor hangar might be employed to serve two adjacent fields of different levels, but, due to conditions limiting airport sites, this would be a rare exception. It is also conceivable that in time airplanes may be ground-driven through the wheels of landing gear; that airport congestion will demand stricter economy of space than now pertains; and that the perfection of the helicopter and autogyro may remove the necessity of low structures. Until these and similar problems are solved, however, the practical value of expensive and experimental airport buildings is doubtful.

3. Polygonal. Six- or eight-sided hangars may be employed if located in the center of a free area to permit taxiing and easy turning of planes. They give the advantage of constant daylighting and the center location of machine shops adds to the efficiency of the working area. Interior space cannot be as well utilized, however, due to the angular shape and the difficulty of maneuvering planes within a restricted area. They are not so well adapted to addition or alteration as the rectangular hangar and cannot accommodate large planes as efficiently.
GENERAL STRUCTURE TYPES

General considerations regulating the choice of materials and structure types include:

1. **Economy.** The large operating expenses of airports, the few income sources, and the possibility of building obsolescence due to radical changes in aircraft, demand the exercise of the most rigid economy in first cost consistent with the minimum of operating expenditure.

2. **Suitability for Projected Use.** Structural systems should be considered solely in relation to building functions from the standpoint of space and time efficiency in the completed structure. Material choices should parallel this from the standpoints of strength, weight, insulating value, fire resistance, stability and appearance.

3. **Adaptability to Varying Conditions.** As public demand for air transportation increases, extension of airport facilities to include additional hangar space or a better arrangement of existing space may be necessary. Hangars should be designed and materials specified to admit of alteration or addition with a minimum of expense and effort. Also, the development of aircraft itself may become an important factor, and the possible salvage value of materials should be given consideration.

Hangar buildings may be divided into three structural types:

1. **Frame.** For storage and minor repairs of small airplanes, frame hangars may be constructed of sheathed stud walls with a timber-trussed or Lamella-type trussless roof. Floors should be concrete on fill pitched to door opening. **Advantages** of frame hangar construction are the low cost and comparative facility in alteration. **Disadvantages** are evidenced in the high fire risk, necessity for continuous maintenance, and the limited facilities in size and type.

2. **Reinforced Concrete.** The advantages derived from this type of hangar are (1) low fire risk, (2) durability of construction, (3) minimum amount of maintenance, and (4) maximum protection from climate. Among the disadvantages are included (1) comparative difficulty in construction, (2) difficulty in alteration, (3) minimum of material salvage value, and (4) limited adaptability to varied uses. European airports have used reinforced concrete systems extensively; in this country, however, such hangar construction has not been much used, although masonry has been employed extensively for curtain walls.

3. **Structural Steel Frame.** The adaptability of a steel frame to various types of plans and conditions of use makes it especially suitable for hangar buildings. The particular design of a structural system depends upon the special requirements of the project, but certain definite principles should be considered.

A. **In planning,** the maximum spans consistent with the equation of future development to immediate building should be chosen to allow for natural expansion of the airport without an immediate necessity of new buildings or quick alteration of old. The same principle pertains to windows. Besides the consideration of daylighting, enlargement is made possible by the removal of existing sash without changes in the structural members. This brings about a two-way span hangar, with shops, offices, etc., located along the side which is least likely to suffer alteration.

B. **Wall systems** should be as open as possible for admission of light as well as facility in alteration. With a two-way span structural system very light curtain walls may be used, and materials should be specified for economy of installation and upkeep, for durability and salvage value, and for qualities of heat insulation. The
conventional use of brick, cement block, clay tile, etc., is satisfactory. Less known materials such as protected metal, composition asbestos board, and structural glass tile should receive serious consideration. They are all capable of application in hangar construction to a high degree of general efficiency.

C. Floors should be pitched to interior sumps and should be at least 6 inches above grade, with an easy ramp from door line to apron. Reinforced concrete slabs should be designed for the heaviest condition of storage indicated by future expansion plans. For general use a fine brush finish is satisfactory; in buildings to be used for manufacturing or storage of heavy planes which require truck handling, a compacted slab and smooth troweled surface should be specified. Local conditions may indicate a more economical floor than concrete, and wood-block, or asphalt-bound gravel may be used. The disadvantages of the latter surfaces are due to damages caused by wear and the expense and loss of time in maintenance.

D. Roof trusses may be designed in three types: (1) bow string, (2) pitched, and (3) flat. The first two, for small installations, are obtainable in stock unit sizes. They are light, easily erected, and in combination with bar joist purlins form an excellent roof structure. In larger airports roof trusses must be designed in view of the expansion considerations already mentioned, and of existing special conditions. The pitched roof is not a necessity and in some cases may hinder the development of airport efficiency. In many localities a hangar roof may serve as a spectators' promenade, as in the recently completed Wayne County Airport, near Detroit. With favorable conditions of terrain, the entire administrative facilities of a considerable airport might be constructed over a large hangar space, served by a ramp to the hangar roof level, half a story above grade.

A suspended roof structure has never been attempted in this country, as far as is known. It might, however, prove highly efficient and economical in problems demanding unusually long spans. It would provide shop and office facilities between corner pier supports, and could be enlarged without interruption of operations.

FACTORS IN DESIGN AND EQUIPMENT

Light, heat, ventilation and color are considerations of relative importance, depending upon the size of the structure, its use and its climatic location.

1. Light. If industrial buildings are taken as a standard, a minimum of 10 foot candles is necessary for efficient work, although the greatest possible amount of daylight, without glare, is desirable. The conditions of use vary somewhat between a hangar and an industrial plant of generally similar structure. Hangar shops are usually located near exterior walls where the light intensity is highest, and most of the detailed repairs are done there. When hangar space proper is used for storage, a portable light is commonly used in checking planes, and a high daylight intensity is not of great importance. In large hangars, where heavy repairs and plane overhauls are common, the length of span may diminish the intensity of light from doors and windows to below the practical minimum, and monitors or skylights may be necessary. In any case, glare is undesirable and, in localities where extreme brightness is common and where orientation to minimize its effect is not possible, sash should be glazed with light-diffusing glass. Artificial illumination by means of direct drop lights, the number and wattage depending upon the hangar space, is adequate for storage areas.

2. Heat. Some heat is desirable in hangars located in zones experiencing freezing tempera-
tures, as planes deteriorate greatly in unheated storage. In machine shops, offices, etc., pipe coils or radiators, ordinary or gas-fired, may be used; but they have proved inefficient in hangars due to large glass areas and infiltration through door openings. Unit heaters, ordinary or gas-fired, and re-circulating fan-duct systems are more successful. Much reliable research on the subject is lacking. The limiting considerations are cost and flexibility, which unit heaters so far meet best. Their placement should be considered to provide natural circulation within the building by warming cold infiltrations from door openings. Due to the fire risk from oil and gasoline fumes, no flame heaters should be considered. It is possible that a radiant heat for wall installation may be developed, as ceiling installations of the same type in other structures have proved efficient and economical. Effort should be made in all cases to prevent heat loss through walls and roofs by insulation, the method depending upon the type of construction.

3. Ventilation. Forced ventilation is usually unnecessary. In large structures monitors with sash or vents, or roof vents, either fixed or revolving should be installed and the ventilation controlled by operation of wall sash. In cases where fan duct systems are used, a controlled roof vent should be coupled with it, this being highly desirable in dope rooms or in motor cleaning areas.

4. Color. Exterior color should be chosen for its visibility from the air and for contrast with surroundings. The Department of Commerce recommends black and chrome yellow for roof areas. White or aluminum paint has high visibility for walls. The color of brick or stone should be chosen with this fact in mind. Interior color should be chosen to aid lighting methods and preserve materials. Mill white or aluminum paint is satisfactory for walls and ceilings with dark doors and 5-foot dado bands.

COST

It is impossible to tabulate costs of any kind for structures of the hangar type. They vary within wide limits, depending upon location, building requirements, market and labor conditions, methods of financing, and seasonal difficulties. The important consideration is not the unit cost of a building, but the general cost of operating an airport, of which a hangar is a part. The elimination of non-essentials by careful planning for future as well as present requirements; the selection of materials for the best combination of useful characteristics in view of these requirements; and close supervision of building methods with a cost-plus-guarantee contract will do much to erect an economical and efficient building. Investigation of new materials may disclose many that are particularly adapted to the needs of airport construction, and new methods of assembly may effect large economies. In steel-frame structures, for example, welding may save from 20 to 25 per cent of truss costs alone, and for an entire job would show a reduction of from 10 to 15 per cent. Light structural materials, such as pre-cast gypsum or aerated concrete floor and roof slabs reduce steel tonnage, and battledeck floors save material in many cases.
Interior of hangar at Curtis-Reynolds Airport, Chicago, Ill., Robert and Wentworth, Architects. The two-way span permits the enclosure of the court between units to form a single large space. Round-the-corner doors serve both sets of openings.

Hangar at Cleveland, Ohio. The Austin Co., Architects and Engineers. The cantilever door saves interior floor space.

DOOR TYPES

(1) Wood Sliding Doors,—Cost, 41-51%.
   Sliding doors, 3 to 4 feet wide, hinged together in pairs. Wood sash in middle, upper half or two-thirds of each door. (a) Hand operated; (b) admits daylight; (c) clear height is same as clearance under trusses; (d) most economical type of round-the-corner door.

(2) Structural Steel Sliding Doors,—Cost, 42-52%.
   Separate sliding doors, 8 to 10 feet wide. (a) Hand operated; (b) clear height is same as clearance under trusses; (c) fire-resisting; (d) most economical type of steel round-the-corner door.

(3) Tubular Steel Sliding Doors,—Cost, 48-58%.
   Separate sliding doors, 8 to 10 feet wide, steel sash in upper half or two-thirds of each door. (a) Hand operated; (b) admits daylight; (c) clear height is same as clearance under trusses; (d) fire-resisting; (e) economical.

(4) Steel Rolling and Cantilever Doors, Motor Operated,—Cost, 90-100%.
   Door is usually made in 3 or 4 sections with posts between. Posts either swing or slide out of the way. (a) Saves floor space; (b) fire-resisting; (c) clear height is same as clearance under trusses; (d) may be operated in sections.

(Compiled by The Austin Co. The cost is in percentages of the most expensive type.)
Floodlighting of airport buildings should be designed to develop maximum visibility to pilots. Glare and spotliness should be avoided. The Templehof Airport, Berlin, Germany. Paul and Klaus Englert, Architects

LIGHTING

Provision should be made for the following classes of lights:

1. Signal lights. A. Revolving beacon, intensity from 2 to 4 million candlepower, 1,000-watt lamp. Location: 50 foot tower, preferably near field control room. Type: two-color radio automatic revolving.
   B. Ceiling light. 500-watt, narrow beam light, located near control room.
   C. Construction lights. 100-watt lamps, in multiple circuits, located on every high portion of airport structures.

2. Flood lights. A. Building lights. Installations vary with the importance of the airport. It is desirable to flood-light the main structures, especially hangars. Roofs should be lighted in all cases where they are adjacent to landing areas. 200-watt lamps may be used, the type of reflector varying with the installation. Glare should be avoided in all cases and light distribution should be even.
   B. Field lights. Two types are in use, the arc light and incandescent bulb, the type and wattage varying with the field requirements. Wattage from 1,500 to 10,000 is employed. Field flood-lights will usually be housed in a small separate building placed to provide highest efficiency for landings and take-offs. They should be controlled, however, from the field control station. Two independent power sources are necessary to provide auxiliary field lights in case of the failure of the main unit.

The subject of lighting is a most important one, and with subsequent airplane development will become increasingly so. Each problem is a special one, and lighting engineers should be freely consulted for efficient solutions, and minimum lighting standards for airports may be obtained from the Aeronautics Branch of the Department of Commerce.
FIRE PROTECTION

The fire hazard in airplane hangars is great, due to the nature of buildings and the storage of highly inflammable materials within them, and all possible precaution should be taken to prevent the inception and spread of fire. Means of accomplishment are divided into three parts.

1. Structural. In all cases hangars should be built of incombustible materials as completely as possible. Construction should avoid the creation of flues, and trusses should be enclosed where possible to form separate roof areas and to prevent drafts through truss space. Separate spaces surrounded by adequate fire stops should be planned for operations tending to increase fire risk, such as doping, fueling, motor cleaning, etc. Fire doors of the usual type are not practical for use in hangars, due to the necessity for an unobstructed interior space. In large structures it might be possible to provide for the installation of thermally operated metal curtains of the roll-up type in the truss space. The automatic closure of hangar doors would tend to prevent drafts, as would a ceiling of incombustible material installed under trusses. Heating plants should be installed in a separate building or completely enclosed by fire-proof construction.

2. Primary Protection. Hangars, regardless of size, should be protected with automatic sprinkler systems. In large structures water curtains, operating from ceilings, walls and floors, and controlled by rate-of-rise systems, should be installed in conjunction with normal overhead sprinklers. Installations should sectionalize hangar space into areas not exceeding 10,000 square feet. Wet pipe systems may be installed, and in unheated hangars a pre-action system operated by rate-of-rise controls is advocated by engineers. In all sections served by sprinklers, drains and scuppers should be installed. One scupper to every 2,500 square feet of floor area should be specified to prevent flooding. The sources of water vary with the installation, but in large structures indicating a large investment two independent sources, one fully automatic, are desirable.

3. Secondary Protection. Automatic protection should be supplemented by approved types of portable extinguishers. Provision for their installation—the type and size depending upon the building and local conditions—should be made during construction. Care should be taken that the operation of doors, etc., does not render them inaccessible.

The importance of the subject should be appreciated. Adequate research has been done regarding it, and reports of complete tests under varied conditions may be obtained from the Aéronautics Branch of the Department of Commerce, and the Standards of Recommended Practice from the National Board of Fire Underwriters.
### Types of Runway Surfaces

The construction of runway surfaces follows good practice in road building, although loose gravel, cinders, etc., should be avoided for a top surface. The sections, with costs expressed in percentages of the most expensive type, are from data collected by The Austin Co.

<table>
<thead>
<tr>
<th>Type of Runway Surface</th>
<th>No. 1</th>
<th>Cost: 10-20%</th>
<th>No. 2</th>
<th>Cost: 55-65%</th>
<th>No. 3</th>
<th>Cost: 90-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oiled Earth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphaltic Concrete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Float Monolithic Finish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sizes of Standard Land Planes

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>No. of Pass.</th>
<th>Design</th>
<th>Span</th>
<th>Length</th>
<th>Height</th>
<th>Weight (Empty)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boeing Airplane Corp.</td>
<td>100</td>
<td>30'-0&quot;</td>
<td>20'-8&quot;</td>
<td>9'-7&quot;</td>
<td></td>
<td>1,882</td>
</tr>
<tr>
<td>Monomail</td>
<td>100</td>
<td>30'-0&quot;</td>
<td>20'-8&quot;</td>
<td>9'-7&quot;</td>
<td></td>
<td>1,882</td>
</tr>
<tr>
<td>Custombilt B-3</td>
<td>28'-0&quot;</td>
<td>21'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td>1,242</td>
</tr>
<tr>
<td>ARL-35A</td>
<td>40'-2&quot;</td>
<td>21'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td>815</td>
</tr>
<tr>
<td>Mod. F-K</td>
<td>29'-6&quot;</td>
<td>20'-8&quot;</td>
<td></td>
<td></td>
<td></td>
<td>1,095</td>
</tr>
<tr>
<td>Robin C-1</td>
<td>41'-0&quot;</td>
<td>25'-10&quot;</td>
<td></td>
<td></td>
<td></td>
<td>1,638</td>
</tr>
<tr>
<td>Cabinair C-165</td>
<td>32'-2&quot;</td>
<td>24'-7&quot;</td>
<td></td>
<td></td>
<td></td>
<td>1,620</td>
</tr>
<tr>
<td>C-225</td>
<td>50'-0&quot;</td>
<td>31'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td>2,325</td>
</tr>
<tr>
<td>Boeing Airplane Corp.</td>
<td>201</td>
<td>39'-8&quot;</td>
<td>32'-6&quot;</td>
<td>12'-0&quot;</td>
<td></td>
<td>3,355</td>
</tr>
<tr>
<td>New Standard Aircraft Corp.</td>
<td></td>
<td>43'-0&quot;</td>
<td>40'-8&quot;</td>
<td>12'-0&quot;</td>
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**Diagram:**
- **Stone Tarvia Surfacing:**
- **Macadam, Gravel, or Cinders:**
- **Concrete Base:**
- **Concrete Base:**
- **Concrete Base:**

778
ONE century of railroad transportation has caused unparalleled changes in the social, industrial, economic and political conditions of the world. The reason is obvious. The railroad, supplemented by the steamship, has provided a rapid and safe means of distribution in and between all countries; and peaceful intercourse between all peoples has resulted in worldwide distribution of natural and manufactured products and knowledge and culture,—the latter, knowledge and culture, the most important. As a natural consequence, modern transportation has affected,—revolutionized,—the art of building. Building is an essential function of every human undertaking. There have been developed new types of buildings particular to railroads and a coincident change in the oldest types of buildings.

The buildings that are particular to railroad transportation have been distinguished by the continuous improvement of the plan, equipment and construction coincident with its development. This has been the work of engineers largely. The problems involved have been extraordinary in many respects and have had to do with the transportation of people and freight.

Today, a passenger terminal receives and discharges daily a number of persons comparable to the total population of sizable cities. Their safe, convenient and rapid circulation through the structure is the principal objective, and it is satisfactorily effected by a suitable plan arrangement. The same is true for the specific purposes of freight terminal warehouses, locomotive and car shops, roundhouses and the large assortment of minor structures. Securing efficient use, satisfactory occupancy and durability has been the primary objective, and it has been attained. There is another desirable and equally essential feature of railroad passenger terminals, in addition to efficient use and satisfactory occupancy, which has to do with the appearance of these structures.

Large sums have been expended to make passenger terminals imposing in appearance corresponding to their necessarily great size. Apparently a studied effort has been made to attain this objective. Use has been made of ancient styles of architecture in the vain attempt to adapt them successfully to a phase of an important modern undertaking,—railroad transportation. These ancient styles were developed for their own specific purposes and successfully, but there is no relation whatever between the uses of ancient structures and those of the modern railroad passenger terminal.

The architect who understands the causes of the changing phases of former civilizations and the controlling influences of our present civilization, and who possesses a reasonable foresight of the future cannot fail to be inspired by the purpose of a great passenger terminal and its relation to our civilization. Such understanding and inspiration have been lacking evidently among some of the American architects who have designed our great terminals. This is evidenced by a comparison of American with foreign examples.

Even in the old Union Station in Kansas City, utterly inadequate structurally and architecturally, one could not fail to be strangely moved by the departure of the many long overland trains to the southwest or the trans-Rocky Mountain states which were the bearers of the builders of great empires, and to be moved as well by the incoming trains bearing those who came to traffic in merchandise and finance, or to seek pleasure. It was truly the gateway of a nation.

Railroading in its construction, operation and purposes is an arduous undertaking. It is concerned with the building and maintenance of empires,—a vigorous, potent thing that should be represented likewise architecturally, emblematic of the masterful, vital spirit which has regenerated the world. Are American passenger terminals representative of this spirit? Can this spirit be represented by the styles of Greece, Rome or the Renaissance? The true answer is found in those great, vigorous effigies that guard the imposing portal to the terminal in Helsingfors.

Foreign passenger terminals, as illustrated in this issue of The Architectural Forum, incorporate either existing indigenous architectural elements or those appropriately devised for the purpose of the structures. They have no details or arrangements that are reminiscent in the slightest degree of other peoples or their architectures. Their purpose is made evident by appropriate appearance. The foreign terminal is given a setting suitable to what it is,—a people's gateway to distant parts. Foreign architects have evidently sensed and then expressed the true function of
the passenger terminal in an architecturally appropriate manner.
The utilitarian and minor American railroad structures, of unquestioned efficiency, are not distinguished by their appearance. Engineering efficiency has been the dominating influence, and the element of a simple but pleasing appearance has been totally wanting. Again the foreign architect has collaborated with the engineer in producing utility buildings of all types which do possess a quality of appropriate beauty,—unostentatious, simple and inexpensive.

Railroad transportation buildings of all types offer a distinct challenge to American architects in the matter of appropriate appearance, and how have the architects answered it?

LOOKING AHEAD

As we come to the end of 1930, the thoughts of all are centered on 1931. What will the year hold for business in general and the architectural profession in particular? Will there be a gradual recovery? Can we look for better times at the beginning of the new year? These are vital questions and not easily answered. The facts about the past year in the building industry will soon be published and the curves plotted showing the descent in building volume, building value, prices and employment. Forecasts of the future will be made. The Architectural Forum is conducting an extensive research in the architectural field, ascertaining the actual conditions in all offices throughout the United States regarding work in progress, projected and in prospect. The results will be published in the January issue. Proper evaluation of these facts, presented in usable form and properly interpreted, will do much to indicate what 1931 holds for architects and for the building industry.

The important question is, “How can we, as architects, improve conditions and increase building activity?” The depression that has caused the severe unemployment among architectural draftsmen, due to fewer commissions in architects’ offices, can be remedied only by more active promotional efforts on the part of architects. Relieving unemployment in this field depends largely on the architects’ ability to influence those who can and should build to begin immediately.

There has been an overbuilding of certain types of structures in certain localities, but there is a shortage of certain other types of buildings in almost every section of the country. The architects who will be busiest in 1931 will be those who carefully analyze the building needs in their communities and who make every effort to influence civic bodies, institutions, government departments, and private individuals to undertake a definite building program at once. There is nothing unethical or unprofessional in this procedure; it is rather a civic duty. The fact that there may be personal gain to the architect does not alter this fact so long as he devotes his energy to the development of sound projects to meet definite needs.

Determination of those needs is the first step. The conditions in different localities vary and must be carefully considered. However, in general, the greatest opportunities seem to lie in the promotion of institutional, governmental and public buildings, such as schools, colleges and university buildings, hospitals and asylums, jails, city and town halls, municipal buildings, court houses, fire stations, police stations, libraries, civic auditoriums, etc.

Residential building has fallen so steadily and in such volume during the past few years that it has been held by some to be largely responsible for the diminishing purchasing power which was a factor in the deflation of the past year. Because such buildings can be erected at less cost than at any time in recent years, an added impetus can be given this work, not only as far as individual dwellings are concerned, but in housing developments as well.

The modernizing and improvement of existing buildings by alteration and addition offer an opportunity for the architect and in many cases may be the means of bringing about the consideration of an entire rebuilding, or the advisability of replacing the old building with a new one.

By concentrating effort on buildings for which there is a known need,—by urging the immediate building of structures now contemplated for future construction,—by presenting to those who might build the advantages of building now,—by having all factors of cost, financing and plan in definite form for such presentation,—the architect will be an important factor in the economic recovery to be hoped for and worked for in 1931.
BUS TERMINAL CONSTRUCTION

BY

JOHN C. FISTERE

THE engineering problems connected with bus terminal construction arise, for the most part, from the efficient handling of the buses themselves, getting them into the loading area, maneuvering them into position for loading and unloading, and getting them out of the building again. The problem might be likened to that of a hypothetical garage and railroad station. It is one of vehicle and passenger circulation, and the solution must be worked out on that basis.

ENTRANCES AND DOORS

Working from the outside in, the first consideration must be the entrance. The average bus is about 8 feet wide,—seldom more than that, and sometimes less,—which means that a straight-in drive should be at least 10 feet wide. Unless double-deck buses are accommodated headroom allowance need not be more than 13 feet, 6 inches; in many states, the maximum height for vehicles is 12 feet, 6 inches. In some instances, it will be advisable to plan the entrance door on an angle to permit the bus to start its turn before entering the building. The width of the entrance then depends on the angle of the turn. For a 45-degree angle, 18 feet is a sufficient width. The type of door to be used depends, of course, on the amount of money available. In warm climates, no door is needed; roll and vertical slide doors are preferred to swinging doors or to horizontal slide doors.

HEADROOM

Headroom in the terminal itself depends more upon the type of baggage loading and passenger loading than upon the dimensions of the bus. If baggage is carried upon the top, it must be remembered that space is to be allowed for an attendant. A mezzanine balcony built out over the loading platform to give easy access to the top of the bus should be about 10 feet above the main floor level. If the terminal is planned with stairs or ramps leading down to the platforms, a landing for access to baggage should be included at the same height as the bus top.

RAMPS

Where bus ramps are used, as in cases where the loading levels are above or below the street,
a 15 per cent grade is about the maximum for safety. By far the most economical floor is concrete with a rough wood or carpet float finish, since a roughened finish is essential to prevent skidding. A metallic hardener in the finish will add years of life to the flooring. For passenger ramps, the ideal grade is 10 per cent or less; their finish should also be roughened. The experience of railroads shows a preference for abrasive tile, although bluestone cement with an abrasive ingredient may be used.

The widths of passenger ramps should be in multiples of 2.7 feet since that is the amount of space occupied by the average passenger carrying a small amount of baggage. Probably the most advisable width is 8.1 feet, which allows three lanes of pedestrians. While landing areas on ramps are not essential, they may be advisable for loading baggage, as was mentioned already. Stairways are planned on the usual rule of 18, that is, the combined measurements of the riser and tread should equal 18 inches. For bus terminals, steps should be comparatively broad and low; a tread of 11 inches is recommended, which means that the riser may be about 7 or 7½ inches. Approximately 1 inch is allowed for the nosing. A crisscross pattern of metal strips, or any of the better abrasives is satisfactory for stair flooring. In this connection, it might be well to recall that ramps discharge pedestrians at a rate one and a half times that of stairs, the figure being 10 passengers discharged per foot of width per minute on stairs, and 15 on ramps.

The mechanical equipment of bus stations is
somewhat similar to that of garages, and in most cases, a garage is an integral part of the terminal itself. The pitch for floor drains should be about 1½ inches, and the number of drains need not be great so long as the drains are well placed. Three or 4-inch drains should be adequate in most cases.

HEATING AND VENTILATING

Steam is generally preferred as a heating medium, although hot water has certain advantages if the freezing of pipes and heating surfaces in exposed places is carefully guarded against. A temperature of approximately 50° is sufficient for the loading areas, and 70° for the rest of the terminal. The larger part of the building equipment for the loading area should be located near the door. Radiators or coils should be located as near the floor as possible but protected to prevent damage by contact with buses. Where the loading area is large, a unit ventilating system may be advisable; the type which does not occupy excessive floor space has been used successfully in many garages. No workable formula is possible for ventilating equipment; the number of exhaust grilles should be generous in the sections where stagnation of air is most common—that is, away from the entrances and ramps.

SERVICES

The devices which are necessary for bus service should be located in the storage area in stub
terminals and apart from the actual loading areas in through stations. Such equipment includes, of course, gasoline, oil, and water supply fixtures; car washing and cleaning equipment; and general repair apparatus. Grease racks open clear to the floor, or the pneumatic type which raises a car on a platform above the floor, are to be preferred to the open pit, which constitutes a real hazard to the mechanic because of the accumulation of carbon monoxide gas.

**TURNTABLES**

For a terminal which is to employ a turntable, the architect is first concerned with the space to be allotted to it, and its position in the plan. Ordinarily, a table with a diameter of 35 feet will accommodate the largest buses in use today. Its position is of course decided upon by the positions of the landing platforms and the drive­ways.

**PLATFORMS**

Reinforced concrete platforms, 8 inches high, are recommended by most bus companies. Island-type platforms should be at least 30 feet in length to provide room for one bus; stall platforms at right angles to the driveway should be the same length. It is not necessary in other types to make the platform as long as the bus, except for those buses which have front and rear entrances. Platforms which do not have stairs leading down to them need not be more than 3½ feet wide, and in some cases, they may be as narrow as 2½ feet. Platforms with ramps or stairs ought to be at least 11 feet wide. A guard rail around the dangerous sections of the platform is advisable.

**BAGGAGE AND CHECKING**

The baggage room should be for the double purpose of checking parcels and bags and for handling them for immediate relay to the buses. A metal-covered counter is standard for the receiving desk. Since the baggage room is usually located in a conspicuous place near the entrance where space is valuable, it might be wise to have conveyors transport the luggage to a storage room in the basement or mezzanine or in some other relatively unimportant section. Leading from the baggage room there should be a separate passage to a balcony over the bus-loading platform or to the platform itself.

The other facilities of the stations are similar to those in railroad stations. There has been a tendency, however, in bus transportation to break away from the standard ticket windows which are parts of every railroad station. Instead, open counters, with all ticket paraphernalia beneath, are being used. The most approved height for the counter is 3 feet, 8 inches, since that, by actual test, permits the agent to work with greater speed, and less fatigue. If the enclosed cage is used, 2 feet, 3 inches is considered the most desirable width for the opening. Some railroad men, however, prefer a wider type, 5 or 6 feet. If divided stalls are used, the partitions should be about 6 feet apart; if the open counter is decided upon, that much space must be allotted for each worker. It is also advisable to provide tables for writing out complicated tickets, because an agent is likely to become confused by passengers' questions if he is working directly in front of them. A baggage rack is often advisable below the counter.

Finally, the materials selected for floors, walls, and roofs must be such as will show up well on the company's maintenance chart. Under the abuse which bus terminals are certain to receive, poor materials and faulty construction will be revealed, to prove the contention that transportation buildings must be built for permanence.
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Wilmington, Delaware

SPEAKMAN SHOWERS and FIXTURES
A New Closet That Helps Rout Three Ghostly Shadows

The Clow Soldier of Sanitation has built a new closet to rout the three grimmest shadows that hover in the toilet rooms of public buildings, schools, hospitals, industrial plants and similar places.

He has made the bowl low, semi-lipped with a form-fitting seat for comfort. He has eliminated the dirt-catching bead that extends around the outside top of more old-fashioned closets.

He has made the bowl sides perpendicular. Anything dropped into the bowl will fall directly into water. Nothing can stick to the sides, because nothing can easily hit the sides.

And even careless minds are defeated and forstalled by the Clow-Madden Valve that flushes the bowl automatically after every occupation.

The many records of ten, fifteen and even more years of trouble-free service established by this valve attest to the long life, and negligible repair costs that can be yours.

And with this brand new closet the Clow Soldier of Sanitation scores another big victory for you against your three most hideous toilet room enemies: Failure—Short Life—and their ghastly brother Insanitation.
In this home the GAR-WOOD gave TWICE THE HEAT... AND SAVED $264 A YEAR BESIDES

Built like an automobile radiator, the Gar-Wood boiler is designed to secure an almost complete transfer of heat to the water sections. The Gar-Wood burner is designed to effect almost complete combustion from the time it starts. Designed for and engineered into each other, the Gar-Wood burner and boiler form one complete balanced heating unit... to provide automatic heat from either oil or gas at a cost that is less than coal.

But what do home owners who have installed the Gar-Wood say about it? Ask Mr. W. P. Harris of Grosse Pointe Park, Mich. He had been using an oil burner... in a boiler built for coal firing... with a separate gas heater to heat his domestic water supply. He rebuilt and enlarged his home so that it required double the amount of radiation. After installing a Gar-Wood unit with its built-in water heater, Mr. Harris says:

"During the past heating season, from September 1st to June 1st, I used only one-half of one per cent more oil with the Gar-Wood plant than with the previous oil burning installation, and I heated twice the amount of radiation. In addition I used the Gar-Wood to heat all my hot water, reducing the gas bills over the previous year from an average of $38.00 per month to an average of $16.00 per month." A clear saving of $22.00 per month or $264.00 a year.

For two years the Gar-Wood has met the test of every practical operating condition in private homes. It has been repeatedly proven that its unprecedented efficiency reduces heating costs far below that of any other type of heating unit. Your clients will expect you to tell them all about the Gar-Wood. The coupon will bring you complete information.

Responsible organizations now distributing through the heating trade should investigate the Gar-Wood franchise. Write the factory for details.
SOLID NICKEL SILVER PLUMBING FIXTURES BY MEYER-SNIFFEN*

IN EQUITABLE TRUST BUILDING, NEW YORK

The Equitable Trust Building, in addition to being one of the largest of modern office buildings, embodies many new features of beauty, comfort and convenience. Throughout this imposing structure Solid Nickel Silver plumbing fixtures have been installed—thereby insuring constant cleanliness and life-long service. Solid Nickel Silver plumbing fixtures are now readily supplied in practically any quantity or style required for all types of quality installations. They are corrosion-resistant and not easily marred or broken during installation or use. Solid Nickel Silver has the hardness and toughness of the best bronze—a factor of great importance in connection with the wear-resistance of valve seats. In its silver-like beauty Solid Nickel Silver resembles Pure Nickel and high Nickel alloys. Architects everywhere are specifying sanitary fixtures made of Solid Nickel Silver for buildings that are designed to serve many generations of discriminating tenants.

* Diamond Metal is the name used by 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.
"BRYANT EQUIPPED" BUILDINGS in the PLAZA ZONE


A Change—Not a Correction!

Another "Random Shot"

SOME months ago, we ran an advertisement featuring a photograph, again reproduced in inset, which appeared in the New York Times. All six of the buildings included in this were "Bryant Equipped". Several weeks ago, there appeared in the New York Sun another photograph of the "Plaza Zone", taken from almost the same spot. This is reproduced above. Note the two additions to the skyline—The Hotel Pierre and The Squibb Building. These, too, are "Bryant Equipped". While the New York skyline is constantly changing, those architects and engineers who insist upon the best continue to specify Bryant "Superior Wiring Devices" and contractors who carry out their plans are only too glad to use them, for Bryant Devices, since 1888, have been a standard throughout the world.
TESTED and APPROVED

by these leading Institutions

FULTH-FISCHER, INC.
New York City
HORN & HARDART CO.
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WILLOW CAFETERIAS, INC.
New York City
HOTEL PIERRE
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NEW YORK LIFE INSURANCE CO.
New York City
COLUMBIA UNIVERSITY
New York City
HARVARD UNIVERSITY
Cambridge, Mass.
TUCK-RICH CAFETERIA
Toronto, Ont.
F., W., WOOLWORTH CO.
New York City
STATE TOWER COFFEE SHOP
Syracuse, New York

YOU can specify the Lamson Trayveyor with the complete assurance that it is the most dependable, sanitary, trouble-free dish and food conveyor possible to obtain. Many of the country's busiest restaurants, hotels, hospitals and clubs have given it their unqualified approval.

The Trayveyor is a precision-built, automatic machine, designed to convey dishes and food—up and down between floors—with the maximum safety, speed and quiet. Its protective devices guard against the carelessness of inefficient help and reduce dish breakage. Sanitary metal enclosures seal the Trayveyor shaft, insuring absolute sanitation. Because of its unique "chain around a chain" principle, the Lamson Trayveyor requires a smaller shaft than any other automatic device of its kind.

This modern device may help you solve a difficult dish-conveying problem. Write to-day for complete information concerning the ascending, descending, double-duty and reversible models.

The Trayveyor is a patented product and the right to use it is fully guaranteed by the Lamson Company.

THE LAMSON COMPANY, SYRACUSE, NEW YORK
A nation-wide institution with offices in principal cities.

LAMSON
TRAYVEYOR

MAIL THIS COUPON

The Lamson Co., Syracuse, N. Y.
Please send me information concerning the Trayveyor.

Name.................................................. Street.......................................... City.................................................. State..........................................
FINAL TESTING...INDICATES A WIDE MARGIN OF SAFETY

After assembly every Jenkins Valve is subjected to severe factory tests which show that the valve will bring to the job a wide margin of safety and strength. Jenkins Tests are the logical climax to a manufacturing routine, which at every step, is characterized by exacting fidelity to Jenkins high standards of craftsmanship. Jenkins are made in types and patterns suitable for practically every service. Jenkins Bros., 80 White St., New York; 524 Atlantic Ave., Boston; 133 No. 7th Street, Philadelphia; 646 Washington Blvd., Chicago; 1121 No. San Jacinto, Houston, Texas; Jenkins Bros., Ltd., Montreal, London.
SOUND SYSTEMS
are of great importance to the architect.

The best time to provide for a sound system in structures built to accommodate education, treatment of the sick, travel and entertainment, is at the time the housing for the enterprise is being planned. We will gladly send the architect full information about Powerizer for his files or have an expert call and discuss any prospect in installation, either for a new building or for one now existing.

Complete Powerizer Sound Systems are installed and serviced by our authorized electricians everywhere. Powerizer is a perfectly balanced set of units comprising a set of equipment for pick-up, amplification and distribution. An attractive booklet about the uses of Sound Systems will be sent upon request.

Von Duprin
Self-Releasing Fire and Panic Exit Latches

Profits from the Superfine

Like other specialties entering into the construction of a building, panic devices offer the architect the choice of specifying an article which is low in first cost or one which is higher priced, but which, because of freedom from maintenance expense, costs far less over the life of the building.

Many architects believe that any building except a temporary structure deserves panic devices which are as nearly free as possible from upkeep and repair expense. It is for these men that we make the genuine Type "B" Von Duprins.

Built with all the skill we have and from the best materials we know, these devices are so strong and so long wearing that maintenance costs are practically unknown. Except in rare instances, the first cost is the entire cost.

To secure the genuine, we suggest that you specify them by name, and separately from the finishing hardware.

VONNEGUT HARDWARE CO.
Indianapolis, Ind.

Listed as Standard by Underwriters' Laboratories

IN 1931
SWEET'S

For your convenience, complete specifications of Ruberoid Built-up Roofs — ASBESTOS — TAR and GRAVEL — ASPHALT — will be found in 1931 Sweet's. In addition, our Engineering Department is always at the architects' service to help solve problems raised by unusual conditions.

Write or 'phone any office listed below.

CONTINENTAL RUBEROID SAPEPACK H. F. WATSON
ROOFING MILLS MILLS MILLS MILLS

The RUBEROID Co.
Office: New York - Chicago - Boston (Mills) - Erie - Baltimore - Mobile
To verify the fact that Kalman Steel Door Frames insure freedom from plaster cracks in the surrounding wall, one architect proved it for himself.

In a Kalman-built doorway, he slammed a heavy door 2,000 times. Eventually, the lock fell off—the door split—yet the surrounding plaster remained crack-free.

So much a part of the wall does the Kalman Steel Door Frame become—overlapping and closely engaging the side of the tile—providing a positive bond and terminal for plaster—that the possibility of plaster cracks is eliminated.

There are 15 advantages with the Kalman Steel Door Frame as compared to any other doorway construction. Write for file folder.
FOR SAFETY AND ECONOMY SPECIFY

NAILCRETE BLOCKS

Architects and builders are quick to see the many advantages of the new Nailcrete Nailable cinder concrete building blocks in the construction of load-bearing walls and partitions. Investigate!

Write for Illustrated Booklet

THE NAILCRETE CORPORATION
105 West 40th Street New York

MEYER Steelforms
THE STANDARD

Inquiries will establish the fact that Meyer Steelforms are the standard for concrete joist floor construction.

CONCRETE ENGINEERING COMPANY
General Offices: Omaha, Nebraska
Branches in all principal cities

 RESPONSIBILITY

— the factor that must not be overlooked in the selection of an incinerator

When you specify a Kernerator you are selecting the product of a financially responsible manufacturer. You can be certain that the installation will be supervised by a trained man. Satisfactory performance during the years to come will be assured by a guarantee—a guarantee that means something—backed by a responsible manufacturer, with a national service organization. Incineration is becoming the accepted necessity for modern homes—the Kernerator has already become the accepted standard in the architectural profession.

KERNER INCINERATOR COMPANY
1574 N. Richards St. Milwaukee
Offices in over 300 cities

KERNER INCINERATOR
FOR NEW AND EXISTING BUILDINGS
See our catalog in Sweet’s or write for A. I. A. folder.
The unofficial palace of New York, as the old Waldorf-Astoria was called, is gone. On its site has been erected the 85-story Empire State Building, the world's highest structure.

A new and greater Waldorf-Astoria, on Park Avenue between 49th and 50th Streets, will open its doors in October, 1931. The superb architectural beauty of this veritable palace, and the rare distinction of its interior decorations will suitably continue a great tradition.

Carnegie Beams were used in the construction of both the Waldorf-Astoria and the Empire State Building.
The presence of a Chemical Laboratory, whether it be in a high school (of which we picture a notable and recently completed example), college or university, a hospital or an industrial building, that laboratory demands Duriron Acid Proof Drain-Pipe if corrosive wastes are to be isolated in a leak-proof drainage system. Not only must the pipe be acid-proof, but the joints must be permanently tight. Anything less than the rigid structure and joint tightness achieved by called Duriron Pipe is insufficient protection for a building you wish to be a monument to your thoroughness.

For details—see our pages in Swett’s.

The DURIRON COMPANY, INC.
446 North Findley Street
DAYTON, OHIO
Sales Office in 50 Principal Cities
DO YOU REALIZE the Importance of EXPANSION WINGS on Corner Bead?

By means of the expanded metal wings every square inch of plaster is reinforced and keyed right up to the bead. There are no smooth surfaces to which the plaster may or may not "stick". The result is a corner of unusual strength... one that will withstand more than average abuse without chipping or cracking.

Time and labor are saved, too. For there is no hunting for nail holes with Milcor Expansion Corner Bead. It can be wired, stapled or nailed to any kind of wall construction at lower cost.

For permanence... for beauty... and for lower costs... use Milcor Expansion Corner Bead. Millions of feet have been installed. Would you like a sample?

Save with Steel
WHAT THEY TEACH IN KANSAS CITY

In Kansas City they teach the young idea its Latin and Algebra and its typewriting and dramatics, under very favorable conditions. Incidentally, they are teaching some other highly useful things—teaching them to the taxpayers as well as to the school children. For instance, the economy of doing things well. The efficiency of favorable working conditions. The protection of property against depreciation. What could be more important?

They teach these things by building admirable modern schools. The Central Junior High School, shown above, is a practical, well-constructed building. It is self-protecting—being caulked against weather with Pecora Calking Compound, applied by the Higgin Mfg. Co. It is built for long-time economy.

* The Central Junior High School, Kansas City, Mo. (Chas. A. Smith, Architect) is caulked against wind, rain, dust, and cold with Pecora Calking Compound, applied by the Higgin Mfg. Co., Kansas City.

MODERN

Copper, and the highly effective use of its heat conducting qualities that is represented by Modine design, has set new standards of domestic heating.

Not only do Modine Concealed Copper Radiators meet every demand for concealed, out-of-the-way heating, but they set a higher standard of heating comfort and economy.

More than that, there is assurance of mechanical perfection that is guaranteed by nineteen years of copper fabricating experience. You can specify Modine with perfect confidence.

MODINE MANUFACTURING COMPANY
Manufacturers of Concealed Copper Radiators,
Unit Heaters and Automotive Radiators
1703 Racine Street, Racine, Wisconsin

MODINE COPPER RADIATORS

ARCHITECTURE PRESERVED

The beauty created by Architects and constructed by Engineers today, need not become the antique fragments of the future. For every destructive effect of water on building walls or foundations, TOCH BROTHERS offer the responsible and economical protection of their "R.I.W." products. For every problem of structural preservation, they offer the scientific resources of their laboratories and the recommendations of their experts.

The Authority of Accomplishment

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(ORGANIZED SINCE 1844)

Water-proofing and Damp-proofing Products,
Cement Compounds and Technical Paints
NEW YORK
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Refer to SWEET'S Architectural and Engineering Catalogue
Today
Mr. Coolidge on Russia.
American Building Ideas.
Farm Relief Attention.
Not Elephants, Microbes.

By ARTHUR BRISBANE

THE APPALLING EXTENT of Italy’s disaster is due to the fact that in building, even small dwellings, walls and floors are nearly all made of stone, roofs of heavy tile. Earthquakes causing even a slight disturbance, separating walls, allow heavy stone floors and tiled roofs to fall through, killing the inmates.

IT IS BELIEVED that Mussolini will order dwellings rebuilt of reinforced concrete. Ordinary steel framing is too expensive; lumber, scarce in Italy, is too perishable to suit Italians.

McClintic-Marshall, an American concern, erecting the great bridge across the Hudson River, has devised a method of steel construction, extremely light, little more expensive than wood. Mussolini should investigate that.

THIS WRITER recently erected a very large residence by the McClintic-Marshall method, most satisfactorily. Earthquake, lightning or gale could not affect it.

ARThUR BRISBANE drops a hint to builders

THE mention of Steel Framing in this editorial was no doubt prompted by Mr. Brisbane’s experience in building his own home, in which Mac-Mar Steel Framing was used.

The house built with Mac-Mar Steel Framing is fire-safe and lightning proof. It is protected against wind and weather. There will be no plaster cracks nor ill fitting doors or windows caused by warping, shrinking or settling of the frame.

Prices are quoted on Mac-Mar Steel Framing, with or without erection, from blueprints designed for any type of construction. And from these same blueprints the steel frame is detailed by us to fit the plans to the quarter of an inch.

Each part of a Mac-Mar Steel Frame is fabricated at the shop to fit in its place perfectly. Erection is quick and easy—no cutting or trimming, no welding or riveting on the job.

Mac-Mar Steel Framing provides modern homes—better homes, of increased value—by bringing to home building all the advantages of skyscraper construction at a cost comparable to that of ordinary construction with wood framing.

STEEL FRAME HOUSE CO.
Subsidiary of McClintic-Marshall Corporation
Oliver Building, Pittsburgh, Pa.
CUTLER TWIN MAIL CHUTE

FOR BUILDINGS where large quantities of mail originate, two or more mail chutes are provided, usually installed in pairs. By opening the chutes on alternate floors, danger of over-crowding is avoided, and in case of need one chute can be cleared, cleaned, or repaired, while the service is maintained by the other without interruption.

FULL DETAILS, specifications and information on request.

THE CUTLER MAIL CHUTE CO.
GENERAL OFFICES AND FACTORY
ROCHESTER, NEW YORK

AIR CIRCULATION

is the key to industrial heating efficiency

Dwyer Unit Heaters circulate large volumes of warm air throughout the working levels. Send for bulletins and see why Dwyer equipment is selected by experienced engineers.

C. A. DUNHAM CO.
UNIT HEATER DIVISION
Successors to the business of Dwyer Equipment Company
450 East Ohio Street  Chicago, Illinois

HEAT WITH UNIT HEATERS

The FITZGIBBONS LINE of STEEL HEATING & POWER BOILERS
for ALL FUELS and ALL HEATING SYSTEMS in Installations of EVERY SIZE


STEEL HEATING BOILERS—TABLE 2. For Intermediate Size Heating Plants, Riveted Longitudinal Scams. 15 lbs. W.S.P. types for All Fuels. 3800 to 25,000 sq. ft. Steam Ratings.

STEEL HEATING AND POWER BOILERS—TABLE 3. For heating large buildings of every description, including those having kitchen, laundry, process and similar high-pressure loads. All-Riveted construction. Types for All Fuels. Heating Boilers for 15 lbs. W.S.P. Power Boilers up to 150 lbs. W.S.P. 4200 to 36,000 sq. ft. Steam Ratings.

FITZGIBBONS BOILER CO., INC.
570 Seventh Ave., NEW YORK, N. Y.
Works: OSWEGO, N. Y.

Branches and Representatives in Principal Cities
FOFTENTIMES, you are required to select a sheet metal of moderate initial cost. Yet it must be a serviceable metal that will not require the frequent repairs and replacements so common to ordinary low-cost sheet metal.

With such a situation confronting you, Armco INGOT IRON solves the problem. Produced originally, twenty-two years ago, expressly to resist rust, this uniform pure iron still sets the standard for durable, inexpensive sheet metals. Behind it is the longest record of actual service of any low-cost, rust-resisting sheets and plates—a record that eliminates hazardous speculation and guesswork from your specifications.

Other advantages of Armco INGOT IRON are exceptional ductility, good welding qualities and, in the case of galvanized sheets, a heavy, tightly-adhering coat of highest grade zinc. If you are concerned with any specific application of sheet metal, an experienced Armco Engineer will gladly assist. Just write to the office nearest you.

Since 1910, Armco INGOT IRON window frames have protected the casements in the Fidelity & Casualty Building, New York City. Not a single repair nor replacement has been required during this period. Architects: McKim, Mead and White.

TUNE IN—The Famous Armco Concert Band broadcasts every Thursday night WLB—700 K. Cincinnati Nine to nine-thirty, E.S.T.

THE AMERICAN ROLLING MILL COMPANY

Executive Offices, Middletown, Ohio

Export: The ARMCO International Corporation

DISTRICT OFFICES: Chicago Cincinnati Cleveland
Detroit New York Philadelphia
Pittsburgh St. Louis San Francisco

"BE SURE IT'S MADE OF ARMCO INGOT IRON"
When you get
THIS COMPLAINT
"my radiators won't get hot"
install
AIRID AIR VALVES

This is the season of complaints for heating contractors. And most of them come from people who are not getting enough heat. In a great many cases the cause is very simple—cheap inefficient air valves. Replace them with Airids (either No. 500 for steam or No. 510 Vac-Airid for vacuum) and you put an end to complaints. Airid Air Valves can be depended on to let the radiator do its work efficiently.

In-Airid
The Invisible Air Valve
No. 1 for Steam  No. 2 for Vacuum

The only air valve—1. That must be installed by a steamfitter. 2. That is inside the section and beautifies the radiator. 3. That can not be stolen or tampered with. 4. That vents all the air from new type steam radiators.

American Radiator Company
Division of American Radiator & Standard Sanitary Corporation
40 West 40th Street, New York

ARCO Accessories Make Any Heating Plant Better

Like Getting
114 Cents on the Dollar!

Actual figures based on U.S. Government Standard Rating, show that on an average 1,000 ft. job, Pierce-Eastwood radiation will deliver from 119 to 140 feet more actual heating surface than any other make! This extra heating surface costs no more—it is a positive economy, an assurance of plus satisfaction that any client can appreciate.

Let a Pierce representative figure with you on your next heating specification and show exactly what this advantage means, in square feet or in dollars.

Pierce, Butler & Pierce MFG. CORP.
41 East 42nd Street New York Branches in Principal Cities
Manufacturers of Heating Equipment since 1839

Pierce-Eastwood Boilers & Radiators

The Name

BROWNELL

Boilers & Radiators

Is Never Appended to Half Way Achievements

It came as no surprise when the Brownell Automatic Stoker immediately set up a new standard of automatic firing performance. Paramount among its distinguishing characteristics are the use of heavier parts and greater precision in manufacture. In the words of competent judges, "there is a truly great stoker."

Heating Boilers and Automatic Stokers For Critical Clientele

When used to fire a Brownell Master heating boiler, the last word in heating efficiency and economy would seem to be reached.

The Brownell Company, Dayton, Ohio
Established in 1855 Representatives in Principal Cities

Brownell
The Balanced Heating Unit
The New **HAVEMEYER STEEL JOIST**

Combining fire safety with minimum weight and simplified installation, the New HAVEMEYER Steel Joist meets a need long-recognized in the construction of fireproof floors and roofs for all types of light-occupancy buildings. For Schools, Hospitals, Sanitariums, Churches, Apartment houses, Hotels, Residences, etc., the HAVEMEYER Steel Joist is ideal. Its use is recommended wherever the utmost in economy, fire-safety and speed of erection are imperative.

Write for new booklet "Havemeyer Steel Joist."

The new HAVEMEYER Steel Joist is made with a specially rolled “Twin-tee” steel section for top and bottom chords. The chords provide a flat bearing surface which adds materially to the lateral stiffness of the joist and simplifies the placing of lath for the finished floor or ceiling. Altogether the HAVEMEYER Steel Joist is a rigid electrically welded unit capable of the utmost strength proportionate to its weight.
WESTINGHOUSE-NATIONAL AIR COMPRESSORS

WHEN
Modern Buildings
NEED AIR » » »

IN MODERN buildings there is usually some need for compressed air—operation of elevator doors, cleaning purposes, stoker firing of steam boilers, operation of fuel oil pumps and general engine room use, deep well pumping, sewage ejection, drying of automobiles after washing and other garage uses, fire protection systems, and operation of small tools such as in dental offices—Westinghouse-National Air compressors are serving in hundreds of the world's finest buildings for many of the pneumatic uses mentioned. They embody distinctive features developed from three score years of experience; are constructed to manufacturing standards that place ultimate service above the all-too-often consideration of first cost, and have a reputation for high efficiency, dependable action, economical operation and long life.

WESTINGHOUSE TRACTION BRAKE CO.
INDUSTRIAL DIVISION
PITTSBURGH • • PENNSYLVANIA
"BUILDINGS Going Up
By Arc Welding" says a headline in my paper and they talk of a couple going up in the West and a couple in the East.

I'm beginning to wonder, Lad, how much there really is to this welding of buildings."

"Not nearly as much to it as in riveted construction, Pop.
Let me take that pencil and make a drawing for you comparing the design of a riveted beam seat and a welded one.
Both are designed for a load of 45,000 pounds.
The riveted seat requires 2 angle members and a filler plate, and to fabricate it you punch 4 pieces and drive 8 rivets.
The welded seat requires but one member ... a piece of a T shape.
You fuse this into the column with 18 lineal inches of \( \frac{3}{8} \)" fillet weld.
So there's not as much in the arc-welded seat by 2 members and by a lot of labor.

I got that from Lincoln's "Studies in Structural Arc Welding" which is a series of plates for architects, engineers and fabricators ... mailed without charge to those with welding work under way, as well as those 'way under-worked in welding.'"

THE LINCOLN ELECTRIC COMPANY
Department No. 4-12 Cleveland, Ohio
World's Largest Manufacturers of Arc Welding Equipment

Lincoln "Stable-Arc" welder, motor-driven portable truck type, for use where electric power is available.
In many buildings the wiring circuits are so numerous and intricate that they would be easier to follow if readily identified by colored wires. Therefore, Hazard Electrical Building Wire is supplied in ten standard, permanent and easily distinguished colors.

All Hazard Wire is uniformly small in diameter with tightly woven braids and a smooth, slick finish that makes handling easy. Copper conductors are full-size, accurately centered in real, elastic, long-lived rubber insulation.

Hazard Insulated Wire Works
Division of The Okonite Company
WORKS: WILKES-BARRE, PA.

Sales Offices
New York Chicago Philadelphia Pittsburgh St. Louis Boston
Atlanta Birmingham San Francisco Los Angeles Seattle Dallas

Send for a free copy of "Installations of Hazard Electrical Building Wire." It shows the ten colors available.
WITHIN the last few months Toncan Iron Pipe has been installed in the heating systems of a 732 room hotel, two department stores, a large parking garage, a number of specialty shops and a 46-story office building. All these are grouped under one roof to form Cincinnati’s outstanding building operation of nineteen-thirty—the famous Carew Tower.

 Paramount among the factors leading to the final selection of this unusual alloy of iron, copper and molybdenum to withstand the rigorous service encountered in the steam return lines throughout this building, was its remarkable resistance to corrosion.

 Dozens of buildings representing many millions of invested capital are similarly protected. It’s a thrifty thought—let Toncan Iron Pipe point the way to Permanence in your specifications.
Selected List of Manufacturers’ Publications

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

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge unless otherwise noted, by applying on your business stationery to The Architectural Forum, 521 Fifth Ave., New York, or the manufacturer direct, in which case kindly mention this publication.

ACOUSTICS

R. Guastavino Co., 40 Court Street, Boston.


Sound-Absorbing Treatment in Tanks and Offices. Brochure, 18 pp., 8 1/2 x 11 ins. Illustrated.


ASH HOISTS

Gillis & Goughegan, Inc., 544 West Broadway, New York.

G & G Telescopic Hoist catalog, 8 1/2 x 11 A. I. A. Standard Classification. Contains descriptions, method of selecting correct model to fit the building’s needs, scaled drawings showing space requirements and specifications.

ASH HOISTS—TELESCOPIC

Gillis & Goughegan, Inc., 544 West Broadway, New York.

G & G Telescopic Hoist catalog, 8 1/2 x 11 A. I. A. Standard Classification 360, contains complete descriptions, method of selecting correct model to fit the building’s needs, scaled drawings showing space requirements and specifications.

BRICK


General Catalog 16 pp., 8 1/2 x 11 ins. Illustrated.

Bradford Reds. Folder. 8 pp., 3 x 8 ins. Illustrated.

CABINET WORK

Henry Klein & Co., 25 Grand Street, Elmhurst, L. I. N. Y.

Drywood Period Moldings in Ornamented Wood. Brochure, 28 pp., 8 1/2 x 11 ins. Illustrated.

General Offices for the Banker and Broker. Folder. 4 pp., 8 1/2 x 11 ins. Illustrated.

Luxurious Office Partitions in Walnut, Mahogany and Quartered Oak. Folder. 4 pp., 8 1/2 x 11 ins. Illustrated.

CARPETS

Collins & Allman Corporation, 2 Madison Avenue, New York.

"Seemingly Seamless Carpets." Booklet, 8 pp., 8 1/2 x 11 ins. Illustrated.

CEMENT

Cement Company, The, Mankato, Minn.

A Remarkable Combination of Quality and Economy. Booklet, 4 pp., 8 1/2 x 11 ins. Illustrated.

Louisville Cement Co., 215 Guthrie St., Louisville, Ky.


Medusa Portland Cement Co., 1002 Engineers’ Building, Cleveland.


Medusa Portland Cement Co., 1002 Engineers’ Building, Cleveland.


Portland Cement Association, Chicago, Ill.

Concrete Masonry Construction. Booklet, 48 pp., 8 1/2 x 11 ins. Illustrated. Deals with various forms of construction.

Town and Country Houses of Concrete Masonry. Booklet, 20 pp., 8 1/2 x 11 ins. Illustrated.

Facts About Concrete Building Tile. Brochure, 16 pp., 8 1/2 x 11 ins. Illustrated.

The Key to Fireproof Homes. Booklet, 16 pp., 8 1/2 x 11 ins. Illustrated.

Design and Control of Concrete Mixers. Brochure, 32 pp., 8 1/2 x 11 ins. Illustrated.

Portland Cement Stucco. Booklet, 64 pp., 8 1/2 x 11 ins. Illustrated.

Concrete in Architecture. Bound Volume, 60 pp., 8 1/2 x 11 ins. Illustrated. An excellent work, giving views of exteriors and interiors.

CENTRAL CLEANING SYSTEMS

The Spencer Turbine Co., Hartford, Conn.

Modern Cleaning Methods for Hotels, Schools, Theatres and Industry.

CHURCH EQUIPMENT

John Van Range Co., Cincinnati.

Practical Planning for Church Food Service. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.

CLUB EQUIPMENT

John Van Range Co., Cincinnati.

Practical Planning for Club Food Service. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.

CONCRETE BUILDING MATERIALS

Concrete Steel Company, 2 Park Avenue, New York, N. Y.

Modern Concrete Reinforcement. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.

CONSTRUCTION, FIREPROOF


Standard Fire Proofing Bulletin 171. 8 1/2 x 11 ins. 32 pp. Illustrated.

A treatise on fireproof floor construction.

CONSTRUCTION, STONE AND TERRA COTTA

Coping and Fireproofing Joint Company, 100 North Wells St., Chicago, Ill.

Pressure Relieving Joint for Buildings of Stone, Terra Cotta or Marble. Booklet, 36 pp., 8 1/2 x 11 ins. Illustrated. Deals with preventing cracks, spalls and breaks.

DAMPROOFING


Complete Index of all Minwax Products. Folder, 6 pp., 8 1/2 x 11 ins. Illustrated. Complete description and detailed specifications.

Toch Brothers, New York, Chicago, Los Angeles.

Handbook of R. I. W. Protective Products. Booklet, 40 pp., 4 1/4 x 7 3/4 ins.

DOORS

David Lupton’s Sons Company, Philadelphia.

Lupton Commercial Steel Doors. Folder, 8 1/2 x 11 ins. Illustrated.

Lupton Steel Industrial Doors. Brochure, 8 pp., 8 1/2 x 11 ins. Illustrated. Details and specifications.

DOORS AND TRIM, METAL

The American Brass Company, Waterbury, Conn.

Anaconda Architectural Bronze Extruded Shapes. Brochure, 180 pp., 8 1/2 x 11 ins. Illustrated and describing more than 2,000 standard bronze shapes of cornices, jambs, sashes, moldings, etc.

William Bayley Co., 147 North Street, Springfield, Ohio.

Bayley Tubular Steel Doors. Brochure, 36 pp., 8 1/2 x 11 ins. Illustrated.

Kalman Steel Company, Chicago, Ill.

Finishing Door Overings, A. I. A. Flie holder with 20 loose-leaf sheets of details and specifications.

The Kaukoer Company, Niles, Michigan.

Detail sheet, 8 1/2 x 11 ins., with A. I. A. File No. featuring Heavy Welded Bronze Doors.


Fire-Doors and Hardware. Booklet, 8 1/2 x 11 ins., 64 pp. Illustrated. Describes entire line of tin-clad and segmented fire doors, complete with automatic closers, track hangers and all the latest equipment—all approved and labeled by Underwriters’ Laboratories.

Truscus Steel Company, Youngstown, Ohio.

Copper Alloy Steel Doors. Catalog 105. Booklet, 48 pp., 8 1/2 x 11 ins. Illustrated.

DOORS, SOUNDPROOF

Irving Hamilton, Evanston, Ill.

The Evanson Soundproof Door. Folder, 8 pp., 8 1/2 x 11 ins. Illustrated. Deals with a valuable type of door.

DRAINAGE FITTINGS


Josam Products. Booklet, 73 pp., 8 1/2 x 11 ins. Illustrated. A valuable line of accessories.

Josam-Marsh Grease, Plaster, Sediment and Hair Interceptors. Brochure, 7 pp., 8 1/2 x 11 ins. Illustrated.

Josam New Saw Tooth-Tooth Drain. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.

REQUEST FOR CATALOGS

To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to The Architectural Forum, 521 Fifth Avenue, New York.
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 167

DUMBWAITERS

Sedwick Machine Works, 151 West 15th St., New York, N. Y. Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 40 x 60 ins., 40 pp. Illustrated. Catalog and pamphlets, 8 x 11 ins. Illustrated. Valuable data on dumbwaiters.

ELECTRICAL EQUIPMENT


Electrical Equipment for Heating and Ventilating Systems. Booklet, 24 pp., 8½ x 11 ins. Illustrated. This is “Motor Application.”


Electric Appliances (Catalog 44-A). 32 pp., 8½ x 11 ins. Deals with accessories for home use.

ELEVATORS


Otal 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.

Esclator. Booklet, 8½ x 11 ins., 22 pp. Illustrated. Describes use of escalators in permanent stores, theaters and industrial buildings. Also includes elevators and dock elevators.


Sedwick Machine Works, 151 West 15th St., New York, N. Y. Catalog and descriptive pamphlets, 64 x 8½ ins., 70 pp. Illustrated. Descriptive pamphlet on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

REQUEST FOR CATALOGS

To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.

ELEVATORS—Continued

Catalog and pamphlets, 8½ x 11 ins. Illustrated. Data on different types of elevators.

ESCALATORS


FIREPROOFING


Concrete Steel Company, 2 Park Avenue, New York, N. Y. Economical Fireproof Floors for Suburban Buildings. Folder. 4 pp., 8½ x 11 ins. Illustrated.


FLOODLIGHTING


FLOOR HARDENERS (CHEMICAL)

Milwauk Company, 11 West 4th Street, New York, N. Y. Concrete Floor Treatments. Folder, 4 pp., 8½ x 11 ins. Illustrated.


FLOORS—STRUCTURAL


FLOORING


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.

Flooring Floors of Good Taste. Booklet, 6 x 9 ins., 48 pp. Illustrated in color. "Explain use of linoleum for offices, stores, etc., with a description of the many ways in color of suitable patterns, also specifications and instructions for laying.


These buildings in San Francisco's business section are served by Jennings Pumps:

1. Huntington Apartments
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5. Cliff Hotel
   - Jennings Vacuum Heating Pump
6. Medical-Dental Building
   - Duplex Jennings Vacuum Heating Pump
7. Metropolitan Life Building
   - Duplex Jennings Vacuum Heating Pump
8. Elks Club
   - Jennings Vacuum Heating Pump
9. 450 Sutter Street
   - Jennings Vacuum Heating Pump
10. Sir Francis Drake Hotel
    - Jennings House Service Pump
11. St. Francis Hotel
    - Jennings Vacuum Heating Pump
12. 500 Sansome Street
    - Jennings Vacuum Heating Pump
13. Financial Center Building
    - Jennings Vacuum Heating Pump
14. Federal Reserve Bank Bldg.
    - Jennings Vacuum Heating Pump
15. Commercial Union Building
    - Jennings Vacuum Heating Pump
16. Alexander Building
    - Jennings Vacuum Heating Pump
17. O'Connor & Moffat Store
    - Duplex Jennings Vacuum Heating Pump
18. Hunter Dulin Building
    - Jennings Vacuum Heating Pump
19. Standard Oil Building
    - Jennings Vacuum Heating Pump
20. Golden Gate Theatre
    - Duplex Jennings Vacuum Heating Pump
21. Shell Oil Building
    - Jennings House Service Pump
22. Bank of Italy
    - Jennings Vacuum Heating Pump
23. Crocker Building
    - Jennings Vacuum Heating Pump
24. Wells Fargo Union Trust
    - Duplex Jennings Vacuum Heating Pump
25. Crocker First National Bank
    - Jennings Vacuum Heating Pump
26. Loew Warfield Theatre
    - Duplex Jennings Vacuum Heating Pump
27. Pacific Gas & Electric Bldg.
    - Jennings Vacuum Heating Pump
28. Claus Spreckles Building
    - Jennings Vacuum Heating Pump
29. Bank of America
    - Jennings Vacuum Heating Pump
30. Western State Life Ins. Bldg.
    - Jennings Vacuum Heating Pump
31. Sharon Building
    - Jennings Vacuum Heating Pump
32. Walter N. Moore Building
    - Jennings Vacuum Heating Pump
33. Pacific Tel. & Telegraph Bldg.
    - Duplex Jennings Vacuum Heating Pump
34. Butler Bros., Building
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In more than thirty important buildings in San Francisco's business section, Jennings Vacuum Heating Pumps stand guard over return lines steam heating systems, assuring proper, efficient heating. San Francisco's architects, engineers and building owners know that they can rely on these sturdy pumps to give years of service with little attention. The Nash Engineering Co., 12 Wilson Rd., So. Norwalk, Conn.

Jennings Pumps
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 168

FLOORING—Continued

Concrete-Nairn, Inc., 65 Belgrove Drive, Kearney, N. J.

Facts you should know about Resilient Floors. A series of booklets for doors (41), schools, (42), hospitals, (43), offices, (44), stores, (45), libraries, (46), churches, (47) clubs and lodges, (48) apartments and hotels. Illustrated.


Sealey Trellis Tiles. Two booklets, 8 and 16 pp. Illustrated.


Manual of Goodyear Tiling Tile Installation Booklet, 71/2 x 101/2 ins. Illustrated.


Pardee Tiling. Bound Volume, 48 pp., 85/4 x 11 ins. Illustrated.


Structural Gypsum Corporation. Linden, N. J.


Structural Gypsum Corporation, Linden, N. J.


FURNITURE

American Seating Co., 14 E. Jackson Blvd., Chicago, Ill.

Furniture Catalog, Brochure, 8 pp., 85/4 x 11 ins. Illustrated. Describes a central all-on-one-floor heating plant with radiators for small residences, stores, and offices.


In-Airid, the Invisible Air Valve. Folder, 8 pp., 85/4 x 11 ins. Illustrated. Data on a valuable detail of heating equipment for using gas.

Bryant Heater & Mfg. Co., 17825 St. Clair Ave., Cleveland, Ohio.


Ideal Arcos Radiator Warmth. Brochure, 60 1/4 x 9 ins. Illustrated. Describes a central all-on-one-floor heating plant with radiators for small residences, stores, and offices.


D.C.G. Trap & Valve Co., 1 East 41st St., New York, N. Y.

Cryer Radiator Control Valve. Bulletin, 85/4 x 11 ins. 22 pp. Illustrated. Explains operation and advantages of this radiator control valve on two-pipe vapor, vacuum or gravity steam systems.

C. A. Dunham Company, 450 East Ohio St., Chicago, Ill.


Dunham Return Heating System. Bulletin 110, 8 x 11 ins. Illustrated. Covers the use of heating apparatus of this kind.


The Fulton Stelphon Company, Knoxville, Tenn.

Stelphon Temperature Regulators. Illustrated brochures, 85/4 x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments.

Stelphon Heating Specialties. Catalog No. 200, 192 pp., 31/4 x 6 ins. Important data on heating.

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To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.
Buildings have voices. Some are harsh voices that shout and scream. Voices that ceaselessly call, “Don’t think . . . hurry, hurry, hurry!” Voices that distract the men who work within their walls.

But here and there you find a quiet, friendly building that hardly whispers. It never, never repeats what is spoken within its walls. Even when people fairly swarm through the corridors you barely hear the building’s voice. And then it only says, “Hush . . . we must have no noise here.” For the architect planned more than beautiful lines. He gave his building the quiet that men seek in forest and field.

Armstrong’s Corkoustic — strong, resilient panels of cork — applied directly to walls and ceilings, absorbs sound. Echoes and reverberations and other air-borne sounds that abound in offices, schools, hospitals, auditoriums, are hushed.

Corkoustic has interesting decorative possibilities, too. Wherever the effect desired is one of dignity — directors’ rooms, for instance — we suggest the natural brown panels. The design is limited only by your ingenuity. Colors and unusual patterns, if desired, are quickly applied with cold-water paints and stencils.

Armstrong’s Corkoustic also functions as an efficient heat insulator. The pure cork prevents the transmission of heat through walls and ceilings. Comfortable temperatures are easier to maintain. Fuel bills are lower, too. For further facts about Corkoustic, send for the book, “Acoustical Correction.” If you have a special problem our engineers will be pleased to consult with you. Armstrong Cork and Insulation Company, 900 Concord St., Lancaster, Penna.
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 170

HEATING EQUIPMENT—Continued


S. T. Johnson Co., Oakland, Calif.


Gillis & Geoghegan, Inc. 535 West Broadway, New York.

Hoffman Specialty Company, Inc., 25 West 45th St., New York. N. Y.

Sarco Company, Inc., 183 Madison Ave., New York City, N. Y.

Kewanee Boiler Corporation, Kewanee, Ill.


Nash Engineering Company, South Norwalk, Conn.


National Radiator Corporation, Johnstown, Pa.


INDIVIDUALIZED WARMTH TO FIT EACH ROOM

"Made to Measure" HEAT

Sylphon Automatic Radiator Valves assure a better general heating for any building—because they prevent fluctuating room temperatures, one common cause of fuel waste. The Sylphon Automatic Radiator Valve is made to do just one job—and does it. Sensitive to the slightest temperature changes of the surrounding air—it steadily holds the warmth of any one room at exactly the degree most satisfactory to the occupants. Once its marked thermostatic head is set at "Hot," "Medium," or "Cold" there the temperature stays. Practically the entire thermometer range of comfort may be scaled for the individual warmth selection and once set all further radiator attention is avoided. Sylphon Automatic Radiator Valves positively eliminate uneven, injurious and wasteful heat for Factory, Office Building, Apartment or Home.

A COMPLETE RADIATOR CONTROLLING DEVICE

The Sylphon Automatic Radiator Valve is a combination packless valve and temperature control unit. Its motor element is the dependable Sylphon Bellows. It has no electrical or mechanical accessories to get out of order. Easily installed and inexpensive—architects and engineers specify it with full confidence in its lasting efficiency.

It is fully described (both types—angle and globe) in our illustrated printed matter which will be gladly sent. Write today for Bulletin XA-250.

FULTON SYLPHON CO.
KNOXVILLE, TENN., U.S.A.

No. 875 AUTOMATIC RADIATOR VALVE
SELECTED LIST OF MANUFACTURERS’ PUBLICATIONS—Continued from page 172

INSULATION—Continued
Novold Cork Covering for Cold Pipes, Coolers and Tanks. Folder 8½ x 11 ins. Illustrated.
Novold Cork Insulation. Folder 8½ x 11 ins. Illustrated.
Structural Gypsum Corporation, Linden, N. J.
Heat Insulation Value of Gypsteel. Folder, 4 pp., 8½ x 11 ins. Illustrated.

KITCHEN EQUIPMENT
To obtain any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.

JOISTS
Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Modern Concrete Reinforcement. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Standard Practice for Placing Havemeyer Reinforcement in Concrete. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Kalsman Steel Company, Chicago, Ill.
Fireplace Floor and Roof Construction. Booklet, 8 pp., 8½ x 11 ins. Joists, lath and accessories.

LABORATORY EQUIPMENT
Alberene Stone Co., 153 West 23rd Street, New York City.
Heat Insulation Value of Gypsteel. Folder, 4 pp., 8½ x 11 ins. Illustrated.
Bibliography. 32 pp., 8½ x 11 ins. Illustrated.
Cork Import Corporation, 345 West 40th Street, New York.
Insulation for Walls and Roofs of Buildings. Booklet, 66 pp., 9½ x 11¾ ins. Illustrates and describes lots, thin slab and similar materials, for strawboard.

LATH, METAL AND REINFORCING
Concrete Steel Company, Youngstown, Ohio.

LAUNDRY MACHINERY

LATH, METAL AND REINFORCING—Continued
Steeltex Data Sheet No. 2. Folder, 8 pp., 8½ x 11 ins. Illustrated.
Steeltex for floors on steel joints with flat top flanges.
Steeltex Data Sheet No. 3. Folder, 8 pp., 8½ x 11 ins. Illustrated.
Steeltex for folders on wood posts.
Truscon Steel Company, Youngstown, Ohio.

LIGHTING EQUIPMENT

MAIL CHUTES
Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet, 4 x 9½ ins., 8 pp. Illustrated.

MANTLES
Dry Cleaning Equipment for Institutional Purposes. Brochure, 50 pp., 8½ x 11 ins. Illustrated.
Functions of the Hotel and Hospital Laundry. Brochure, 8 pp., 8½ x 11 ins. Illustrated.

MARBLE
The Georgia Marble Company, Tate, Ga.; New York Office, 1328 Broadway.
Why Georgia Marble Is Better. Booklet, 34½ x 6 ins. Gives analyses, physical qualities, comparison of absorption with granite, opinions of authorities, etc.
Convincing proof. 3½ x 6 ins. 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.

REQUEST FOR CATALOGS
To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.
No. 75 of a series of advertisements featuring prominent laundry installations

St. Peter's Hospital, New Brunswick, N. J., has its own laundry—installed with the cooperation of The American Laundry Machinery Company.
Maginnis & Walsh, Boston, Mass., Architects.

"... and where does our laundry department go?"

YESTERDAY only the very large hotels and hospitals gave a thought to a laundry installation. Today even the smallest institution asks the architect for suggestions about the handling of its "laundry bag."
That is why more than three thousand architects have written for our file-size booklet that's brim full of modern laundry practise facts. That is why, in recent years, our engineers have been privileged to work with architects in the planning of more than one thousand laundries, of every type and size. And that is why, before you have gone far with your next institutional project, you will want to make use of the "American" collaboration that is yours for the asking.

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

For the small hospital or hotel . . . 4 Full Production Machines

The American Raytex Washer The American 17" Manex Extractor The American Drytex Tumbler The American Electric Steam Ironer
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 174

METALS

How to Use ARMCO Dredging Pipe. Booklet, 16 pp., 4 1/4 x 6 ins. Illustrated. Important data on a complete line of steam, gas and water works supplies.


Partitions—Continued

Plastic

Tudor Lumber and Veneer Co., Marshall, Minn. Roddis Doors, Catalog G. Booklet, 184 pp., 6 1/2 x 11 ins. Illustrated. Gives full data on all types of doors, including partitions of three different types.

Improved Office Partition Co., 23 Grand St., Elmhurst, L. I., N. Y. (See Henry Klein & Co.)


Structural Gypsum Corporation, Linden, N. J. Service Sheet No. 4. Specifications for Gypsteel Partition File. Folder, 8 1/2 x 11 ins. Illustrated.

Telesco Office Partition Co., 25 Grand St., Elmhurst, L. I., N. Y. (See Henry Klein & Co.)

PIPE


National Tube Co., Frick Building, Pittsburgh, Pa. "National" Bulletin No. 2. Corrosion of Hot Water Pipe, 8 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 material consists of seven investigations by authorities on this subject.

"National" Bulletin No. 3. The Protection of Pipe Against Internal Corrosion. 8 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. 5. "National" Pipe in Large Buildings. 8 1/2 x 11 ins., 48 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 1/2 x 11 ins., profusely illustrated with half-tone and line engravings of the important operations in the manufacture of the pipe.

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Theoretical problems are presented and solved. Calculations of the many factors to be considered, in design and installation, are given in detail. Tables and charts, essential to an accurate determination, are included in Carbondale's Air Conditioning Bulletin.

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Interior Walls Everlasting. Brochure, 20 pp., 8 1/2 x 11 ins. Illustrated. Describes origin of Keene's Cement and views of buildings in which it is used.

Structural Gypsum Corporation, Linden, N. J.

Plastering Suggestion Book. 32 pp., 8 1/2 x 11 ins. Illustrated. Describes designs and gives specifications for using Gypsum Plasters.

PLUMBING EQUIPMENT

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill.

Catalog, 94 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.


Duriron Company, Dayton, Ohio.

Duriron Acid, Alkalii and Rust-Proof Drain Pipe and Fittings. Catalog, 8 x 11 ins., 20 pp. Full details regarding a valuable form of piping.

Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.

Water Rooting Subs. Current Catalog. Water closets, Liquid Soap Fixtures, etc. 8 1/2 x 11 ins., 136 pp., loose-leaf catalog, showing rough-in measurements, etc.

Kohler Company, Kohler, Wis.

Catalog & 32 pp., 8 1/2 x 11 ins. Illustrated. Loose-leaf catalog showing line of plumbing fixtures and accessories.

New Beauty and Utility in Plumbing Fixtures. Brochure, 36 pp., 6 x 9 ins. Illustrated. Shows well-arranged bathrooms, kitchens, etc.

Speakman Company, Wilmington, Del.

K-2 No. 40. Booklet. 25 pp., 8 1/2 x 11 ins. Illustrated. Data on showrooms and equipment details.

PEANUT PIPE SYSTEMS


Catalog, 8 1/2 x 11 ins. Illustrated. Bulletins. 74 x 10 1/2 ins. Illustrated. Catalog of tube systems for retail stores and other buildings.

4 pp., 8 1/2 x 11 ins. Data Sheet showing schematic diagrams for hotel, bank, factory and wholesale buildings, table of sizes, space requirements and preliminary layout steps. A. I. A. 35821.

PUMPS

Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill.


Nash Engineering Company, South Norwalk, Conn.

Bulletin No. 25. Bulletin 603. 8 1/2 x 14 ins. Illustrated. Deerived to Jennings Standard Centrifugal Pumps for house service, boosting city water pressure to supply top stories, for circulating warm water, etc.


REFRIGERATION

The Fulton Syphon Company, Knoxville, Tenn.

Temperature Control of Refrigeration Systems. Booklet, 8 pp., 8 1/2 x 11 ins. Illustrated. Deals with cold storage, chilling of meats, etc.

REINFORCED CONCRETE—See also Construction, Concrete

Concrete Steel Company, 2 Park Avenue, New York, N. Y.

Modern Concrete Reinforcement. Booklet, 22 pp., 8 1/2 x 11 ins. Illustrated.

Kalman Steel Company, Chicago, Ill.

Building for Permanence. Booklet, 8 pp., 8 1/2 x 11 ins. Reinforced concrete splendidly illustrated.

Truscon Steel Company, Youngstown, Ohio.

Shaping Stresses in Reinforced Concrete Beams. Booklet, 8 1/2 x 11 ins., 12 pp.

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To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.
QUESTION:
What determines correct ventilation in the institutional laundry!

ANSWER:
Adequate ventilation of the institutional laundry should be insisted on for several reasons. It safeguards the health of employees. It enables them to work in comfort. The result is not only a vanishing labor turnover, but also an increase in the quantity and quality of work done.

To design and install an efficient ventilating system, experience and familiarity with such work are essential. Air volume, air temperature, relative humidity, air motion, air purity with regard to freedom from bacteria, odors, dust, toxic gases and other objectionable matter, and air distribution including general distribution, air movement and freedom from drafts are factors that must be accurately determined and properly balanced one against the other. On these factors good ventilation depends.

Distribution ducts, dampers, etc., are all matters subject to exacting design. Number of air changes per hour, quantity of heat and vapor given off from machines, type of exhaust used, and many other things influence the layout.

Hot humid air, gases and vapors should be completely exhausted through properly constructed hoods and ducts. Such exhausts are sometimes planned for each individual washer and ironer. Sometimes a group of machines or an entire room is exhausted as a unit. A slow movement of air in the working space is a necessity. Drafts are to be avoided. Not only are they objectionable from the standpoint of health but they often disturb work in the finishing department.

Rooms or spaces devoted to receiving, storing, sorting, toilets and other places giving off noxious smells should be exhausted independently. The exhaust system should be adequate for running during the day and also during the night, over week-ends and on holidays. In hospitals, this applies also to the sterilization room.

The whole subject of ventilation, of which the above is but the merest outline, is one on which Troy Engineering Service is in a position to render valuable assistance to the architect and institutional executive.
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 178

STEEL PRODUCTS FOR BUILDING

STEEL FRAME STANDARD GASOLINE SERVICE STATIONS. Booklet, 8 pp., 9 x 11 ins. Illustrated.

Steel Joists and Stanchions. Booklet, 72 pp., 8 1/2 x 11 ins.


Welding of Structural Steel. Brochure, 32 pp., 9 x 11 ins. Illustrated. Deals with an important structural process.

STONE, BUILDING

Indiana Limestone Company, Bedford, Ind.

Volume 1. Series B. Indiana Limestone Library. 8 1/2 x 11 ins., 36 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.

Volume 2. Series B. Indiana Limestone Library. 8 1/2 x 11 ins., 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.


Volume 4. Series B. Indiana Limestone. Portfolio. 11 x 8 1/2 ins. Illustrated. Describes and illustrates the use of stone for small houses with floor plans of each.

Volume 5. Series B. Indiana Limestone School and College Buildings. 8 1/2 x 11 ins., 80 pp. Illustrated.


Old Gothic Random Ashlar. 8 1/2 x 11 ins., 16 pp. Illustrated.

STOREFRONTS


Catalog No. 34. Series 202. Standard construction. Booklet, 16 pp., 9 x 11 ins. Illustrated, complete data on an important type of building.

Detail Sheets. Set of seven sheets, 8 1/2 x 11 ins., printed on tracing paper, giving full-sized details and suggestions for storefront designs.

Davis Solid Architectural Bronze Sash. Set of six sheets, 8 1/2 x 11 ins., printed on tracing paper. Full-sized details and suggestions for design of special bronze store front construction.

The Kawneer Company, Niles, Mich.

Catalog M, 1929 Edition, 64 pages, 8 1/2 x 11 ins., with the A.I.A. File No., profusely illustrated. General Catalog

Detail Sheet and descriptive folder, 8 1/2 x 11 ins., with A.I.A. File No., featuring "8" Store Front Construction, designed along modernistic lines.

National Terra Cotta Society, 230 Park Avenue, New York, N. Y.

Terra Cotta Store and Store Fronts. Booklet, 13 pp., 9 x 11 ins. Illustrated.

TELEPHONE SERVICE ARRANGEMENTS

All Bell Telephone Companies. Apply nearest Business Office, or American Telephone and Telegraph Company, 195 Broadway, New York.

Planning for Home Telephone Conveniences. Booklet, 52 pp., 8 1/2 x 11 inches. Illustrated.


TERRA COTTA

National Terra Cotta Society, 19 West 6th St., New York, N. Y.


TIMBERLE TILE VAULTS

R. Gueastavino Co., 40 Court Street, Boston.

Timber Arch Construction. Booklet, 8 pp., 8 1/2 x 11 ins.

TILE


Vincraft Tiles, Unglazed. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Details of patterns in full color. Ask for Form A-300.

Faience Tiles for Bathrooms. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Ask for Form A-301.


Flintcraft Files. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Machine-made floor or wall tile. Ask for Form A-303.


Hanley Quarry Tile. Folder. 4 pp., 8 1/2 x 8 ins. Illustrated.


Pardee Tiles. Bound volume, 48 pp., 8 1/2 x 11 ins. Illustrated.

TRUSSES

McKown Bros. Co., 521 South Keeler Avenue, Chicago.

Truth in Architecture. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Deals with use of trusses of wood.

Factory Built Bowling Trusses. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.

Timber Trusses. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.

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 Brothers, 80 White Street, New York.


VENETIAN BLINDS


Venetian Blinds, Booklet, 8 1/2 x 11 ins., 24 pp. Illustrated. Describes the "Burlington" Venetian blinds, method of operation, advantages of installation to obtain perfect control of light in the room.

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MEMBER OF OIL HEATING INSTITUTE
SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 180

VENTILATION
American Blower Co., Detroit, Mich.
American H. S. Fans, Brochure, 28 pp., 8 1/2 x 11 ins. Data on an important line of blowers.
Dunifon Company, Dayton, Ohio.
Acid-proof Exhaust Fans. Folder, 8 x 10 ins., 8 pp. Data regarding fans for ventilation of laboratory fume hoods.

WATERPROOFING
Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
Minwax Company, Inc., 11 West 42nd St., New York.
Waterproofing Stadia. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Transparent Waterproofings for All Masonry Walls and Surfaces. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.
Data Sheet on Membrane Waterproofing. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated.

Tech Brothers, New York, Chicago, Los Angeles.
Architect's Specification Data. Sheets in loose leaf binder, 8 1/2 x 11 ins., dealing with an important line of materials.

WEATHER STRIPS
Athey Company, 6035 West 66th St., Chicago, Ill.
The Only Weatherstrip with a Cloth to Metal Contact. Booklet, 16 pp., 8 1/2 x 11 ins. Illustrated. Data on an important type of weather stripping.

WALL GLASS
Pittsburgh Plate Glass Company, Grant Building, Pittsburgh, Pa.
Pennsylvania Window Glass With the New Flatter Surface. Booklet, 16 pp., 8 1/2 x 11 ins. Illustrated.

WINDWALLS
William Bayley Co., 147 North Street, Springfield, Ohio.

WINDOWS
Minwax Company, Inc., 11 West 42nd St., New York.

WINDOBS, CASEMENT—Continued
Lupton Creates a Complete Casement. Folder, 8 1/2 x 11 ins. Illustrated data on a casement providing for screens, shades and draperies.
Lupton Heavy Casements. Detail Sheet No. 101, 4 pp., 8 1/2 x 11 ins. Details and specifications only.
Casement Window Hardware. Booklet, 24 pp., 8 1/2 x 11 ins. Illustrated. Shows typical installations, detail drawings, construction details, blue-prints if desired. Describes AIR-way Muntind Window Hardware.
Architectural Details. Booklet, 8 1/2 x 11 ins., 16 pp. Tables of specifications and typical details of different types of construction.

List of Parts for Assembly. Booklet, 8 1/2 x 11 ins., 16 pp. Full lists of parts for different units.

WINDOW SCREENS
William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Pivotned Windows Screened. Booklet, 8 pp., 8 1/2 x 11 ins. Data on screening and window ventilation.

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Screen Casements. Brochure, 16 pp., 8 1/2 x 11 ins. Illustrated.

WINDOWS, STEEL AND BRONZE
William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Steel Window Inserts. Brochure, 16 pp., 8 1/2 x 11 ins. Illustrated. Suggestions on correct use of inserts.

A Rain-shed and Ventilator of Glass and Steel. Pamphlet, 4 pp., 8 1/2 x 11 ins. Deals with Pond Continuous Sash. Sawtooth Roofs, etc.


Truscon Steel Company, Youngstown, Ohio.
Draffing Room Standards. Book, 6 1/2 x 11 ins., 130 pages of mechanical drawings showing drafting room standards, specifications and construction details of Truscon Steel Windows, Steel Lintels, Steel Doors and Mechanical Operators.


Continuous Steel Windows and Mechanical Operators. Catalog 128. Booklet, 32 pp., 8 1/2 x 11 ins. Illustrated.

WOOD—See also Millwork
American Walnut. Booklet 7 x 9 ins., 46 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 Doors, Sinks, comparative tests of physical properties and the advantages of American Walnut for woodwork.

Wood Conversion Company, Clouett, Miss.

True Insulation for Your Present House. Brochure, 12 pp., 5 x 7 ins. Illustrated.


House Comfort that Pays for Itself. Brochure, 32 pp., 8 1/2 x 7 1/4 ins. Illustrated.

WOOD FINISH
Minwax Company, Inc., 11 West 42nd St., New York.
Color card and specification for Minwax Flat Finish. Folder, 4 pp., 8 1/2 x 11 ins. Illustrated. Deals with a penetrative, preservative stain finish giving stain and soft varnish effect.

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If the United States Army could be said to worship a fetish in the selection of its equipment, it is that of reliability. Guns, motors, planes, communication devices, must be able to "stand the gaff"—must not fail even under the most difficult conditions. Materials which are purchased and used for training and pre-war activities must measure up to the same standards of dependability that they must meet during actual war times.

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1. Double air locks (vacuum check and vacuum diaphragm).
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Because the two new Hardinge Domestic Fuel Oil Burners have flexible drives instead of rigid steel shafts, they are practically soundless. Because these two new models are much more compact, they fit inside the boiler or furnace, under the grate line, leaving nothing outside to stumble over or waste floor space. They’re out of hearing, out of sight, and truly out of mind; here are domestic oil burners built as an architect would have them. Your home building clients, surely, will appreciate your suggestion to inspect these new domestic labor-savers. ... For your own daily usage, we have some handy oil burner working data, sent on request. Hardinge Brothers, Inc., 4149 Ravenswood Avenue, Chicago, Illinois.

HARDINGE

FUEL OIL BURNERS FOR BUNGALOW TO SKYSCRAPER

The new Hardinge Domestic Fuel Oil Burners are silenced to the last degree, and hidden under the grate line.
Flexwood, a new wood product just announced by the Flexwood Company of Chicago, permits paneling of wall surfaces in the master cabinets in the form of aluminum. Its cost is from one-third to one-half of the cost of plywood paneling. It is one of the year's significant contributions to the building industry. Wood paneling in cabinet woods for wall surfaces, until recently associated only with the most expensive offices and lavishly finished homes, has now been made available at a cost which opens an entirely new field of possibilities in the treatment of offices, apartment, and house wall interiors. Flexwood is a real wood, which is made as pliable across the grain as a piece of leather by a new process. Its cost is from one-third to one-half lower than plywood paneling, and it can be applied to any interior wall construction. It is immune from the effects of moisture and does not warp or crack, even the most carefully thought out plans have a way of failing most lamentably when put into actual practice. To bring the benefits of this service to the attention of architects and others interested, the Company has issued recently a number of booklets on the subject—"Practical Planning for Hospital Food Service," "Practical Planning for School Food Service," "Practical Planning for Club Food Service"; "Practical Planning for School Food Service"; and "Practical Planning for Church Food Service." The latest addition to the series is entitled, "Practical Planning for Hospital Food Service." Like the brochures already issued, it reviews in carefully considered text the entire subject involved. Then it presents plans and illustrations of hospitals large and small and of every imaginable character in which the firm's equipment has been installed after study by the firm's specialists in preparing and serving food. As has already been suggested, the matter is rather beyond the scope of an architect unless his practice involves planning hospitals and nothing else, and the data and help which the John Van Range Co. places at the service of architects in this volume put the profession under renewed obligations to the Company. Like the other booklets, this brochure is important.

One particularly interesting detail of modern building is the rapidly increasing use of aluminum. The colossal structure being built on the site of the former Waldorf-Astoria in New York makes lavish use of the metal in the form of spandrels, and it is said that a Boston building costing $20,000,000 is to be crowned with a dome of aluminum. Another striking use of this material is to be seen in Chicago, where the new building of the Board of Trade is capped by a stately cast of aluminum, the statue being 31 feet high and weighing more than three tons. Reliability and the possibility of using aluminum or buralumin structural in the upper stories of skyscrapers was discussed as a means of lightening the supported load throughout the structure. However, the recent progress in the architectural field of use of aluminum has been most noticeable in its employment for decorative purposes such as cornices, parapets, grilles, railings, decorative castings, etc. Aluminum possesses physical qualities that recommend its use to the architect and engineer in construction of buildings, particularly its lightness, facilitating handling and lessening the strain upon the workers while at the same time giving permanence in form and effect. This folder gives valuable data on the use of aluminum and suggestions on its use.

REVIEWS OF MANUFACTURERS' PUBLICATIONS


The latest addition to the series is entitled, "Practical Planning for Hospital Food Service." An invaluable booklet.


The company has issued lately a number of booklets on the subject—"Planning Restaurants that Make Money"; "Practical Planning for Club Food Service"; "Practical Planning for School Food Service"; and "Practical Planning for Church Food Service." The latest addition to the series is entitled, "Practical Planning for Hospital Food Service." Like the brochures already issued, it reviews in carefully considered text the entire subject involved. Then it presents plans and illustrations of hospitals large and small and of every imaginable character in which the firm's equipment has been installed after study by the firm's specialists in preparing and serving food. As has already been suggested, the matter is rather beyond the scope of an architect unless his practice involves planning hospitals and nothing else, and the data and help which the John Van Range Co. places at the service of architects in this volume put the profession under renewed obligations to the Company. Like the other booklets, this brochure is important.

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When you buy UNIVERSAL heating and ventilating Units...

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UNIVERSAL UNITS provide a highly efficient, economical and dependable method of supplying classrooms with regularly-changed, clean and wholesome, heated air. They represent a sound investment not only in heating and ventilating equipment, but also in comfort and health.

Universal Units deliver a vertical discharge of air heated at just the required temperature, constantly and quietly. There is no overheating, no underheating; no drafts or stuffiness. Universal Units have been designed and constructed to meet every heating and ventilating requirement and to give years of reliable service.

Universal Units can be applied with complete satisfaction in the large school and the small; in the new and the old. They are being installed in increasing numbers in many of the nation’s leading schools. They are recommended by prominent architects throughout the country.

The American Blower Branch Office near you will be glad to give you complete information. Ask for the list of prominent installations, or catalog and engineer’s data book. There is no obligation.

AMERICAN BLOWER CORPORATION, DETROIT, MICH.
CANADIAN SIROCCO CO., LIMITED, WINDSOR, ONTARIO
BRANCH OFFICES IN ALL PRINCIPAL CITIES
Many merchants and even some architects and builders are of the opinion that the modern shop fronts of metal and glass which are now being used almost everywhere are troublesome to design and costly to build. They can be both, of course, when their details must be drawn by skilled designers and their designs carried out in expensive materials, but there is a way out of the difficulty by using the metal parts or units carried in stock by a number of manufacturers, from which there may be built up a shop front of any size or shape. This booklet deals with the units or sections supplied by the Newman Manufacturing Co., with its headquarters in Cincinnati and branches in Chicago and New York. The brochure is laid out upon an excellent plan; a page will illustrate a shop facade, and the same page will show the various members or parts which entered into its building. The designing has been done with excellent taste, and illustrations are given of shop fronts in many different cities built of this company's materials. Some of the designs seem to be calculated to please those who favor the "modernistic," while others are likely to be preferred by those of more conservative tastes as more appropriate for their use.


Many of the uses which are made of electric lighting would be impossible were it not for the time switch. Countless shops have their show windows lighted during the evening hours, the time switch turning the light on and off at the determined times. Electric signs are lighted up and the light extinguished at the hours at which the switch is set, and many of the public buildings and business structures which are illuminated at night are equipped with switches which turn the electricity on and off without the attention of attendants. This brochure deals with the Sauter Electric Time Switch as applied to all the purposes just mentioned, while in regard to clocks the switch not only illuminates their dials but attends to their winding. "The self-winding time switches eliminate the human element to the extent of doing away with manual winding and weekly setting. These switches may safely be left alone for two and three months on end. If they are used to control illumination on a full-night or on a half-night lighting schedule, the clocks are equipped with the appropriate type of Sauter astronomical dial, the operations of the time switch then automatically follow the changes in schedule. If operations are to be omitted on Sundays, or if the hours over the weekend are to be different, a special additional 7-day program dial is available.

THE TYLER COMPANY, Cleveland, "Store Fronts, Show Window Backs, and Backgrounds."

Modern methods of merchandising involve more than a little of what might be called "psychology applied to business." A modern and wholly up-to-date shop has (or should have) a definite and distinct "personality," based to some extent upon its type, to some extent upon its business methods, and to a considerable extent upon the character of the clientele to which its appeal is directed. Quite lately it was thought necessary to entirely remodel a most elaborate business structure in New York because it was found that notwithstanding its great cost the setting was not adapted to the type of business to be conducted therein. Naturally, the shop's first appeal to the public is based upon its external appearance,—its facade, its entrances, and particularly upon its show windows, which might be said to follow up the shop's initial appeal and bring the observer into the store. All this forms the subject matter of a booklet issued by a firm which has made an exhaustive and successful study of how to make shops attractive and consequently profitable. The brochure deals with shop fronts, entrances and especially upon show windows with their permanent or temporary backgrounds, as well as with other matters related thereto. The booklet is of especial value to shop owners and to architects who are designing business structures.

Schaubler & Lounsbery are occupying offices temporarily at 1401 Twentieth Street, Washington.

Lawrence Hampton Hall is occupying new offices in the Dayton Industries Building, Dayton, O.

Charles L. Hofmann announces the opening of new offices at 222 North Eighth Street, Richmond, Va. He desires the catalogs and other publications of manufacturers.

Harold Holmes Owen, lately of the firm of Owen & Osberg, has opened an office under his own name at 3 North State Street, Concord, N. H. The publications of manufacturers will be appreciated.

Harry W. Bogner, formerly a member of the firm of Judell & Bogner, announces the opening of his own office at 759 North Milwaukee Street, Milwaukee. He desires the publications and the samples issued by manufacturers.

ARMSTRONG CORK & INSULATION COMPANY, Lancaster, Pa., "Armstrong's Corkoustic."

The wide use which architects and builders are making of acoustical materials often brings up problems which, while interesting, are sometimes difficult to solve. Some such materials while possessing undoubted merit in the way of absorbing sound are wholly without architectural or decorative qualities, and any attempt to render them more pleasing is likely to impair if not quite spoil the very qualities which brought about their use in the first place. This folder deals with the use of "Corkoustic," a material supplied by the Armstrong Cork & Insulation Company for securing proper acoustical qualities in interiors where such qualities do not already exist. Corkoustic is described as a material possessing naturally a rich brown color which is often acceptable for interior walls and ceilings, but if the decorative treatment calls for figure and color it is easy to secure both without impairing Corkoustic's sound-absorbing value, by spraying cold water paint over the surface; in fact the folder presents two patterns in color, made by the use of stains, the patterns possessing all the design value which could well be desired. The folder also gives all the data likely to be required for the specifying or installation of Corkoustic. The folder says that the firm publishes a booklet entitled "Acoustical Correction," which can be had for the asking.

THE CROMAR COMPANY, Williamsport, Pa., "Cromar Oak Floors."

Wearing qualities of a wood floor depend upon the excellence of the wood itself and the care with which the wood is laid and finished. The finishing is usually done after the wood strips are laid in place, and the process in addition to being costly if properly done is likely to last for several days or at times even weeks. The Cromar Company supplies flooring strips of an excellent quality of oak, properly cut, cured by the most approved methods, and then milled, tumbled, varnished, and even treated to resist moisture, and this before the strips leave the Cromar factory, so that they need only to be nailed down when they reach the building where they are to be used. "The timber from which Cromar strips are cut is Appalachian white oak,—whose fiber and grain make it the finest in the world for flooring purposes. At the Cromar plant the carefully selected oak boards are cured in the yard and dry kiln, and milled into smooth-surfaced flooring strips. And then, going from one department to another, these beautifully grained strips become 'Cromar Factory Finished Oak Flooring,' the pride not only of the makers but of thousands of home owners in every part of the land." This brochure supplies architects with all the data required for the intelligent ordering and laying of these flooring materials, and it gives directions for their proper upkeep or maintenance.
SERVICE THAT IS WITHIN 24 HOURS OF WHERE YOU ARE

Johnson Service Company maintains thirty branches on the North American continent: one in each of the twenty-five largest and geographically best situated cities in United States, and five likewise in Canada.

Each branch is Johnson Service Company; not an agency, dealer or contractor, but thoroughly Johnson.

Whatever the requirement, wherever the job is located, Johnson "Service", with direct attention by Johnson Company personnel, is available within twenty-four hours time.

In addition to this immediate service attention, each installation receives Johnson inspection annually.

This indicates the continued interest given by this company in the service of its system and apparatus.

JOHNSON SERVICE COMPANY

149 EAST MICHIGAN

MILWAUKEE, WISCONSIN

Union Gas & Electric Company Building, Cincinnati, Ohio

Architects:
Garber & Woodward ............... Cincinnati
John Russell Pope ................. New York City
Fosdick & Hilmer ................. Consulting Engineers

200 Johnson Dual Thermostats control 512 radiator valves in Union Gas & Electric Company Building: maintaining normal temperature during the day, automatically lowering the temperature for the night, and automatically returning the temperature to normal again each morning. In addition, this installation includes Johnson system fan control and Johnson cut-off fresh air and vent dampers on the building's ventilating system.

JOHNSON HEAT AND HUMIDITY CONTROL
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