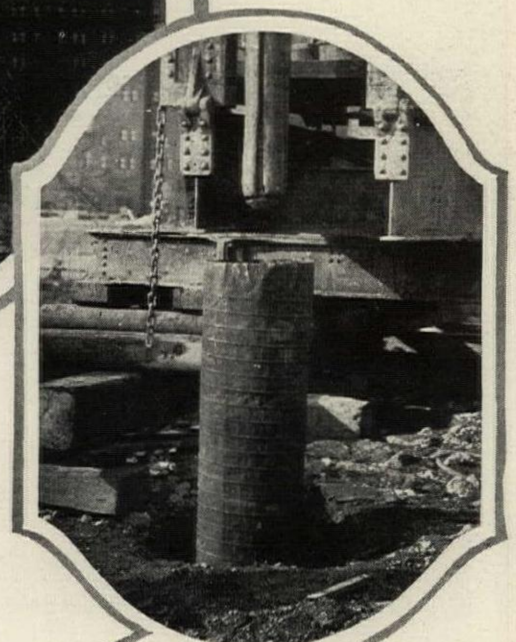
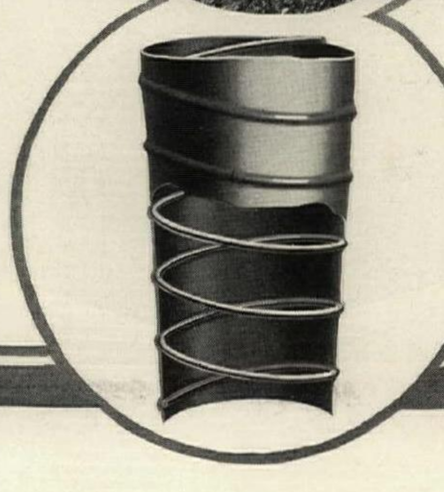
THE ARCHITECTURAL FORUM

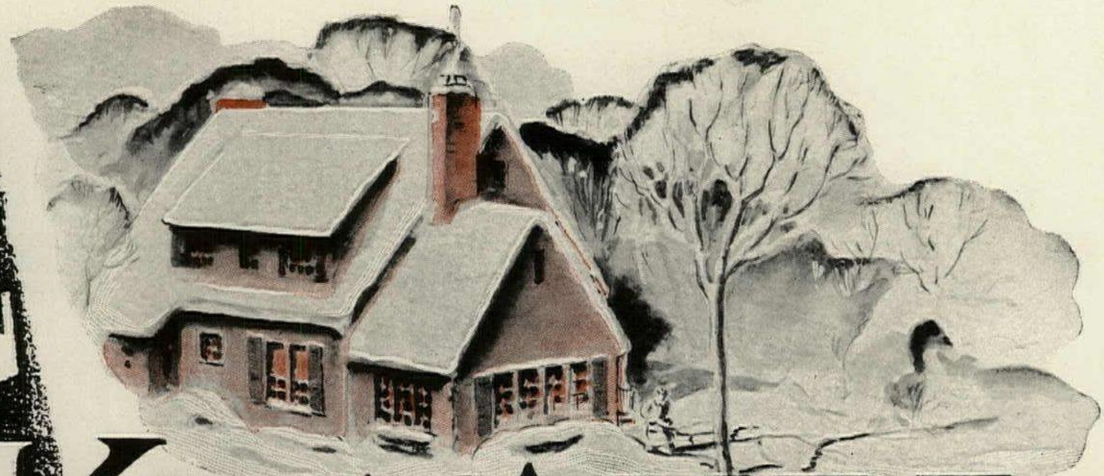
ARCHITECTURAL ENGINEERING & BUSINESS

IN TWO PARTS PART TWO

JANUARY 1930

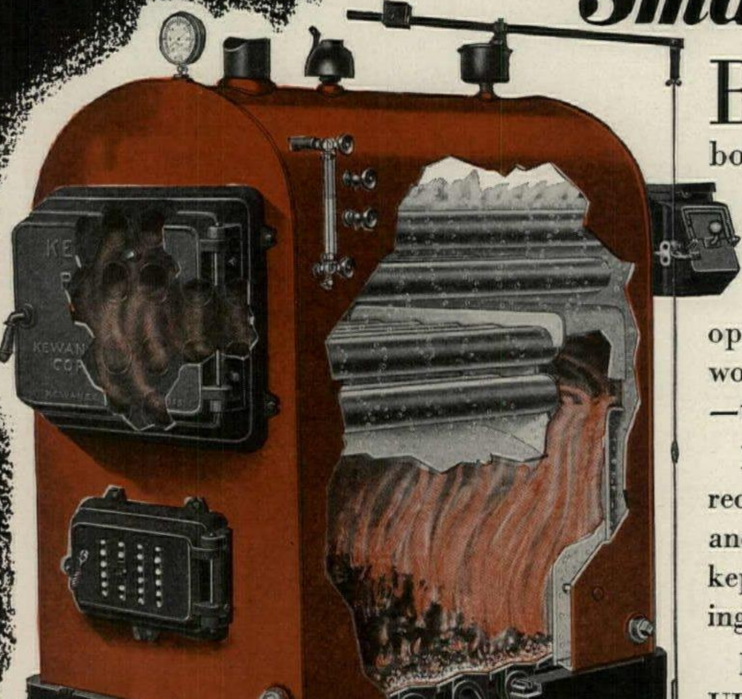






A NEW KEWANEE STEEL BOILER

for Homes and Smaller Buildings



BORN of more than 60 years experience in boiler building, here is a boiler especially designed, engineered and built to meet the demand for a *better residence heating boiler.*

Actually—it is a climax in the development of steel boilers—a product well worthy to take its place in the Kewanee line—the most complete in the world.

In Type "R" will be found all that correctness of design; sturdiness of materials; and skilled care in manufacturing which has kept Kewanee foremost among steel heating boilers.

Even to the smallest details it is built UP to the rigid Kewanee requirements—a **boiler that can be relied upon to give many extra years of service—not a boiler built DOWN to a price.**

NOW—there's a Kewanee Steel Boiler

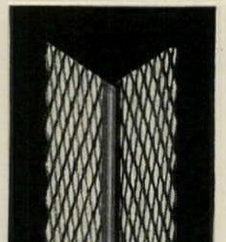
walls that retain their *Original Beauty*

The general use of *Milcor* metal building products in fine homes . . clubs and other buildings of architectural merit has been an inevitable development. In no other way can the original beauty of walls and ceilings be permanently preserved . . . . Stay-Rib Metal Lath . . *Milcor's* outstanding contribution to better building . . is a definite advance in the design of expanded metal plaster bases. Reinforced, as it is, with longitudinal ribs of exclusive *Milcor* design, it is unusually strong. A special reannealing process contributes towards permanence. It has a mesh design that firmly imbeds the plaster with slight pressure and provides an entirely adequate key without waste.

Milcor Expansion Corner Bead is similarly an outstanding development. Its patented wings of expanded metal grip the plaster tightly, right up to the head and distribute shocks and blows over the entire wing. In this way *Milcor* Expansion Corner Bead permanently preserves and protects the sharp, true corners and graceful, accurate curves which it creates. When used over Stay-Rib Metal Lath, the plaster keys through the wing of the bead and the mesh of the lath giving additional strength at these vulnerable points.

MILWAUKEE CORRUGATING CO.
1405 Burnham Street Milwaukee, Wisconsin

DINING ROOM
MILWAUKEE COUNTRY CLUB.
Architects:
FITZHUGH SCOTT, Milwaukee,
ROGER H. BULLARD,
New York City.



(A)

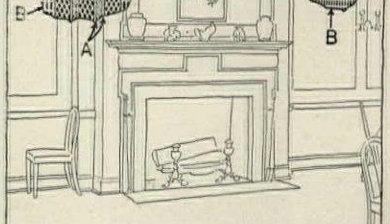
Milcor Expansion Corner Bead is also distinguished by its expanded metal wings. This feature — a Milcor patent — permits a perfect grip on the plaster and prevents chipping off due to unavoidable abuse.

Save with Steel

ARMCO Ingot Iron

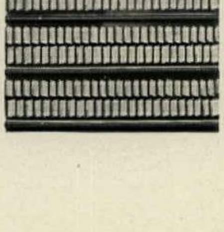
Copper Alloy Steel

Complete information covering the use of MILCOR metal building products is contained in the "MILCOR MANUAL". You should have a copy handy in your files.



(B)

Milcor Stay-Rib Metal Lath is reinforced by longitudinal ribs of unusual strength. It has the rigidity and mesh design of an ideal plaster base, providing maximum protection against plaster cracks.



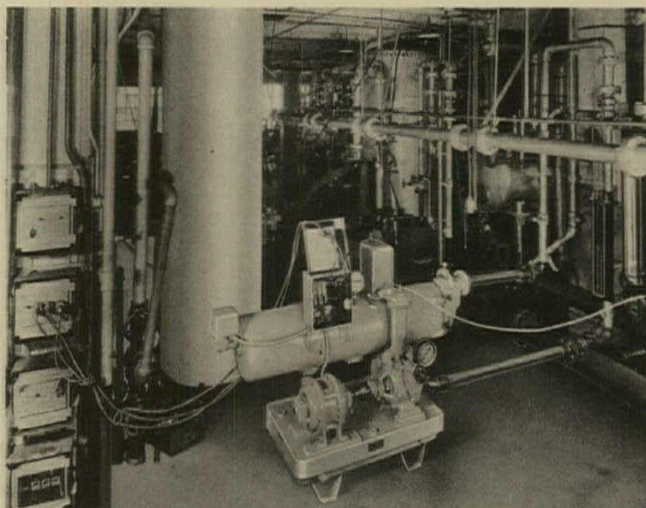
MILCOR PRODUCTS

Branches: Chicago, Ill., Kansas City, Mo., La Crosse, Wis.
Sales Offices: Boston, Mass., Detroit, Mich., Atlanta, Ga., Little Rock., Ark., Minneapolis, Minn., New York, N. Y., Los Angeles, Calif.
Eastern Plant: THE ELLER MANUFACTURING CO., *Canton, Ohio*

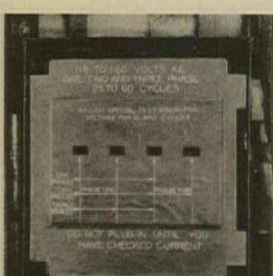
Stretching square foot pump ratings will not fill the bill

Combined Air and Water Capacity
determines the amount of radiation a heating pump can serve

ALTHOUGH it is usually possible to calculate within close limits the volume of condensation to be removed from a steam heating system, the quantity of air to be exhausted may vary greatly. The degree of tightness, the efficiency of radiator traps, the temperature of the condensate, the cooling effect of the return piping, the use of lifts, the relative quantity of fan surface installed, the vacuum to be maintained, the necessity of introducing high temperature water into return piping near the pump, and the use of long runs to the radiator, are certain to vary.



GENERAL VIEW OF NASH TEST PLANT



TYPE OF SWITCHBOARD PLUG-IN BOX IN NASH TEST PLANT WHICH FURNISHES ELECTRIC CURRENT OF ANY PHASE, VOLTAGE AND FREQUENCY

No wonder the volumes of condensation and air to be removed from two such systems having the same radiation surface may differ greatly!

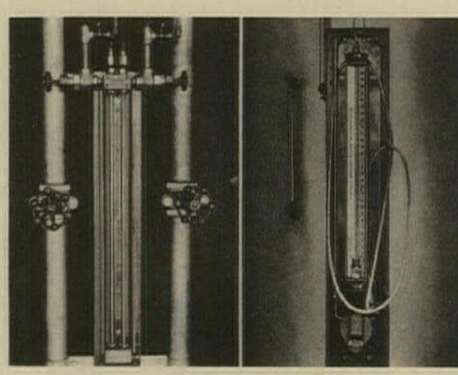
So, the determining factor in recommending the correct size of vacuum pump for a given heating system is the maximum quantity of air the pump will ever be called upon to remove from the system.

Nash Engineers have recognized these facts for years. They have always rated Jennings Return Line Vacuum Steam Heating Pumps on the basis of their combined water and air capacity.

CAPACITIES OF JENNINGS VACUUM HEATING PUMPS

Pump Size	Equivalent Direct Radiation Square Feet	Water Capacity G.P.M.	Air Capacity Cu. Ft. Per Min.	Orifice Diameter Inches	MOTOR HORSEPOWER 10 Lbs.	20 Lbs.	30 Lbs.	40 Lbs.
T	2,500	4	3	7/64	1/3	1/2	1	1½
U	5,000	9	3	7/64	1/3	1/2	1	1½
V	10,000	14	6	5/32	1	1	1½	2
B	16,000	22	9	3/16	1½	2	3	5
C	26,000	35	15	1/4	2	3	5	5
D	40,000	60	19	9/32	3	5	5	7½
E	65,000	90	34	3/8	5	5	7½	10
F	100,000	140	50	7/16	7½	10	15	15
*G	150,000	200	102	9/16 & 5/16	10	15	UPON REQUEST	
*H	300,000	400	171	2-7/16 & 1-9/16	UPON REQUEST			

* The last two sizes are not of the manifold type.



TYPES OF VENTURI METER AND VACUUM MANOMETER USED IN TESTING JENNINGS PUMPS

Jennings Pump Capacities Are Determined by Actual Tests

This combined capacity is definitely established before each pump is shipped from the factory. Exhaustive tests conducted in a completely equipped laboratory accurately determine the volume of water in g.p.m. that the pump can remove from the receiving tank under a prescribed vacuum and deliver against a specified discharge pressure. Simultaneously, a calibrated orifice checks the number of cu. ft. per min. of air that the pump can withdraw from the receiving tank and discharge into the atmosphere. A certified report of these tests is furnished to the customer on request.

STANDARD TEST ORIFICE

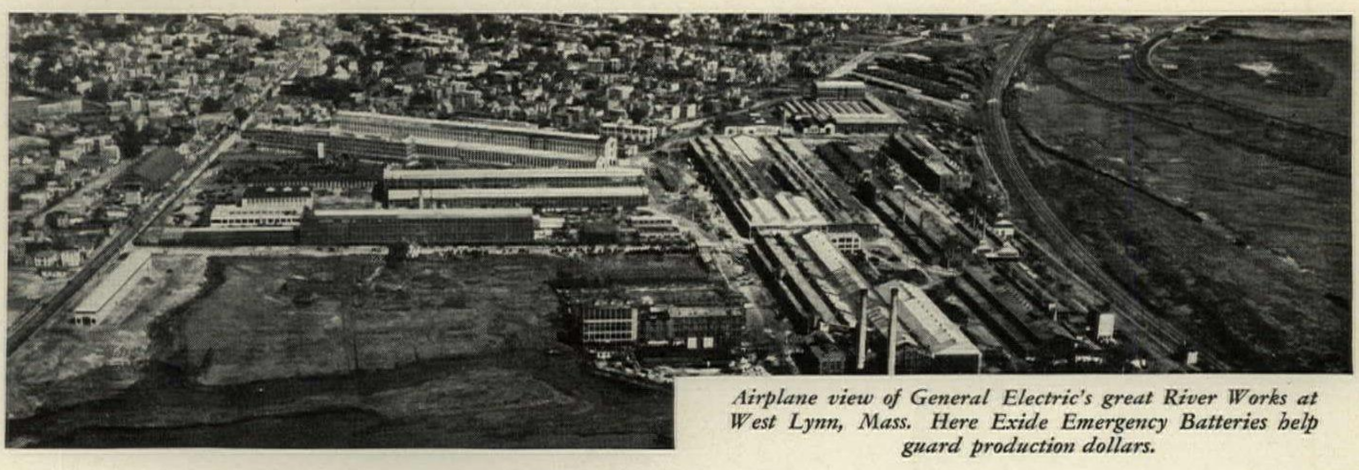
Ratings Are Reliable Under Varying Conditions

Jennings Vacuum Heating Pump ratings are reliable. They are based on actual performance. A Jennings Pump, with the capacity given in the table, can be depended on to serve *any* reasonably well installed system, for which it is recommended, for the life of the building.

CERTIFIED REPORT OF TEST

Jennings Pumps

NASH ENGINEERING CO.
SOUTH NORWALK, CONN., U. S. A.

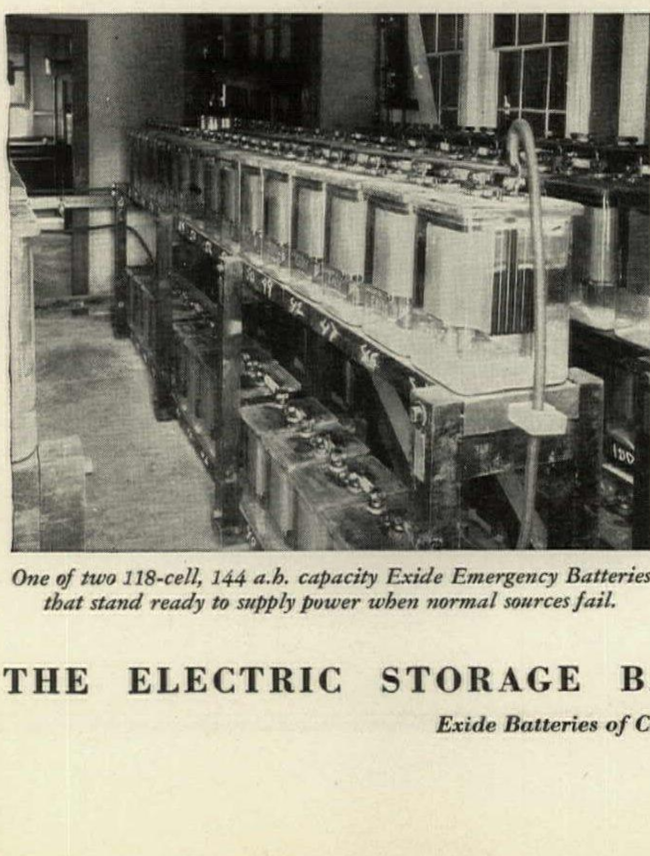


Airplane view of General Electric's great River Works at West Lynn, Mass. Here Exide Emergency Batteries help guard production dollars.

The well-planned plant guards against power failure

The General Electric Company forestalls breaks in production with Exide Emergency Batteries

THE complete modern plant has a source of emergency power. An example of this is the River Works of the General Electric Company at West Lynn, Mass. In the shop where great herringbone reduction gears are cut for turbo drives, a motor generator set which furnishes power is operated in conjunction with two great 118-cell Exide Emergency Batteries, which insures an uninterrupted flow of power at all times.



One of two 118-cell, 144 a.h. capacity Exide Emergency Batteries that stand ready to supply power when normal sources fail.

Skilled engineers have designed Exide Emergency Batteries to keep machines humming and lights burning when normal power sources fail. Load is switched *instantly and automatically* to the batteries by simple, electrical devices.

In silk mills, glass mills, steel mills, and other industries where uninterrupted power and lighting are necessary, architects are specifying Exides to guard production dollars. Exide Emergency Batteries, the product of forty-one years of experience in building batteries for every purpose, have a wide reputation for dependability and long life.

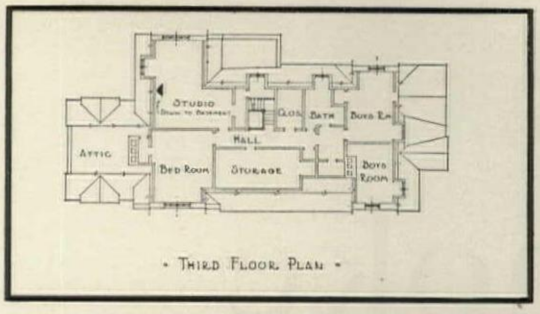
Let us send an expert to consult with you on your industrial jobs, and public and office buildings. A letter will bring him at your convenience and will entail no obligation.

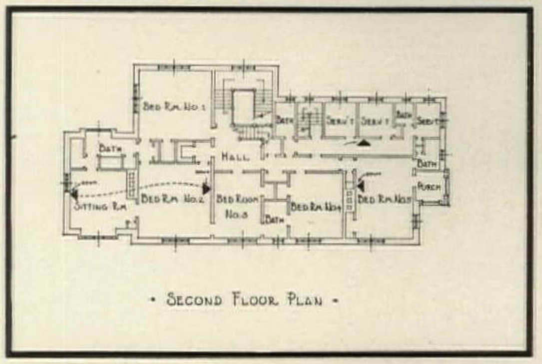
Exide
EMERGENCY BATTERIES

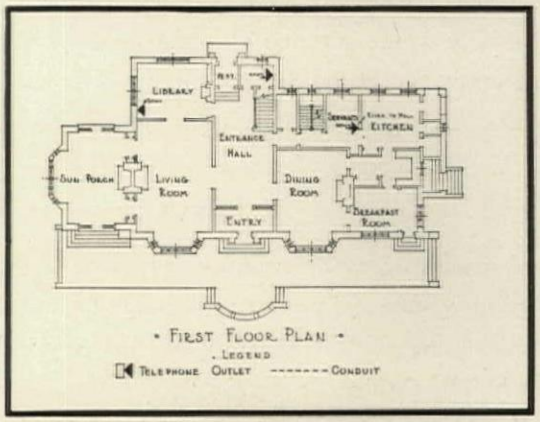
THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

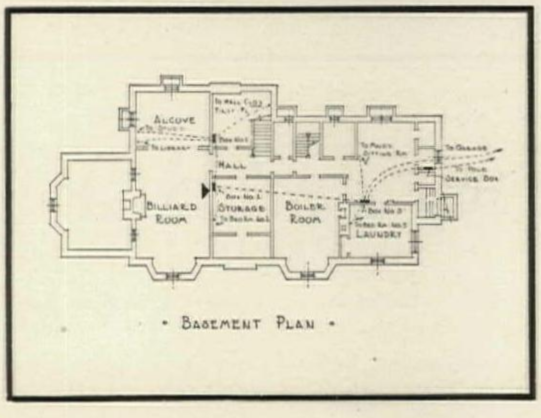
Exide Batteries of Canada, Limited, Toronto

New Beauty and Smartness— with Modern Telephone Convenience









In the residence of Mr. Philip N. Lawes, 56 Highland Avenue, Montclair, N. J., there are ten telephone outlets, including one in the garage and one in the basement. Conduit built into the walls and floors conceals the telephone wiring.
W. LESLIE WALKER, Architect, *New York City.*

A FEATURE of modern telephone convenience which is of particular interest to architects is that it adds to the *appearance* of a house, as well as providing greater convenience and comfort for the occupants. Telephones today are not only an indispensable means of communication, they have become a part of home decoration. Planning for the telephone arrangements in advance of construction makes it possible to utilize modern facilities to full advantage.

Conduits are placed within the walls to all points where telephone service may be desired immediately or in the future, avoiding the necessity of exposed wiring at any time. Underground service entrances conceal the wires coming from the outside. Attractive wall niches or cabinets for instruments and directories are constructed in some instances, especially where space is limited. Many other things contribute to utility and smartness.

It is desirable that architects consult freely with representatives of the telephone company in planning for telephone convenience in new or remodeled houses. No charge is made for this service. Just call the Business Office.

AMERICAN TELEPHONE & TELEGRAPH CO. BELL SYSTEM AND ASSOCIATED COMPANIES

The Smith Young Tower, San Antonio, Texas, in which Youngstown pipe is used for heating and cold water plumbing.

Architects—**ATLEE B. and ROBERT M. AYERS**

General Contractors—**McKENZIE CONSTRUCTION CO.**

Plumbing and Heating Contractors—**JUD & ORMOND**

YOUNGSTOWN PIPE

Cited for Endurance, by Architects from Coast to Coast

FABRICATED of the finest grade of steel to render a life-time of service, Youngstown pipe has earned the confidence of leading architects from coast to coast. Its specification for plumbing, heating, sprinkler and refrigeration systems in so many thousands of buildings is the reward of sheer merit—an architectural citation for "extraordinary service rendered."

Written into the specifications of any building, Youngstown pipe is the soundest insurance of pipe permanence—a fact which is proved beyond question by performance facts. Unquestionably, it pays to pipe with Youngstown—and it costs no more.

YOUNGSTOWN

GALVANIZED SHEETS PROTECT SAVE WITH STEEL

THE YOUNGSTOWN SHEET AND TUBE COMPANY

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

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NEW ORLEANS—Hibernia Bldg.
NEW YORK—30 Church St.
PHILADELPHIA—Franklin Trust Bldg.
PITTSBURGH—Oliver Bldg.
SAN FRANCISCO—55 New Montgomery St.
SEATTLE—Central Bldg.
ST. LOUIS—Shell Bldg., 13th and Locust Sts.
YOUNGSTOWN—Stambaugh Bldg.

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

MINWAX PRODUCTS · SEAL · PROTECT · BEAUTIFY

MINWAX

A dead line against dampness and disintegration *for the life of any building*

In any city or any town there is an immediate need for some Minwax Product. Below are listed the principal items that we manufacture. As a group they constitute a complete service covering all protective requirements. Each has been conceived, made and perfected to solve some problem of dampproofing or preserving wood or masonry. For detail information either refer to Sweet's Catalogue, or send us your name and address, and complete data will be sent you by return mail.

MEMBRANE WATERPROOFING . . . The original, elastic, cotton fabric system. It is built up on the job with moppings of MINWAX Waterproofing Asphalt and layers of MINWAX Saturated Fabric to form an elastic stretchable permanent waterproofing.

FOUNDATION DAMPPROOFING . . . MINWAX Fibrous Brush Coat, applied cold with a brush penetrates and deposits a tough film of MINWAX Asphalt re-inforced asbestos fibre. Simple, positive, lasting, economical.

CAULKING COMPOUNDS . . . In black or colors. For use around steel or wood windows. Will not harden or become brittle.

DAMPPROOFING (PLASTERBOND) . . . Developed from MINWAX Asphalts for use on exposed masonry walls under plaster to prevent staining, leakage, etc. Produced in three consistencies: Plain, for spray, Semi-mastic, for brush, Trowel Mastic, for trowel application.

TRANSPARENT WATERPROOFING . . . For preventing leakage, efflorescence and disintegration of masonry walls without changing their color or texture. Three distinct types:

Colorless Waterproofing, Clear Waterproofing, Heavy Clear Waterproofing.

BRICK AND CEMENT COATING . . . A preservative, waterproof coating developed from MINWAX Clear Waterproofing for use on all masonry buildings to waterproof and prevent leakage, decorate and preserve. White and in colors.

CONCRETE AND TERRAZZO FLOOR FINISH . . . Plain or colored. Protects, toughens and develops maximum efficiency of all masonry floors.

Also a full bodied floor enamel of unusual toughness.

WOOD FINISHES . . . MINWAX Flat Finish is a preservative, penetrative treatment forming a complete architectural finish for floors and trim. In stain and in colors. Produces a beautiful, soft, lustrous finish. Also penetrating finishes for Maple Floors.

WAXES . . . MINWAX Lustrcote (Paste and Liquid). Paste form recommended for producing high polish finish. Liquid form as a conditioner, cleaner and maintenance material. Designed to function with MINWAX Flat Finish, but useable on all surfaces.

MINWAX CO., Inc.

A complete service for waterproofing, dampproofing, and preservation of masonry and wood.

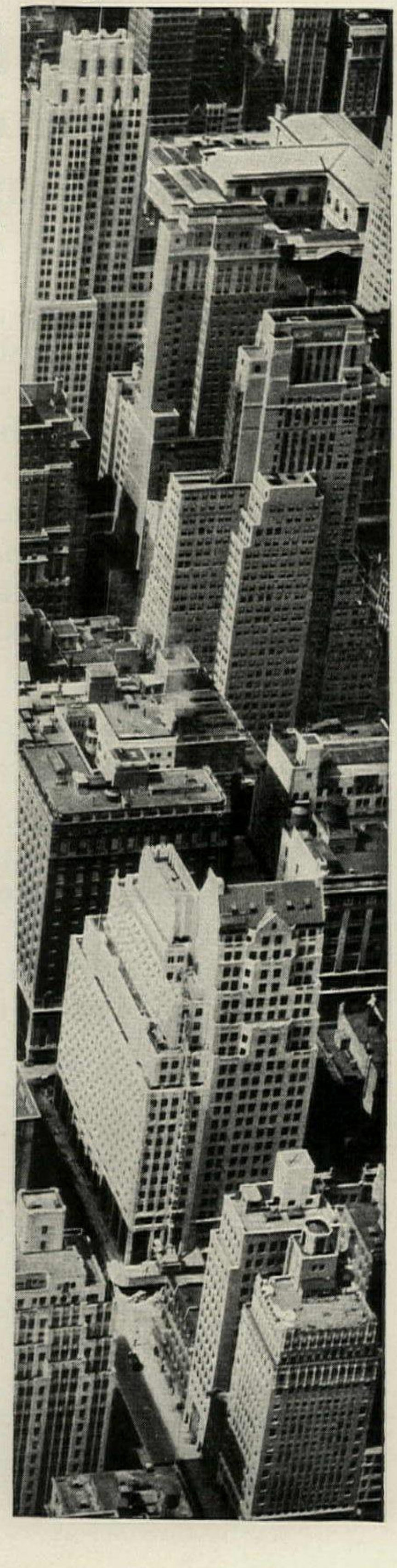
11 West 42nd Street, New York City

Branch: 232 East Erie St. Chicago, Ill.

Factory: Delawanna, New Jersey

For Representatives — Refer to telephone directory or see Sweet's

Canadian Representative: The Raines Company of Canada 1008 Anderson Street, Montreal, Que.



--with no premiums to pay

THE Westinghouse Nofuz panelboard is an insurance against the dangers of overfusing, with the resultant possible overloading of the wiring. It is also an insurance against the loss of valuable good-will because of wiring troubles due to inadequate protection.

And maintenance costs are the minimum.

In homes, large buildings, stores and industrial plants, the Nofuz panelboard insures positive protection to the wiring, and greater convenience in restoring service.

Note the features of this new panelboard. A circuit-breaker replaces both switch and fuse in the branch circuits. No adjustments are necessary after tripping, except to reset the breaker. The contacts cannot be held closed against an abnormal overload or short circuit because the automatic mechanism trips-free from the handle.

The breaker calibration cannot be altered or the breaker action blocked so as to remove its protective features.

The panelboard is very easily installed.

Complete information can be obtained from the nearest Westinghouse office and a panelboard specialist will be glad to show you a sample circuit-breaker.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
BROOKLYN WORKS BROOKLYN, N. Y.

SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES

Westinghouse

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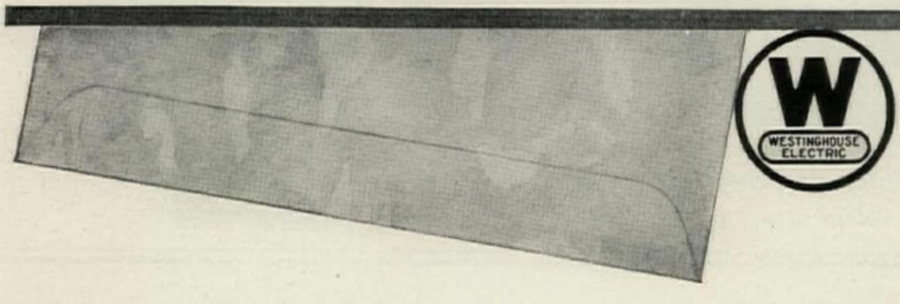
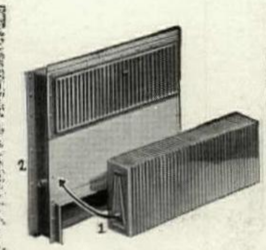




Radiator (1) comes installed in a steel case (2) more substantial than the wall itself. The complete unit is ready to install in any standard wall or partition. Note the installation at left, with radiator in the plastered wall under window.

HERMAN NELSON RADIATOR

Out of Sight and Out of the Way—
the radiators that heat this room

TOTALLY new effects in interior planning of homes, offices and monumental buildings are made possible—long-sought ideals of the architect are realized—by a heating method that discards the space-wasting radiator forever.

The Herman Nelson Invisible Radiator fits *inside* the wall or partition. Requires no floor space. Places no limits on color harmony or furniture arrangement. Yet it brings all the advantages of finest radiator heat.

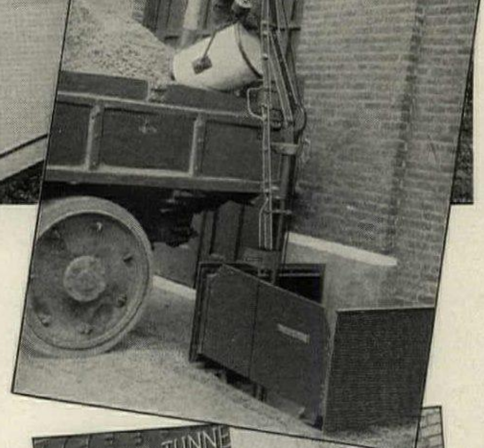
Once walled in the Herman Nelson Invisible Radiator never demands service; it is leak-proof, rust-proof, indestructible; even freezing does not harm it. Here, truly, is a new heating standard—from the standpoint of investment as well as comfort and sanitation.

Let us send you our book and complete data. The Herman Nelson Corporation, Moline, Illinois.

HERMAN NELSON
Invisible
RADIATOR

For Steam, Hot Water, Vapor or Vacuum Heating

ASH REMOVAL



SPECIFIED FOR USE

in Many of the Nation's Prominent Buildings

IT is significant that G&G Ash Removal Equipment has been selected for use in many of the most important buildings in the country. Architects have through the years shown a growing preference for G&G Equipment for all types of structures where ashes must be removed from cellar to grade. Here are a few of the better-known buildings served by G&G Ash Removal Equipment:

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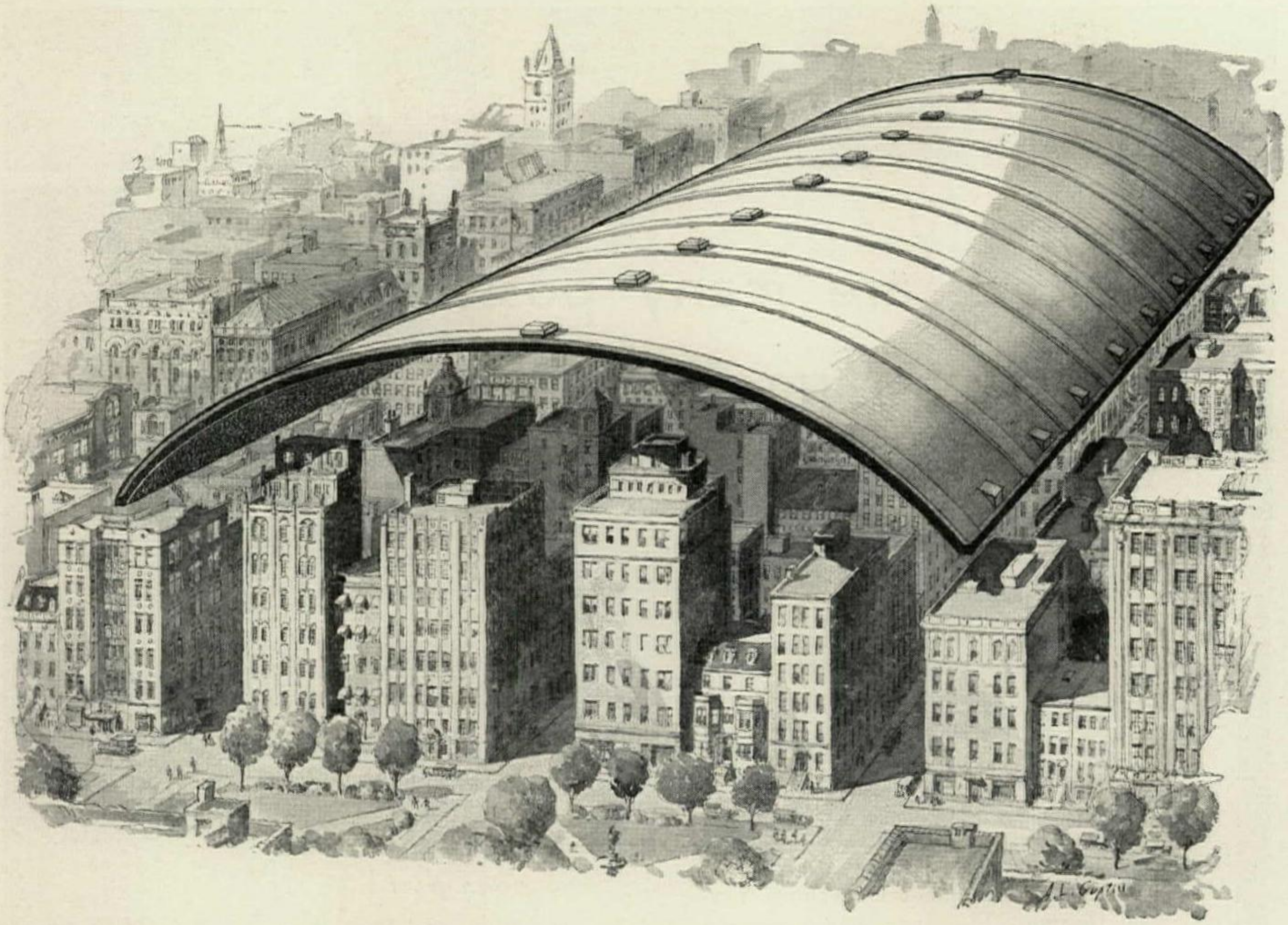
INDEPENDENCE HALL, PHILADELPHIA
U. S. CHAMBER OF COMMERCE, WASHINGTON, D. C.
AMERICAN ACADEMY OF ARTS & LETTERS, NEW YORK
HOLLAND TUNNEL BLDGS. (2 HOISTS), NEW YORK
CORCORAN ART GALLERY, WASHINGTON, D. C.
MUSEUM OF THE AMERICAN INDIAN, NEW YORK
COLUMBIA PRESBYTERIAN MEDICAL CENTER, NEW YORK
BIRTHPLACE OF THEODORE ROOSEVELT, NEW YORK

1,885 schools, 588 banks, 171 Bell Telephone Buildings, use G&G Ash Removal Equipment. The list of satisfied users covers almost every building classification. Electric and hand-power models to meet varying conditions, but all noted for their outstanding economy in operation, positive safety features and extra long life. Our Engineering Department will be glad to work with you on your next project.

Catalog in Sweet's Arch't. Cat., 24th Ed., pp. D5116-23
Catalog in Specification Data, 1929 Ed., pp. 226-7

GILLIS & GEOGHEGAN

544 West Broadway New York, N. Y.

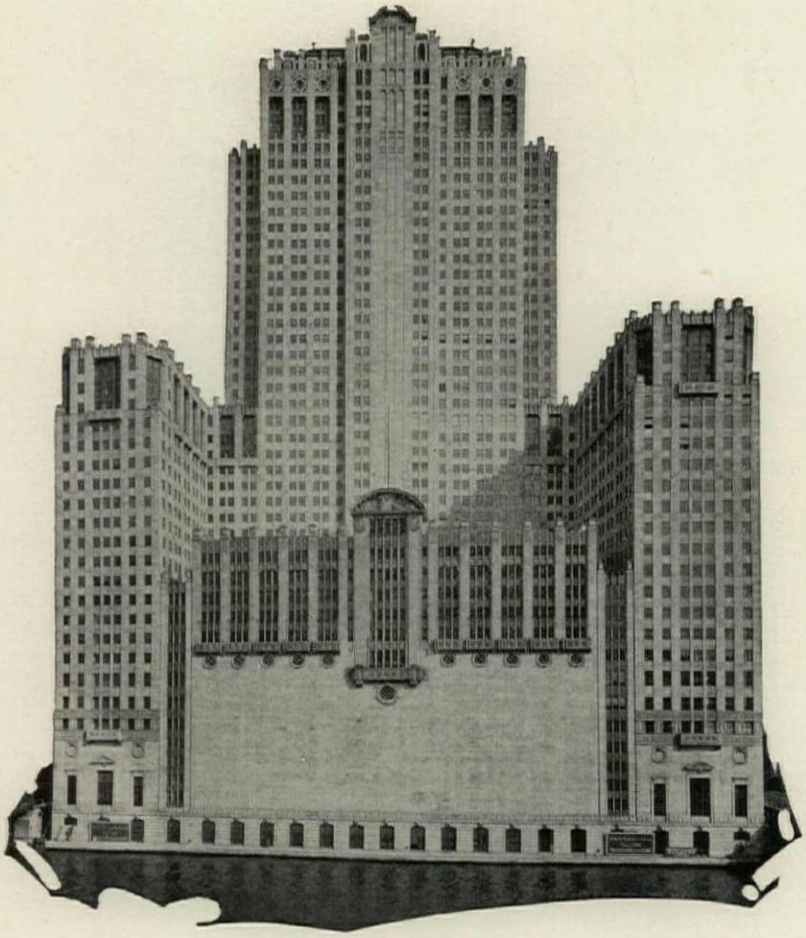


Aquatint study of the Brearley School, New York City ~ Benjamin W. Morris, Architect ~ Clyde R. Place, Consulting Engineer ~ Turner Construction Company, General Contractor ~ Gillis & Geoghegan, Heating Contractor ~ J. L. Murphy, Plumbing Contractor . . Jenkins Valves serve in both the plumbing and heating of this modern school.

Jenkins Bros. ~ 80 White St., New York ~ 524 Atlantic Ave. Boston ~ 133 No. 7th St., Philadelphia ~ 646 Washington Blvd., Chicago . . . Jenkins Bros., Ltd. ~ Montreal ~ London.

Always marked with the "Diamond"
Jenkins Valves
SINCE 1864

Reproduction of this etching sent on request addressed to 80 White Street, New York



The New Chicago Civic Opera House. Graham, Anderson, Probst & White, Architects; John Griffiths & Son Company, General Contractors.

Von Duprin

Self-Releasing Fire and Panic Exit Latches

Like so many other outstandingly fine buildings, the new Civic Opera House at Chicago is equipped with Von Duprin concealed latches . . . Where high quality, fine workmanship and reliability count—as they do on any building sheltering considerable numbers of people—there is no adequate substitute for Von Duprin devices . . . Your request will bring the new Von Duprin catalog by return mail, or see Sweet's, pages C3130-C3135 (AIA 27c5).

VONNEGUT HARDWARE CO
Indianapolis, Ind.

Listed as Standard by Underwriters' Laboratories

BOOK DEPARTMENT

THE LAW OF BUILDING CONTRACTS AND MECHANICS' LIENS

A REVIEW BY

ARTHUR L. H. STREET

"WHAT Every Owner, Contractor and Subcontractor, Engineer and Architect, Mason, Plumber, Carpenter and Materialman Should Know About the Law of Building Contracts and Mechanics Liens," is the comprehensive title of a 98-page work compiled and just published by Myron H. Lewis, professional engineer and attorney, New York.

Accompanying the book, the text of which is mimeographed, is an 8-page supplement containing an "analysis and digest of the changes in the revised mechanics' lien law of the state of New York." That all parties concerned in building operations should have a more intimate knowledge of the principles of law governing everyday dealings in their field than is usually possessed by architects, builders, etc., is not to be doubted. The law reports teem with cases showing how often members of the building professions have expensively taken hindsight, instead of inexpensive foresight, views of the law. Therefore, it requires no argument to demonstrate that there is a good field for Mr. Lewis' book and others of its general kind previously published. Nor should it require any extended argument to show that no one can be quite so well qualified to prepare a work of this nature as one who has had practical experience both as an architect, engineer, or builder and as an attorney at law experienced in the settling of controversies arising over building contracts, etc. Hence the appropriateness of Mr. Lewis' having undertaken the preparation of the volume here under review.

Although there is much in the book that may be read with profit by architects and their brothers-in-building throughout the country, the volume is especially adapted for use in New York. And its appearance is particularly timely, because of the changes effective October 1, 1929, in the New York mechanics' lien law. The preface shows that the material for the work was gathered in the course of the author's own experience "in building and adjusting mechanics' lien claims." That commends the practicality of the work, which is further promoted by the fact that Mr. Lewis has wisely chosen to write in the language of the layman, rather than to use legal terminology without explaining its meaning.

The author no doubt had in mind the saying that "the man who is his own lawyer has a fool for a client," because the preface emphasizes a disavowal that the book is intended to make the reader his own lawyer. Obviously, what Mr. Lewis aims at is merely to give members of the building trades and professions the benefit of his own experience, and the experience of others, in meeting and settling controversies, with a view minimizing the chances of the reader's running into similar difficulties. Part I, comprising 64 pages, deals with various aspects of contracts, while Part II, covering the remaining 33 pages of the volume proper, deals with phases of the mechanics' lien law. The first section deals with such fundamentally important matters as the importance of entering into a valid contract, considering the necessity for distinct and complete mutual understanding, the necessity for reducing certain agreements to writing and having them signed, etc. Fifteen important points to be observed by engineers and architects, to discharge their duties to owners and contractors as go-betweens, are set forth. One page shows how conflicts between plans and specifications should be adjusted. Another page specifies 20 essentials of a good set of specifications. There is a concise outline of rights and liabilities arising under defects in plans and specifications, and a statement of the extent to which a contractor may be held to have guaranteed the soundness of work constructed by him. Various suggestions are made on how to avoid misunderstandings concerning the amounts of payments to be made contractors, etc. and the times when they are to fall due. Three pages deal with the rights and liabilities of sureties on building bonds, showing grounds on which sureties may or may not insist upon release from responsibility.

A particularly important summary of the legal effect of architects' and engineers' certificates is presented, appropriately followed by a brief reference to the law of arbitration. Then there follows an explanation of vital phases of contract performance, with reference to waiver of rights, excuse for non-performance, etc. Fifteen common grounds on which builders have been held by the courts not to have been excused from liability for delayed completion of work are set forth, followed by 18 excuses that have been judicially sustained. Several pages deal with the assessment of damages for violating contractual obligations, etc.

In view of the frequency with which controversies arise over what constitute extras in the performance of building contracts, Mr. Lewis' exposition of the law on phases of this subject adds value to the work. There is a clear explanation of the functions of judges and juries in deciding litigated cases, and some wholesome advice on resorting to a lawsuit only when attempts to adjust differences by conferences, arbitration, etc., have definitely failed. There are given nine particulars that should be observed in preserving records of the progress of work, with a view to being able to prove important facts relating to work in case litigation should arise. Part II shows the purpose of lien laws, what claims are lienable, how liens are to be preserved and enforced, etc.

Those who are given to judging a man according to whether or not he wears tailor-made clothes may condemn Mr. Lewis' volume at first glance, because only the cover is printed, the text being mimeographed. But those who are not too fastidious to glean knowledge from the face of typewriter type will find this volume an extremely valuable aid to the avoidance of legal disputes. The book, being for laymen, does not give court decision citations.

THE LAW OF BUILDING CONTRACTS AND MECHANICS' LIENS. By Myron H. Lewis, C.E. 98 mimeographed pages, 8½x11 ins. Price $2. M. H. Lewis, 507 Fifth Avenue, New York.

THE OLD COTTAGES AND FARMHOUSES OF NORFOLK. By Claude J. W. Messent, A.R.I.B.A. With more than 100 full-page illustrations from pen and ink drawings. 10½ x 7½ ins.; handsomely bound in full cloth. Limited Edition, 10s Net. H. W. Hunt, 14 Orford Hill, Norfolk. To be ordered directly from the publisher.

IT is not only in the older cities of America that structures of architectural beauty and character and of historic interest fall before the march of what we like to consider progress. Travelers in Europe, particularly in England and France, bring back pathetic reports of destruction proceeding apace in both countries, and of what is nearly as bad and perhaps even more pathetic, the decay or even ruin into which fine old buildings are permitted to fall and the ugly and slovenly means (if any) taken to keep them habitable at all. Students of English architecture find that each of many sections in England has its characteristic historic architecture, and the types which were developed in Norfolk during centuries possess charm, virility and character in a high degree. The same is true of the materials which were used for building, and in Norfolk, although brick and flint are generally supposed to be the materials chiefly used, the old buildings show the wide use of half-timber, weatherboarding, clay lump, carstone, clunch (hard chalk lump). and wattle and daub, often used in ways which seem to be confined to Norfolk. The old villages and towns and even the remote rural districts of Norfolk, therefore, constitute a rich mine for the present-day architect.

In this volume a well known English architect, a member of the Royal Institute of British Architects, deals with quite a number of the old cottages, farm houses and manor houses which still exist in Norfolk, and he deals as well with some farm buildings and such minor structures as dove cotes and pigeon houses and likewise with a few interesting old Georgian shop fronts in the Norfolk villages and small towns. All these subjects possess interest for the present-day architect, whether in England or America, for along with the interest given by the excellence of planning and economy of material and construction, there is the interest inherent in beauty and simplicity of design, and architects are fully awake to the necessity of securing beauty and architectural character in buildings of any kind.

In preparing his excellent sketches of these old Norfolk buildings, Mr. Messent has very wisely restricted himself to buildings which are little known and which might be easily overlooked by the traveler, and it has apparently not been difficult in a country as rich as Norfolk to find architectural character of a high order in places where the architecturally-minded traveler might not go. The value of this excellent work should secure for it a place in the library of every architect interested in the important matter of design, particularly for structures of a domestic nature. It abounds in suggestions.

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Architect's handbook on request. Louisville Cement Company, *Incorporated,* Louisville, Ky.

District Sales Offices: 1610 Builders Bldg., *Chicago;* 301 Rose Bldg., *Cleveland;* 602 Murphy Bldg., *Detroit;* 101 Park Ave., *New York*

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INTRODUCTORY HANDBOOK TO THE STYLES OF ENGLISH ARCHITECTURE. Part II. Tudor and Renaissance. By Arthur Stratton. 32 pp., 5½ x 8¼ ins. Price $1. J. B. Lippincott Company. Washington Square, Philadelphia.

PLANNED as a companion to a series of large scale comparative diagrams, this little volume has been prepared for the use of schools, teachers, students and the like. Another volume of the same scope dealt with the earlier architectural forms from which were evolved the styles which followed, this particular volume treating of the Tudor type, dealing in what is necessarily a much condensed form with the influence of the Renaissance which wrought considerable change in developing the Tudor into the forms associated with the reigns of Queen Elizabeth, the Stuart sovereigns, and the Georges.

In America at least, taste in architecture seems to be largely a matter of vogue or fashion. Many will remember the whim for what in the eighties and the nineties was known as "Queen Anne,"—which had no relation whatever to anything known in England during the reign of that sovereign,—and later there prevailed taste for other types, one by one, followed within late years by a wide vogue of the Italian and Spanish types which were sadly mis-used and overworked or else used in localities for which they were wholly unsuited. Today what is being called "modern" occupies the center of the stage, though it seems to be a somewhat timid or tentative following, for even our most advanced examples fall far short of reaching the extremes which, according to the publications which deal with architecture are engaging the attention of the French and Germans.

But in all this strange medley or welter, the most staple, permanent architectural type in America,—the type which always has been and always will be acceptable,—is that founded on historic English precedent. A building designed according to conservative English tradition, be it Elizabethan, Queen Anne, or Georgian, "holds its own" with a tenacity wholly British; it is never obsolete or out of date, and architects, interior decorators and home furnishers know that the type constitutes the foundation as well as the cornerstone of everything which relates to the subject. For this reason works on architecture of this era have high value and deserve wide and careful study, and the volumes written or edited by Mr. Stratton occupy high rank in their field, one reason being that unlike many writers he does not deal exclusively with great town houses or vast country mansions which are, after all, of but little practical value, but devotes considerable space and not a little effort to dealing with architecture of a much more moderate scope and of considerable more importance.

EDIFICES DE ROME MODERNE. By Paul Letarouilly. In Six Volumes. Vol. Two. Text and Plates. 9¾x14½ ins. Price, cloth bound, 7s., 6d. John Tiranti & Co., Tottenham Court Road, London. Orders to be sent directly to publishers.

GENERATIONS of architectural students have studied and emulated the brilliant draftsmanship of Letarouilly. But often the very students who could have profited most from study of his published drawings have been denied access to them because of the cost of the volumes, and an edition well within reach of anyone is to be welcomed. This edition is complete in six volumes.

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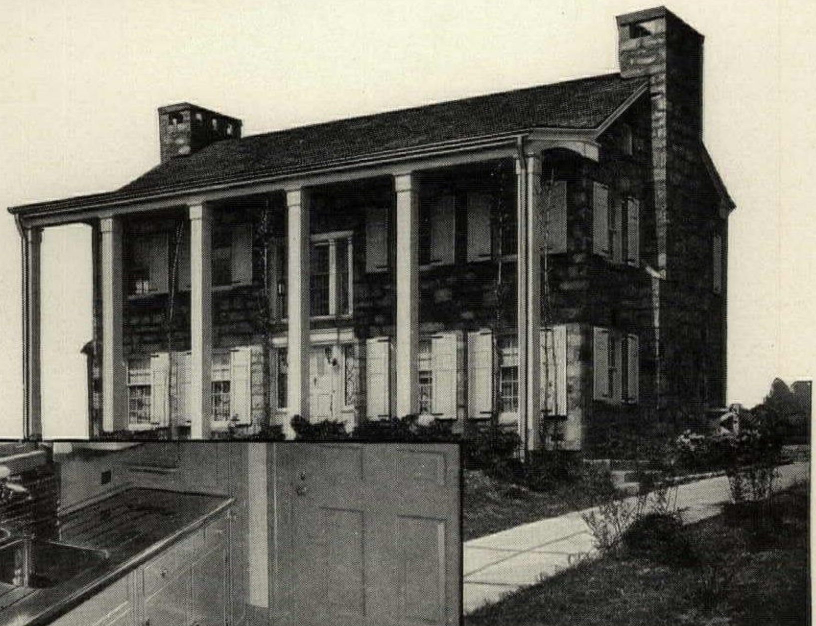

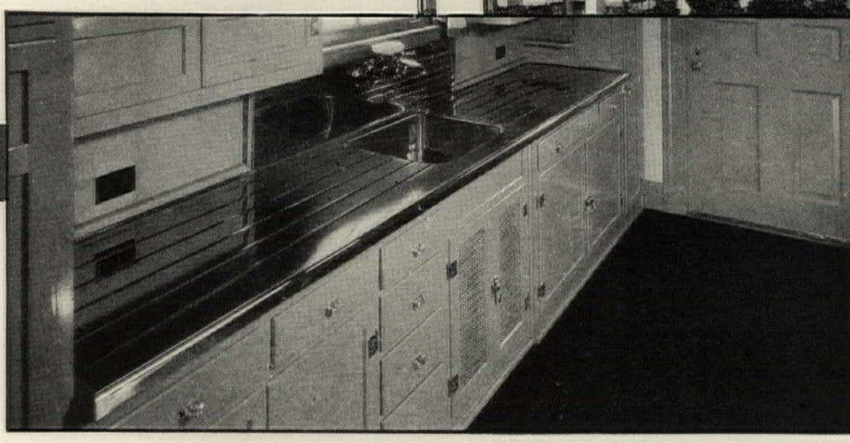

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THE
ARCHITECTURAL FORUM

VOLUME LII — NUMBER ONE

CONTENTS

PART ONE—ARCHITECTURAL DESIGN

PART TWO—ARCHITECTURAL ENGINEERING AND BUSINESS

THE ARCHITECTURAL FORUM is published monthly by National Building Publications, Division of National Trade Journals, Inc., 521 Fifth Avenue, New York.

H. J. Redfield, Chairman of the Board and Treasurer; Howard Myers, President and General Manager; John Thomas Wilson, Vice-President; James A. Rice, Vice-President; C. Stanley Taylor, Vice-President; Henry J. Brown, Jr., Secretary.

Yearly Subscription, Payable in Advance, U. S. A., Insular Possessions and Cuba, $7.00. Canada, $8.00. Foreign Countries in the Postal Union, $9.00. Single Copies: Quarterly Reference Numbers, $3.00; Regular Issues, $1.00. All Copies Mailed Flat. Trade Supplied by American News Company and its Branches.

THE ARCHITECTURAL FORUM

1930

Beginning with this issue, THE FORUM inaugurates the constructive policy of a close relationship between the architectural and the engineering and economic descriptions of the buildings featured in each issue. The phases of architectural plan and design, ornamentation, decoration and finish are considered in the Architectural Design section of THE FORUM, and in the Architectural Engineering and Business section the structural design and the mechanical plant and equipment, and the economic phases of the feature building are taken up in detail.

The two articles about the *Chicago Daily News* Building, therefore, complement each other and form a complete and useful whole. The illustrations are carefully chosen and logically arranged in each article. In future issues this policy will be continued in order that architects may have the essential information regarding outstanding buildings throughout the country. It is believed that this arrangement will prove to be the most effective and useful presentation of the distinguished architectural accomplishments that are featured in THE ARCHITECTURAL FORUM throughout the year.

The Editors

THE CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

The Chicago Civic Opera House may be seen at the right. Graham, Anderson, Probst & White, Architects

THE
ARCHITECTURAL
FORUM

VOLUME LII NUMBER ONE

JANUARY 1930

THE STRUCTURE AND EQUIPMENT OF THE CHICAGO DAILY NEWS BUILDING

HOLABIRD & ROOT, ARCHITECTS

BY
KENNETH KINGSLEY STOWELL

A DESCRIPTION of any building is dead and dry,—unless vitalized by the reader; unless he visualizes with understanding; unless he can read the living functioning between the lines of technical data and statistics. Especially is this true when the description is of those things below the surface,—the structure, the mechanical equipment, heating, ventilating, lighting, sanitation, communication, insulation, which we are considering here. Am I begging the question? Is it not the writer's function to set forth these things in their true light? Should he not so describe these things so that the reader must see them in their proper relations? Perhaps,—but where shall we find the author who will steer the true course between the Scylla of dry technicality and the Charybdis of "popular" worthlessness?

A description of such a large structure as the *Chicago Daily News* Building in which the reader could see only the component parts as so many of this and that, so big, would be as understanding as a coroner's report on a man after an autopsy,—missing the whole point, the vitality, the functioning, the personality of the building, as of the man. For today buildings are not mere shelters or creations meant to satisfy the eye alone and to give æsthetic pleasure;—they do that, but they are living organisms,—balanced, efficient structures with bones of steel and cement, nerves of electricity, lungs that breathe in fresh air, maintaining a constant temperature, equipped with mechanism to create the products man desires,—all actuated by man, reflecting the personality of him who created it.

In the section of THE FORUM *devoted to Architectural Design there will be found illustrations, details, and a general description of the architecture of this building.*

The *Chicago Daily News* Building serves and serves well in functioning for many purposes. It serves as the production plant for a great metropolitan newspaper. It houses the facilities of this great enterprise,—the executive and editorial offices, composing rooms, press rooms, paper storage areas and all the many and varied functions of the newspaper. A hundred tons or more of newsprint each day pass through the presses, issuing forth to spread the news in some 450,000 copies of an afternoon paper,—a Herculean task that requires efficiency in planning and nicety of adjustment that are awe-inspiring to the uninitiated. The building serves as a concourse for some 30,000 people who use it on their way to work from the railroad station each morning, and to their trains in the evening. It serves the complicated business of a great railroad office demanding special arrangements and communication facilities. Then, there are the floors of offices of private tenants who transact many and varied forms of business. The topmost floors are devoted to the unusual and highly developed broadcasting station of WAMQ, which must function without faltering from 5 in the morning until after midnight. And under this great structure there must pass the speeding trains of the Chicago, Milwaukee, St. Paul & Pacific Railroad,—trains belching forth smoke that would cut off the engineer's vision and perhaps cause serious accidents did not the building carry it away.

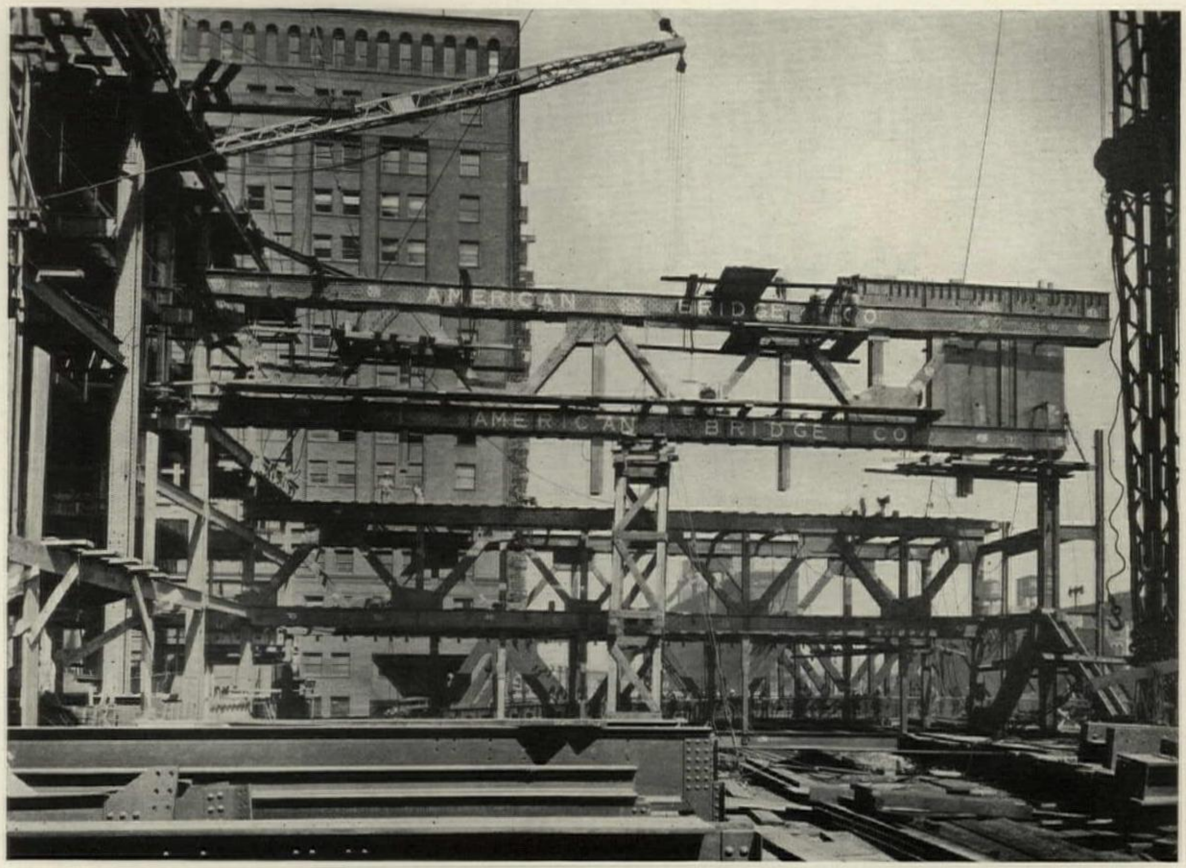
Structurally, these tracks caused the greatest complications, for they were laid out for the efficient operation of trains and could not be moved.

The Chicago Daily News Building Under Construction

The columns of the building, therefore, had to be placed in relation to the tracks first, and in relation to the superstructure, second. As the length of the building was approximately north and south, which is the direction of the tracks, the columns could be, and were, spaced on 20-foot centers in this direction. However, in the east and west direction the columns were spaced in relation to the tracks. In some cases, as under the north wing, the columns had to be 100 or more feet apart. This called for ingenuity on the part of the structural engineer, who solved the problem with cantilevered plate girders, some of them double, and with huge trusses, which we shall consider later. The foundations of the building proper are caissons to rock, about 90 feet below the level of Lake Michigan. Those under the plaza of the building rest on hardpan about 60 feet below the water level.

Smoke Disposal. The first floor above the tracks forms the bottom of the smoke chamber, which is about 5 feet high, varying over different portions of the plan. The first floor proper forms the roof of the smoke chamber. This smoke chamber, and the stacks leading from it, are of special importance because the building above the tracks would not have been possible had the smoke problem not been solved. In New York the same problem did not come up, because the roads there are electrified. The final plan for smoke disposal was not adopted until many experiments had been made to determine the behavior of smoke under actual conditions. In the floor of this smoke chamber, which forms the ceiling over the tracks, openings run continuously over each track so that the smoke will immediately ascend into this large expansion chamber. A section is shown in one of the diagrams (see page 111). The expansion of the smoke decreases its density and makes it practically as light as air. A great deal of the soot and solid portion of the smoke will accumulate on the floor of the smoke chamber, but this can easily be removed. The large concrete smoke stack running the entire height of the building is 15 x 20 feet, divided into two compartments. A fan is used, as well as gravity, to eliminate the smoke. This system was developed largely by Joshua D'Esposito, consulting engineer of the railroad.

The structural frame of the building is of steel, and the typical floor construction throughout the office portion of the structure is of the concrete joist and flat slab type, formed with

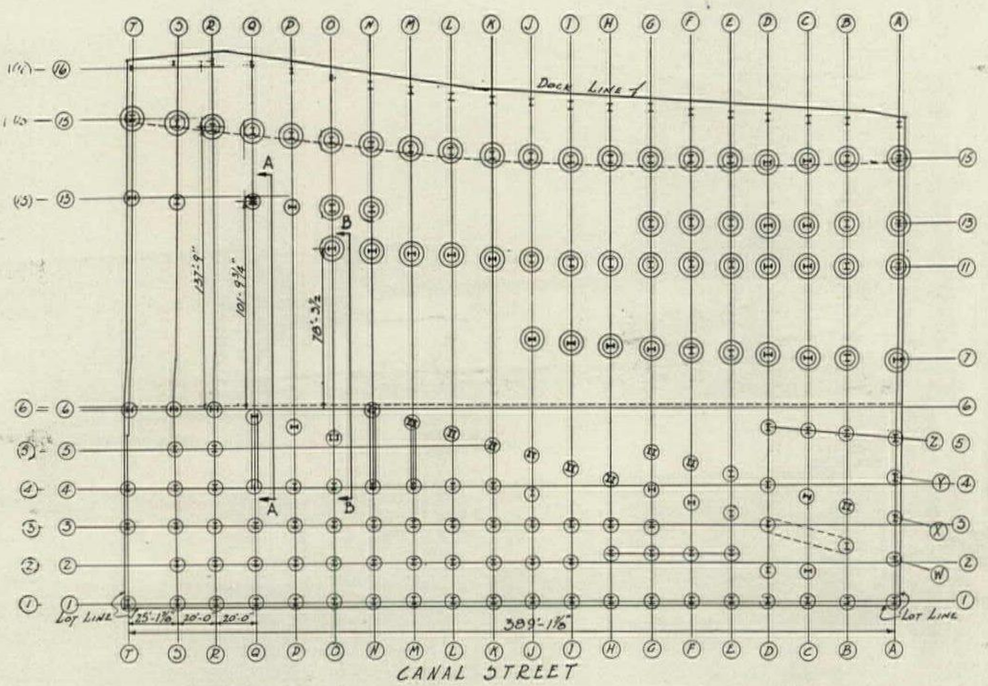


Trusses of the North Wing Over the Railroad Tracks

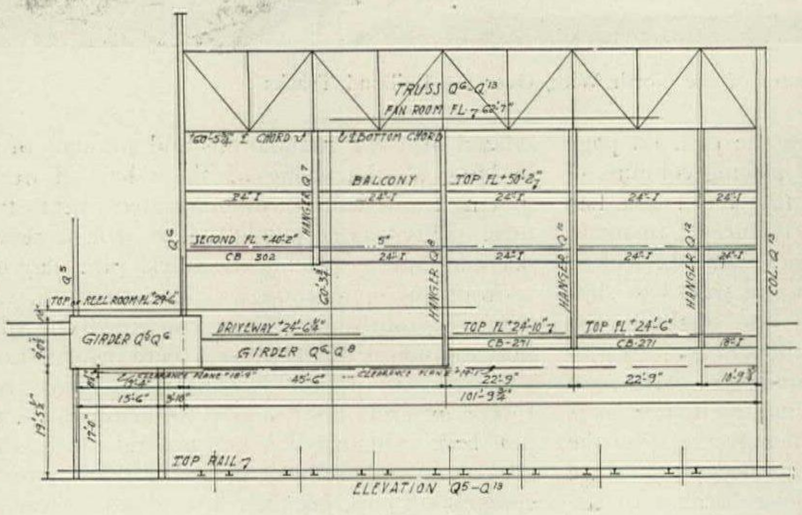
30-inch pans, as illustrated in the plan on page 113. Due to the difficulty of placing columns in proper relation to the tracks, the steel frame has some particularly interesting features. In many cases, large double plate girders, some 12 feet in depth, were cantilevered over the tracks to support the heaviest loads. In one instance, the moment on one of these cantilevers was 56 million foot-pounds. To these cantilevers there were attached smaller girders carrying the lighter loads and spanning the remaining distance between the columns. In some cases, it was necessary to use pin connections for this purpose because of the restricted headroom, dictated by the clearance above the tracks. In one instance, a truss, Q_6-O_{13}, supports a roof on its top chord, and four floors of the building are suspended from this truss. The bottom chord of this truss alone weighs 65 tons and was erected in two hours, which was the maximum time allowed, because it had to be put in place above the tracks without interfering with the train service. The rest of the truss was erected in place over the bottom chord. The truss may be seen in one of the illustrations as well as in the diagram. It is placed over the tracks in the north wing.

Vibration Insulation. The train tracks are insulated over the foundations and columns of the building so that none of the vibration of the moving trains will be communicated to the structure. This was accomplished, as will be seen in one diagram, by placing the tracks on a clay base without any connection with the structure. Another diagram shows the way in which the vibration and noises of the presses were insulated over the structure of the building. A heavy reinforced concrete floor, about 10 inches thick, was first laid. On this slab and around the bases of all columns there was placed a thick layer of compressed cork between iron plates. Over this another reinforced concrete slab, 6 inches in depth, was poured to support the presses. The cork insulation absorbs the vibration so that one is not conscious elsewhere in the building that these giant machines are operating.

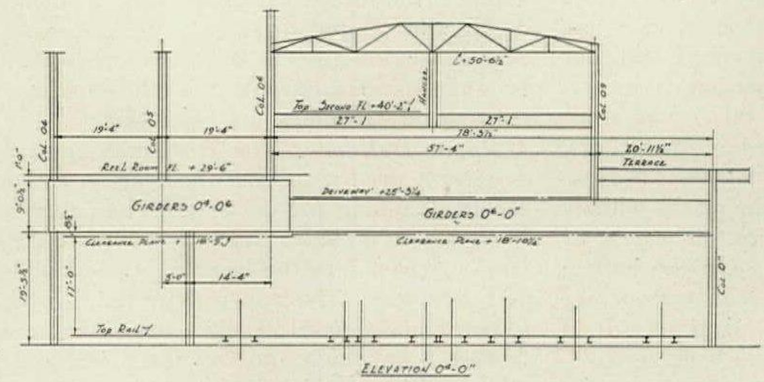
Paper Delivery. The immense tonnage of newsprint needed to feed these presses required careful planning for delivery. The paper is delivered (1) directly from the railroad, (2) by trucks driven into the heart of the building, or (3) by boat. The paper delivered by boat is lowered into a vertical shaft to a tunnel, which is over 8 feet high and 6½ feet wide, and it is 40 feet below the level of the lake. The tunnel



DIAGRAMMATIC PLAN SHOWING COLUMN LOCATIONS. PECULIAR COLUMN SPACING IS DUE TO LINES OF RAILROAD TRACKS



SECTION A-A SHOWING THE TRUSS Q6-Q13 SUPPORTING FOUR FLOORS OVER THE TRACKS; THE LOADS ON THIS TRUSS AND ITS MEMBERS ARE SHOWN ON PAGE 111. NOTE ALSO LARGE GIRDERS Q5-Q6 AND Q6-Q8



SECTION B-B (ON PLAN ABOVE) SHOWING GIRDERS SUPPORTING TERRACE AND FLOORS ABOVE THE TRACKS

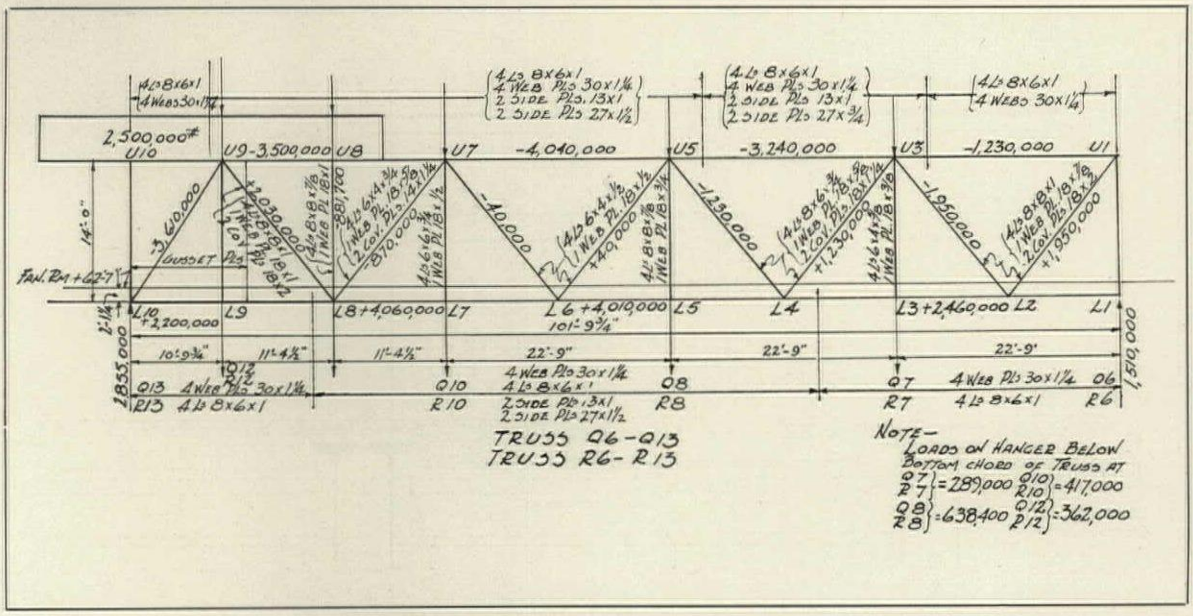
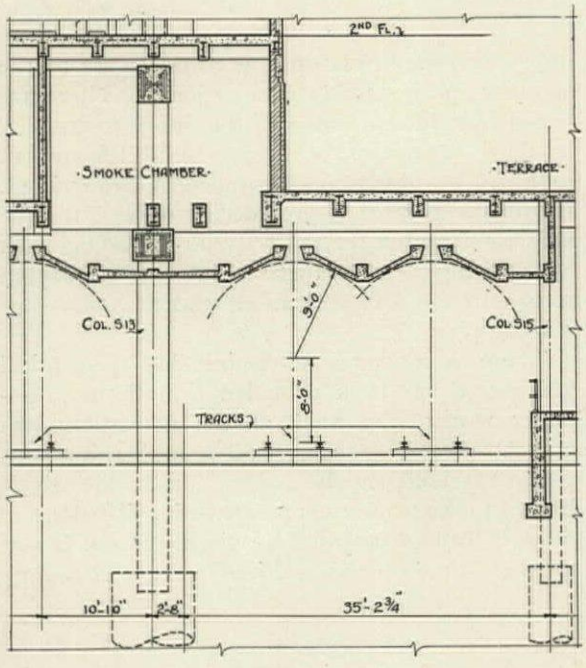


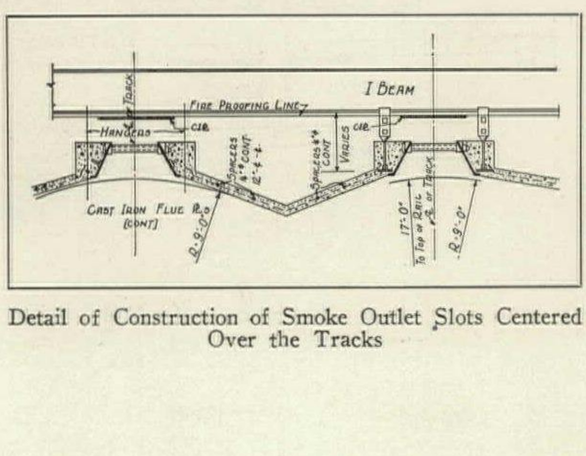
Diagram of Trusses Q6-Q13 Showing Loads, Stresses and Members

was placed at this depth in order that at some future date another level of tracks might be placed below the present track level, if necessary, without interfering with the paper delivery from the water side. The waterproofing of the concrete below the water level was taken care of, for the most part, by a careful proportioning of the 1:2:4 mix with the proper water ratio, and the use of small aggregate. The control of this work was determined by field tests. From the tunnel the newsprint goes up on elevators to the paper storage portion below the level of the presses. The presses themselves are of an improved type designed to conserve space by placing the rollers one above another rather than side by side in a horizontal position. Some 60 more lineal feet of floor area would have been needed for presses of the old style.

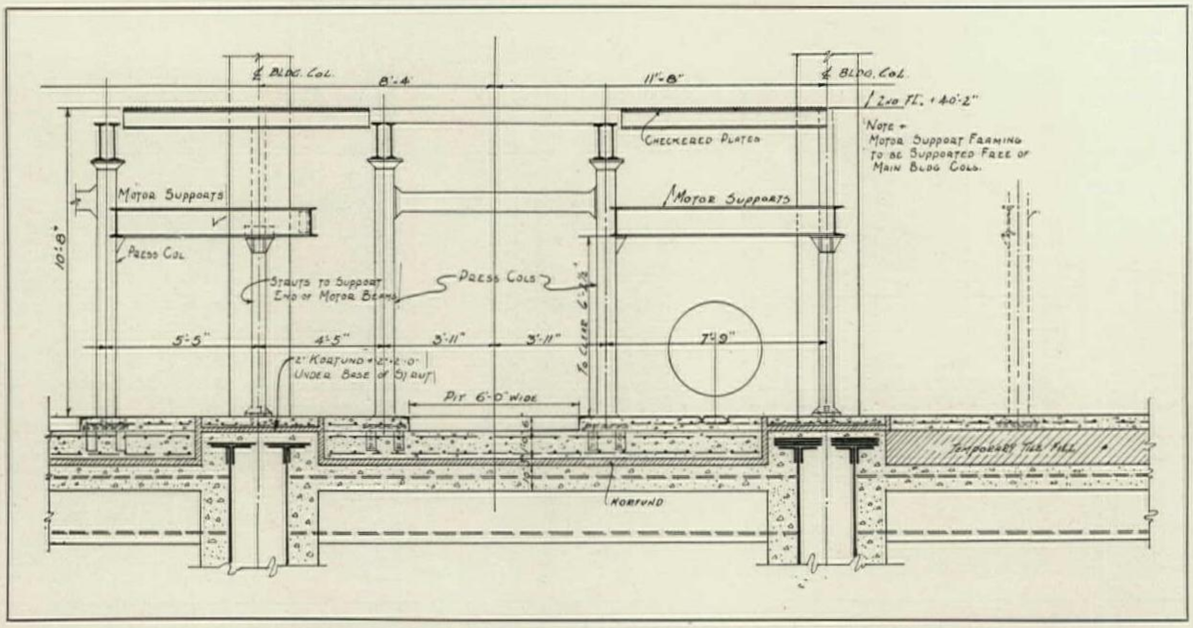
Heating and Ventilating. This building has no boiler room or power plant of its own, although provision has been made for such future installation if it should ever be advisable. The steam and electricity are supplied by public service companies. The heating of the building is by an up-feed system from the lowest to the 7th floor, inclusive, and by a down-feed system from the 23rd to the 8th floor, inclusive. The 24th, 25th and 26th floors, occupied by the radio studio, are heated by a separate up-feed system which has its pipe area on the 23rd floor ceiling. The distributing mains in this pipe space are equipped with air-operated valves for opening and closing, which are controlled in the pump room on the first floor. Two high-pressure lines run into the building,—one a 10-inch high-pressure pipe for general heating to carry the heaviest loads, and



Section Showing the Construction of the Smoke Disposal Chamber in Relation to Tracks and Terrace



Detail of Construction of Smoke Outlet Slots Centered Over the Tracks



Typical Cross Section, Upper and Lower Paper Reel Floors, Showing Insulation of Motor and Press Supports from Main Structure of the Building

one 4-inch high-pressure line to take care of the summer and hot water heating loads. There are pressure-reducing valves in the pump rooms. A vacuum system of heating is used throughout with cast iron radiators controlled by hand valves. Automatic control is provided, however, for the pressroom and in the radio studios. Leading from the heating system there is a 4-inch vacuum return to the Union Station, and a 2-inch condensate pipe.

There is no air conditioning, but mechanical ventilation has been provided for all the newspaper workrooms, such as the pressroom, reporters' rooms, storage, etc. The mechanical ventilation is both supply and exhaust. The air is heated to the proper temperature for distribution, filtered through an oil type air filter, and blown through the various sections of the building.

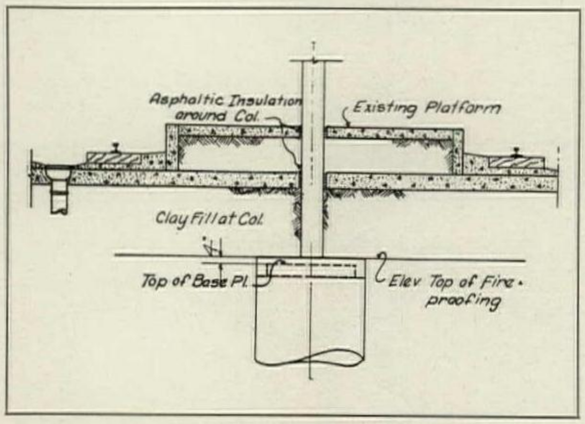
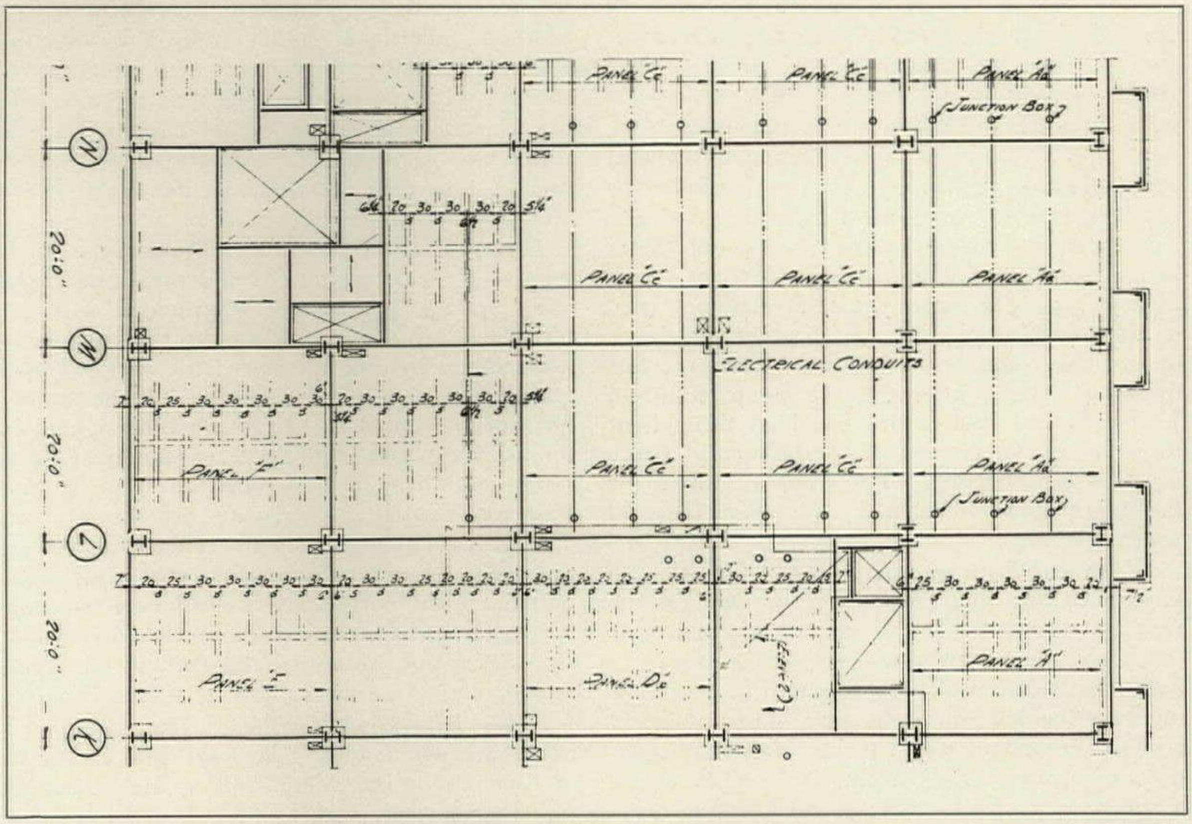


Diagram Showing the Vibration Insulation of the Tracks from the Foundations and Columns of the Building

There is no central system of ventilation, since such a system would undoubtedly distribute noise as well as air. The fans are placed where they are needed, and the ducts are run as directly as possible for efficient operation. The pump rooms have exhaust at the ceilings only. The first and second floors have supply ventilation only. There is no mechanical ventilation of the concourse, as natural ventilation is relied upon. The kitchen and cafeterias have separate systems, the supply being to the cafeteria in the north wing, and the fans on the fourth floor of this wing provide for the exhaust from the kitchen. A portion of exhaust air from the pressroom passes through the roof of the north wing, and three other exhausts from the pressroom direct the air downward into the driveway which runs from north to south through the building. The air that is thus expelled into the driveway is taken largely from the pressrooms, which have a considerable amount of heat. In this way, the driveway is somewhat warmed and made more comfortable for the delivery trucks passing through the driveway. There are five separate exhausts from the stereotype, etching, engraving and dark rooms to the outside atmosphere. There is no re-circulation of the air. Throughout the tenant floors the only ventilation is exhaust ventilation for toilets.

The ventilation of the portion of the building occupied by the radio broadcasting company, that is the 24th, 25th and 26th floors, has been very carefully devised to eliminate extraneous noises and the passage of sound from one room to another. The studios, control room, rehearsal studio and television studio are each connected

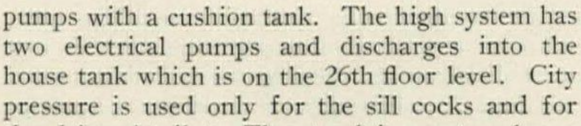


Portion of a Typical Floor Framing Plan. Floor Pan Construction and Electric Conduit Layouts are Shown

by a separate duct with the fan. The exhaust for each room is separate also to prevent sound travel along the ducts. Canvas connections are used between the ducts and the ventilating units in order that no mechanical vibration may find its way through the ducts. All fans are insulated from the floor by layers of cork and plank on 6-inch concrete foundations in addition to the floor. The heating coils of the ventilating system are controlled thermostatically.

Sound Insulation. The pressroom and linotype rooms are sound-insulated on the ceilings with a standard insulating material which has a perforated metal covering. This efficient insulation, combined with the insulation of the foundations of the presses, makes a comparatively quiet pressroom. The ventilating ducts in the pressroom are also covered with this sound-insulation material. In many portions of the radio corporation floors the efficient sound insulation has been provided by the use of a fiber type insulating board. By carefully eliminating mechanical connection where it might cause noise, by separating the ventilating systems, and by the use of sound-absorbing materials, the noise problem in this building has been solved.

Plumbing. There are two systems,—one the high-level, the other the low. The low-pressure system is provided by three electric centrifugal pumps with a cushion tank. The high system has two electrical pumps and discharges into the house tank which is on the 26th floor level. City pressure is used only for the sill cocks and for the drivers' toilet. The standpipe system has a 1,000-gallon, three-stage fire pump with a cushion tank. The sprinkler system is installed in the basement incinerator room, in the paper-baling room on the ground floor, and in such rooms as locker rooms, storage shops, carpenters' and electricians' rooms. There is an incinerator in the sub-basement in which rubbish of all kinds is



Section of a Typical Floor Joist Showing Reinforcing and Conduits burned, as the pressroom naturally provides a great deal of inflammable material. The pipes for both hot and cold water are of galvanized steel; the vent stacks, down-spouts, etc., are of wrought iron, and the steam system is of black steel pipe. The steam pipes running throughout the smoke chamber under the plaza and under the north and south wings are of flange-bolted cast iron protected by a double frost-proof cover tarred to seal, and wrapped in a 22-gauge aluminum jacket. The same type of insulation is used on the plumbing pipes in this location, which are of wrought iron with cast iron fittings. The drinking water is filtered in the pump room and 15 mechanical coolers are provided throughout the *Daily News* portion of the building. There are also ten bubblers. The drinking water for the upper floors is taken directly from the cold water system.

Electrical Equipment. The first question to be decided regarding electrical provisions was the type of current to be used. Considerations of the power rates and of the requirements of the machinery which had to be operated in the building were the determining factors. Direct current is used throughout the structure with the exception of the alternating current which is brought in a special A.C. feeder for the use of the broadcasting studio, WAMQ. D.C. current was chosen, as it allowed of the necessary refinement of control demanded by the presses. There are 32 units of presses arranged in eight lines and four 200-horse power motors are required for each line of presses. Other consumers of current are the lead-melting pots of the stereotype machines, of which there are four of 200 kw. each, and three of 60 kw. each. Approximately 5,000 kw. are required for the combined heating and power loads. These are brought in through 32 2-million circular-mill cables.

There are 16 elevators; three serve the *Daily News* portion of the building running to the seventh floor, having a speed of 450 feet per minute. There are five local and six express elevators running throughout the building, which have a speed of 700 feet per minute, and there are also hatchways for two more locals. All of these passenger elevators have the modern push-button type of control. In addition, there are one freight elevator for building use, and two freight elevators serving the newspaper spaces.

Wiring System. There are two main wire shafts so spaced as to equalize the horizontal runs. Standard round iron conduit with one outlet to each bay is used from the 7th to the 16th floor. Switches are provided throughout on the columns or walls as was convenient. Under-floor conduit in addition to the round conduit is provided for the offices of the Chicago & North Western Railway. There are three ducts in each of these underfloor conduit lines,—one duct for 110-volt current to provide for desk lights, dictaphones, etc., one for the telephone circuits, and one for the low-voltage signal circuits. These ducts may be tapped at 5-foot centers longitudinally, and they are tied together about every 40 feet across the building.

Lighting. The *Daily News* portion of the building, with the exception of the pressrooms and other special workrooms, is provided with indirect lighting fixtures, while the railroad offices use a direct lighting fixture of the enclosed opal glass globe type. The spacing of the ceiling fixtures is from 8 to 12 feet on centers, and in the working areas the level of illumination is never less than 10 foot candles. The lighting load was figured at 5½ watts per square foot. The pressroom is lighted by ceiling fixtures of the well known type having an opal glass globe within a white porcelain enameled steel reflector, No mercury lamps are used in this pressroom, although many pressrooms throughout the country do employ the mercury type of lamp.

Other Electrical Systems. The newspaper offices are wired with radio loud-speaker outlets in each important room. There are numerous signaling devices, such as press-dispatch signals, automatic annunciators in the executive publishing offices, business managers' offices, and so forth, signals which automatically report any irregularities in the starting of the presses which get out the regular editions, so that these matters may be immediately straightened out and the paper issued on time. There are call systems for messengers, stenographers, etc., and a call system for repair mechanics to work on the linotype, stereotype and presses. There is a mat-chute annunciator which records the delivery to the pressroom of mats from which the stereotypes are made. There is a complete electric synchronized time clock system throughout the newspaper section, consisting of 110 clocks and two large exterior clocks. The time is checked every hour from a master clock in the Station system. A portable watchman's clock system has about 150 switches in all throughout the building. Conduit has also been provided for an electric fire alarm system. The telephone system is a combination of manual and automatic.

It would be interesting to go into greater detail in regard to the equipment and its functioning, but such a course is impossible in an article of this character. It is hoped, however, that the high spots here outlined may indicate the excellence of the provisions that have been incorporated in this outstanding building in order that it may serve its multitudinous purposes with the maximum of efficiency and dispatch.

FINANCING THE LARGE BUILDING PROJECT

BY

ALTON L. WELLS*

ARCHITECTS, the country over, are finding that a knowledge of building finance and having substantial financial connections are factors of increasing importance to their offices. Not only is new business attracted by the fact that financial counsel and help may be obtained, but many a project in the perilous stages of early promotion is finally landed on an architect's boards solely because of his ability to suggest a satisfactory plan of financing or because of his ability to put his client in touch with a financial house that will provide the money that is needed.

A new building project usually comes to the architect in the form of an idea only. He is expected to translate the idea into blue prints and eventually into a building that will produce a satisfactory income for the owner. Seldom is the original conception accompanied by enough cash to finance the undertaking to completion, especially in these days when real estate operations are assuming such large proportions.

Procedure. In financing a new enterprise the procedure for securing funds falls naturally into these general divisions: (1) the preparation of a set-up or statement of facts concerning the proposed project; (2) the formulation of a financial plan to be followed in arranging the loan; (3) the selection of an investment banking house or other financial concern to which the appeal for funds shall be made; (4) the negotiations with the banker; and (5) the closing of the loan, once a commitment has been obtained.

Before proceeding to consider the matter of preparing the set-up, it should be observed that many proposals come to the architect's office that never should go further than the stage of a preliminary conference. Badly conceived projects, "shoe string" promoters, and other impractical schemes and schemers are all too familiar to members of the profession. Much time and money are wasted in attempting to develop undertakings which can never be "put over." Fortunately, undesirable business usually can be detected quite easily by asking a few questions.

Causes of Failure. The two most common causes of failure in new enterprises are inability to secure the site for the building, and the absence of any real capital in the hands of the owner or promoter. It is hardly worth while to prepare even preliminary sketches for a building unless the principal in the case either owns the ground involved or has a written option on it for a long enough time to insure that the necessary promotion work can be completed before its expiration. Many a likely operation has been wrecked, sometimes in the advanced stages of its development, because at the crucial moment it was found that the land could not be obtained; or that part of the site may have been available but some essential parcel could not be secured. A practical example of an unfortunate situation of this kind occurred last year when a $6,000,000 operation came very close to failure because the promoter neglected, until late in the financing negotiations, to secure a small piece of ground, worth about $10,000, that was an indispensable part of the building site. The owner of the ground, realizing the predicament of the would-be buyer, sat calmly in his office and listened to the bidding. The ground was finally purchased, but the price was $25,000 instead of its real value.

It is possible, occasionally, to finance an undertaking up to 100 per cent of its entire cost, the principal contributing nothing but his ideas and his time. But in the present condition of the money market, these cases are now occurring chiefly only in story books. And even if such financing were possible, it is questionable whether it would be sound business for either the promoter or the architect. It certainly would not be desirable from the standpoint of the banker and his clients. How much money a principal should have depends in great measure upon circumstances. But no one should expect to start a building operation, even under the most favorable conditions, unless he has at least from 15 to 25 per cent of the total cost of the project, either in cash or in ground value estimated at its actual worth.

Another vital factor which must be considered in determining the soundness and practicability of a new building operation is whether the estimated net income from the completed structure will be sufficient to defray all operating expenses and carrying charges, with a comfortable margin for contingencies. This cannot be discovered, usually, until the set-up facts and figures are prepared, but it should be definitely ascertained at that time. A building enterprise whose estimated net income is apparently insufficient to take care of all the obligations which must be met with enough left over to return a reasonable income on the owner's equity investment, may well be abandoned. Even if financing were secured, the undertaking would probably result, sooner or later, in financial grief for the owner.

Preliminary Survey. Preliminary to begin-

* *Manager Mortgage Department, Story & Company*

ning the actual work of assembling the information and material for the set-up, some consideration should be given to a survey of those general and special conditions which might affect the success of the proposed operation. While it is true that the principal concern of the architect is to design and erect a satisfactory building, when he assumes the role of financial adviser to his client he is under some additional obligations. He should do all in his power to assure himself that the proposed operation is one that will terminate favorably for his principal. Besides acting as a check-up on the safety of the enterprise, an investigation of this kind will serve the further purpose of providing the architect with many helpful facts which can be used when approaching the banker for financial aid.

PREPARING THE SURVEY

The scope of this survey should include such matters as general business conditions, the local rental situation, the desirability of the site selected, and the adaptability of the proposed building to the uses for which it is intended and to the character of the neighborhood in which it is to be erected. In judging the location these factors should be considered: street railway and bus transportation; available automobile parking space; proximity to railroad stations, trunk line highways, and shopping sections; trend of neighborhood improvements; property restrictions and local zoning ordinances. Naturally, the facts sought will vary somewhat with the type of building proposed.

The set-up, as is well known, is a compact statement of all the essential facts and figures relating to the proposed building operation. Its usefulness is two-fold; it enables the owner or promoter, by an examination of the information contained therein, to determine with a remarkable degree of accuracy whether the enterprise is a sound business undertaking, and it serves as a strong selling argument when the project is presented to the banker for financing. A set-up should be formulated with both these ends in mind.

The first step in preparing the set-up is to draw the preliminary sketches for the building. The drawings needed for financing purposes are a ground floor plan, a typical floor plan, and an elevation showing the number of floors and the ceiling heights. The ground floor plan should show store room sizes (if a commercial building), the dimension figures of other rooms, and the outside measurements of the base of the structure. The typical floor sketch should indicate the room and the corridor arrangement and the dimensions of the various rooms. Somewhere on the sketches there should be recorded the number of cubic feet in the building, the total number of square feet of net rentable area, and the number of square feet of rentable area on a typical floor. If the building is of a type that contains more than one variety of rentable space, as for instance store space, general office space, etc., the number of square feet of rentable area for each classification should be shown separately. Brief outline specifications, sufficiently complete to indicate the nature of the construction, should accompany the sketches.

These preliminary drawings should be free from non-essential details and of a character to be easily understood by the banker. It will be helpful, too, if sketches are made of a uniform size so that, when reproduced, they will conform in dimensions with the paper on which the set-up figures are written. This permits of all the set-up material being bound together in an attractive pamphlet that can be handled readily. It is surprising how a set-up of attractive physical appearance will influence a banker to look over a proposal when a carelessly prepared or too lengthy presentation will discourage him from even going into the preliminary details. Inasmuch as few people have the ability to visualize a completed building from an examination of its plans, an architect's rendered sketch, illustrating his conception of the finished structure, will repay its cost many times if skillfully used as a part of the set-up equipment.

Perhaps the most vital portion of the set-up is that which contains the figures relating to the costs of the enterprise, the proposed plan for providing funds, the estimated gross income, operating and maintenance expenses, net income, and other pertinent details. The success or failure of the operation will depend largely upon the story which these figures tell. The tabulation here will serve to indicate what facts should be presented:

COSTS		Totals
Ground value.		$———
Estimated cost of building (including builder's profit).		$———
Architect's fee (6% of building cost).		$———
Cost of financing.		
First mortagage.	$———	
Secondary financing.	$———	$———
Carrying charges during construction.		
Interest on loans.	$———	$———
Taxes.	$———	$———
Any other charges.	$———	$———
Miscellaneous expenses.		
Legal fees, trustee's charges, printing, appraisal charges, title expense, insurance, surveys, incidentals, contingencies.		$———
Total costs.		$———

In giving the ground value the number of square feet in the plot and the value per foot should be shown. The cost of the building may be ascertained by the use of a cubic foot cost figure which the experience of the architect indicates as conservative, or actual bids may be obtained from reliable builders. If the cubic foot cost method is used, the number of cubic feet in the building should be given and the unit cubic foot cost figure included. Prior to estimating the cost of financing, a rough calculation should be made of the total cost of the project. With this figure in mind a first mortgage loan of from 50 to 55 per cent may be presupposed, if an institutional loan is to be sought, or about 66⅔ per cent of the total cost if a bond issue is to be made. Secondary financing in an amount that, with the first mortgage, will aggregate from 75 to 85 per cent of the total cost, may be assumed. In these troublesome times of real estate financing it is difficult to predict what the charges for funds may be, but in a general way institutional loans should not cost over from 2 to 3 per cent, first mortgage bond issues not over 5 per cent, and secondary financing not over 10 per cent. If the rates asked are in excess of these figures, it is a question as to whether the ordinary building project can pay them without burdening itself with a serious financial handicap.

Some very good authorities insist that financing charges should not appear in the cost figures. But general practice is against this contention, the belief being that financing charges are as necessary an item of cost as those for materials, labor or any other essential element that enters into the construction of the building. Many estimators place the expense of a completion bond in the cost column. It would seem that this should be done only when this item is not provided for elsewhere. Sometimes a builder provides bonding service which is given without cost if he proves to be the successful bidder. Occasionally the price of the bond is included in the estimate of building cost. Not infrequently cost estimates contain provisions for working capital and for furniture and fixtures. The banker almost invariably eliminates these amounts from the set-up on the assumption that they are not properly charges against the building operation. At the same time, when funds for these items are essential to the successful operation of the building, the banker will probably insist that they be provided for independently of the regular financing. This, no doubt, is sound practice.

PLAN FOR PROVIDING FUNDS

Under this heading there should be given a brief resume of just how the owner or promoter proposes to raise the money for 100 per cent of the cost of his enterprise. As for example:

First mortgage	$————
Secondary financing	$————
Equity investment	$————

The total of these amounts should equal the total amount of costs. In setting forth these figures it is well to indicate the rates of interest on the first mortgage and the secondary financing, and the amounts of amortization which the project can probably pay on each.

The interest rate on first mortgage financing is fairly well stabilized at present at 6 per cent. Secondary financing will probably carry an interest charge of from 6 to 6½ per cent according to the amount of discount paid on the issue. Institutional first mortgage loans in conservative amounts may be had at 5½ per cent, and in some rare instances as low as 5 per cent. Long term first mortgage bond issues will probably involve an annual amortization payment of about 2 per cent, and secondary issues will have to be amortized at rates varying from 3 to 5 per cent per annum. If preferred stock is issued for secondary financing, it will no doubt carry a 7 per cent dividend requirement. The advantages of making these suppositions as to interest and amortization are that they serve as guide posts to the banker as to about what the project can pay, and they permit the owner or promoter to calculate whether his net income is going to be sufficient to pay all necessary charges.

GROSS INCOME

Here there should be shown estimates of all possible earnings of the building. The illustration given here is general. The essential requirement is that the facts stated shall be comprehensive, and clearly indicate from just what sources revenue is expected and in what amounts. Where space is segregated to produce different rates of rental return, the different classifications should be shown separately.

Store rentals, ———— sq. ft. @ $—— per sq. ft.	$————
Upper floors, ———— sq. ft. @ $—— per sq. ft.	$————
Concessions, cigar stand, restaurant, etc.	$————
Any other sources of revenue	$————
Total gross revenue	$————

VACANCIES

Instances are rare where, year in and year out, a building continues to be fully rented. Vacancies occur, and they must be considered in computing net income. For set-up purposes the vacancy rate is estimated, such estimate being based upon the general experience with buildings of similar character and upon conditions in the specific locality of the proposed project. All types of buildings do not have the same percentage of unoccupied space. The allowances ordinarily made for vacancies are: office buildings, 10 per cent; apartment houses, about 15 per cent; and commercial hotels from 25 to 30 per cent. If the vacancy experience exceeds these figures, it is almost certain that either the management is inefficient or the building is improperly located. Theaters, particularly large houses, are seldom built without being leased in advance. This is often true of hotels.

OPERATING AND MAINTENANCE EXPENSES

Quite naturally, the expense of operating and maintaining a building varies with the type of structure. Expense schedules for an office building and a hotel will differ, as will, also, those for a large and a small building. Care should be taken to see that every item of expense connected with the operation and maintenance of the building under consideration is included in the list furnished. The items given here are by way of suggestion only, but they include most of the ordinary expenditures.

Payroll; managers, clerks, telephone operators, elevator operators, janitors, firemen, and other employes under the direction of the chief executive. The list of salaries should be itemized and the total carried out.
Electricity; light and power
Coal
Gas
Water
Decorating and repairs
Elevator maintenance
Supplies
Ashes and garbage removal
Window cleaning
Insurance, fire, rent, liability, casualty, etc.
Taxes
Management
Miscellaneous
Total expenses $————

Expense estimates should be very carefully computed. Where possible, they should be compared with experience of similar buildings in the same locality. They should be liberal enough to provide for contingencies.

NET INCOME

Practically all of the figuring done thus far in the preparation of the set-up has been for the purpose of arriving at the amount of that extremely important factor, net income. Upon the showing which the net income figure makes will depend very largely the decision of the banker as to whether he cares to go further into the details of the project. To compute net income is a simple matter when once the figures for gross income, vacancy, and operating and maintenance expenses, are in hand. For instance:

Gross income		$————
From which are deducted:		
Vacancy	$————	
Operating and maintenance expenses	$————	$————
Net income		$————

A considerable number of people contend that income tax requirements should be deducted from gross income in addition to the items already suggested, particularly if the owner of the building be a corporation. This is an open question. For practical purposes in presenting the set-up to the banker, a common practice is to omit the income tax deduction on the assumption that if the question is raised by anyone it should be raised by the banker.

To be safe for the owner, and to be acceptable to the banker, the net income of a project should be at least twice the amount of the annual interest charges on the first mortgage. This, however, is a minimum. If the ratio is 2½ or 3 times, so much the better. A recent analysis of 20 leading issues of real estate securities marketed during the last year showed that the average ratio of net income to first mortgage interest charges was 2.48 times.

So much for the set-up proper. Without any further preparation, an appeal for funds might be made to the banker. But while the set-up should be brief, and its significant features capable of being comprehended almost at a glance, there is some supplementary material that should be included for the purpose of amplifying and supporting the facts already compiled. This additional data may be submitted in considerable detail. It should be neatly bound and attached to the set-up in such a way that it can be referred to by the banker if his interest in the enterprise prompts him to seek further information. Included in this section of the set-up there should be:

1. A map of the city in which the operation is located, with the site of the building marked thereon. A small map is preferable.
2. A locality map, drawn by the architect, showing the important buildings in the immediate vicinity of the proposed structure together with any other data that might serve to emphasize the value of this particular location.
3. A plot map of the ground, also prepared by the architect or obtained by him from the city surveyor's office, showing lot lines and dimensions.
4. One or more appraisals showing the value of the ground on which the building is to be located. These appraisals should be made by well known local real estate authorities.
5. If the building costs in the set-up have been based on actual offers of responsible builders to construct for the figures named, copies of the

letters making such offers should be attached.

6. Rental estimates should be supported by the written opinions of rental experts, saying that the rates quoted are reasonable and that, according to their judgment, the space in the proposed building should rent quite readily. If advance leasing arrangements have been made with prospective tenants, this information should be included. Any further evidence supporting contentions as to amount or permanency of income will prove valuable.
7. The banker will be much interested in the financial stability of the principal. Full information regarding him should be furnished, such as address, business connection, and financial and other references. One or more commercial agency reports will add weight to the evidence. If the principal has been successful in the operation of other properties, this fact should be disclosed. If the principal is a syndicate, full information should be given about all the members of the group. Emphasis should be laid on the actual amount of cash, or its equivalent, that the principal is investing in the project.
8. A statement should be made of any other facts that might strengthen the case. As for example, increases in the values of adjacent properties, the existence of well rented and prosperous buildings in the immediate vicinity of the proposed structure, new developments, such as improved transportation, that might tend to enhance the value of the undertaking.
9. An index page, placed at the front of this section of the set-up, will facilitate the use of its contents.

Backed up with the full equipment which has been suggested, the promoter is ready to start out in search of financial backing. Before attempting this, however, one important precaution should be taken. *Verify every fact in the set-up.* There is hardly a situation more embarrassing, or one that is more inimical to successful negotiation, than to discover, during the course of the conferences with the banker, that some of the information submitted is inaccurate. Inaccuracies are due in most cases to placing dependence on loose statements made by other people. One who is seeking to borrow funds running, perhaps, into seven figures, can ill afford to jeopardize his opportunity of bringing home the essential dollars by relying upon anything less than personally verified information.

The Architect's Rendering of a Proposed Office Building Helped Very Materially in Securing the Required Financing

FINANCIAL SET-UP OF AN ACTUAL OFFICE BUILDING PROJECT

COSTS

Ground value, 16,492 sq. ft. @ $82.50 per sq. ft.		$1,360,590
Estimated cost of building, 1,970,000 cu. ft. @ $.55 per cubic foot		1,083,500
Architect's fee, 6%		65,000
Cost of financing,		
First mortgage, 5% of $1,900,000	$95,000	
Secondary, 10% of 375,000	37,500	132,500
Carrying charges during construction (period of 1 year)		
Interest on loans,		
$1,900,000 @ 6%	$114,000	
375,000 @ 6½%	24,375	
*Taxes	26,650	165,025
Miscellaneous expense, including legal fees, appraisals, trustees, charges, printing, title expense, surveys, insurance and contingencies (estimated)		35,000
Total costs		$2,841,615

*In this particular case there was an old, heavily taxed, existing improvement on the ground. This was demolished later.

PLAN FOR PROVIDING FUNDS

First mortgage, $1,900,000 bond issue for 15 years, 6% interest, 2% annual amort.	$1,900,000
Secondary financing, $375,000 bond issue for 10 years, 6½% interest, 5% annual amort.	375,000
Equity investment	566,615
Total financing	$2,841,615

GROSS INCOME

	Annual
10,000 net rentable square feet on each of 11 floors, or 110,000 sq. ft. @ $2.25 per sq. ft.	$247,500
12,500 square feet of net ground floor area, at average rate of $9 per sq. ft. (figures based on leases running from 5 to 10 years)	112,500
Concessions, and miscellaneous	none
	$360,000

VACANCY

Figured on a basis of 10%	$36,000

OPERATING AND MAINTENANCE EXPENSES (Estimated)

The figures given here are based on the actual costs of operating a nearby building.

Payroll	$20,000	
Electricity and gas	6,000	
Coal	5,000	
Water	1,200	
Partitioning and remodeling	2,500	
Supplies	3,000	
Ashes and garbage removal	600	
Window cleaning	1,200	
Repairs	5,000	
Insurance	2,200	
Taxes	30,000	
Total expenses		$76,700

NET INCOME

Gross income		$360,000
From which are deducted:		
Vacancy	36,000	
Operating and maintenance expenses	76,700	
		112,700
Net income		$247,300

Annual interest charges on first mortgage, $114,000.

Net income, $247,300 or 2.17 times interest requirements of first mortgage.

AIRPLANE HANGAR DESIGN

BY

R. W. SEXTON

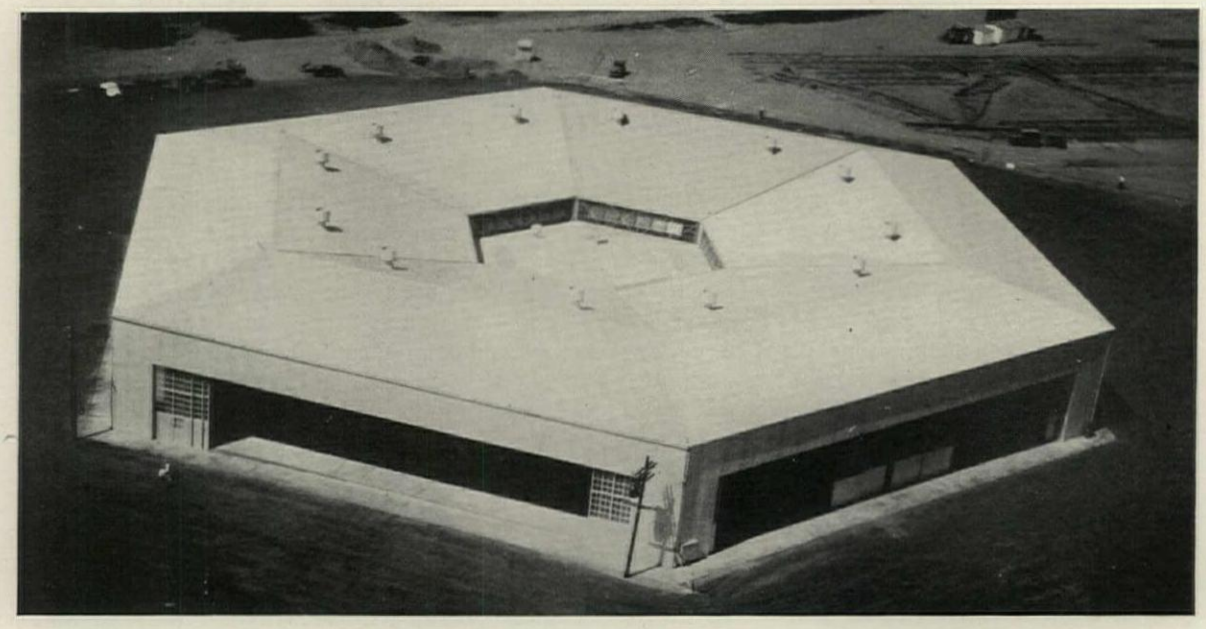
THE practicability of air transportation as a commercial enterprise has been demonstrated for a number of years, and now the architectural features involved are claiming increased attention. The hangar is the essential building to be designed, with the incidental structures pertaining to airports, such as passenger and freight terminals, hotels and restaurants. The hangar is the only one of the airport buildings that presents a new problem. The hangars that have been built to date have had no particular architectural character. They are merely four walls and a roof, serving every practical purpose. They have been constructed with the utmost economy because, perhaps, of the speculative character of the air transportation business along with its lack of funds.

An architecturally attractive hangar is a difficult problem in design, and it has not yet been solved satisfactorily. Now that the elements of the plan and the necessary utilities have been fairly well established, the element of architectural design may well be studied and the hangar lifted out of the locomotive round-house class of architecture as designed by the old time railroad engineers. The hangar is deserving of a better appearance than the round-house because it usually has better surroundings and is in closer contact with the passengers and the public. The function of the hangar is to house airplanes and airships, and in addition there are sometimes included divisions used for repair shops, storage of supplies, washrooms and other facilities. The maximum economy in hangar construction is attained when it has minimum cubic contents, and this will result by correctly relating the plan of the structure to the size and shape of the vehicles to be housed. As air vehicles of the airplane and airship types are recent inventions, it is not probable that their design and limits of size have become fixed; on the contrary, quite radical changes are to be expected, and corresponding changes will have to be made in hangar designs. Obsolescence will be a factor in the experience of hangars, as it is found to be inevitably so with other commercial buildings, and it is a factor to be considered in their designing and construction.

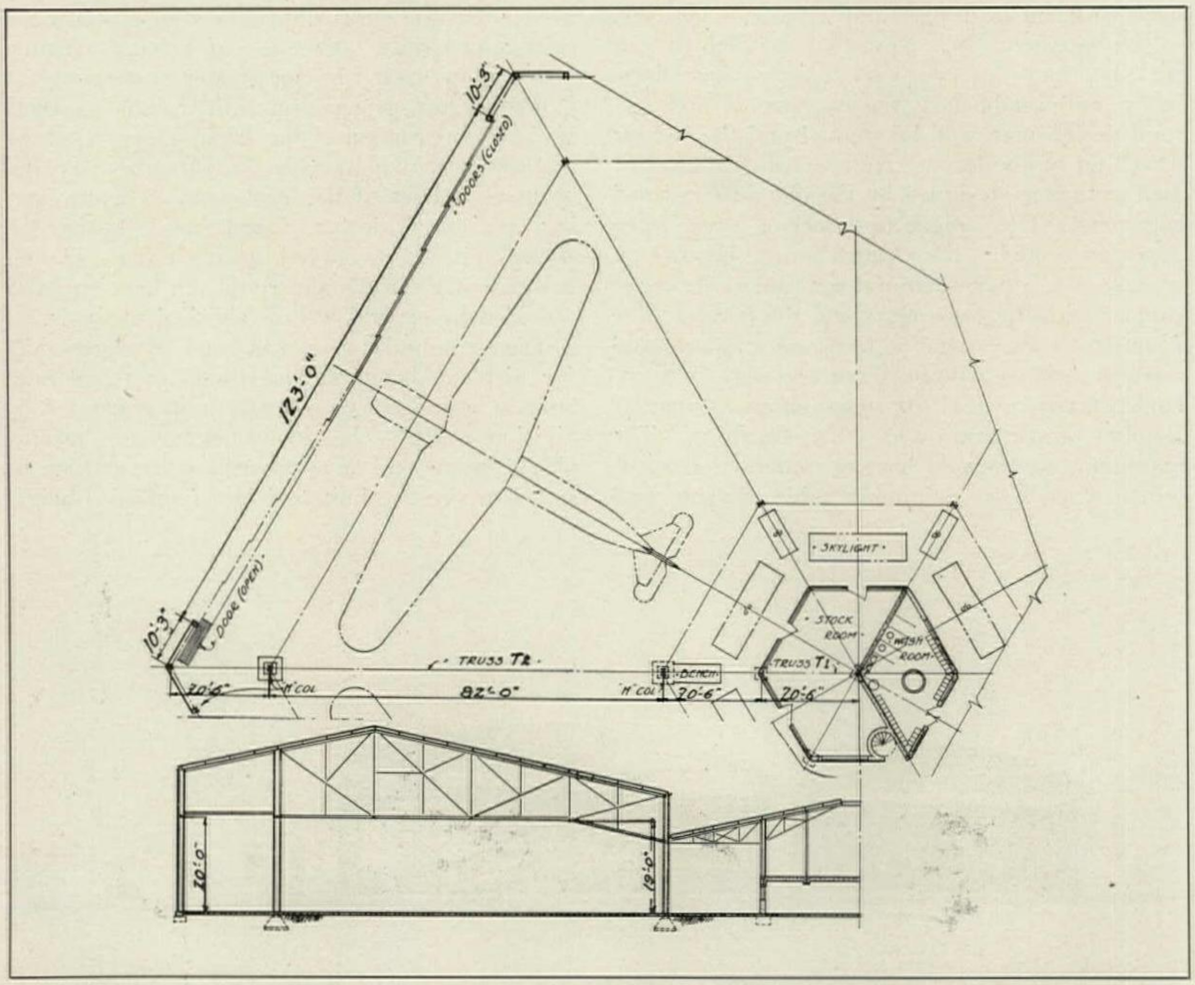
Considering the cross-section of hangars, it is found that airplanes are more snugly and economically housed with vertical side walls of minimum height and approximately flat roof construction of minimum depth. The shape of the airship is such that the semi- elliptical cross-section is the most appropriate. The cost of heating hangars, which is necessary in the greater portion of the United States, depends upon their cubic contents and the construction of the walls, doors, windows and roof. Minimum cubic content is best secured by using trusses of the least possible depth, having horizontal lower chords and horizontal, slightly pitched or curved upper chords. The insulation of the walls and roofs can be adequately provided by several well established methods.

The rectangular plan has been used generally for airplane hangars, and these are sometimes built in series of two or more units separated by division walls. The door openings are usually placed in one end or at opposite ends, and are of sufficient size to admit vehicles of specified height

Fireproof Hangars at the Central Airport, Camden, N. J., Fifteen Minutes From the Center of Philadelphia

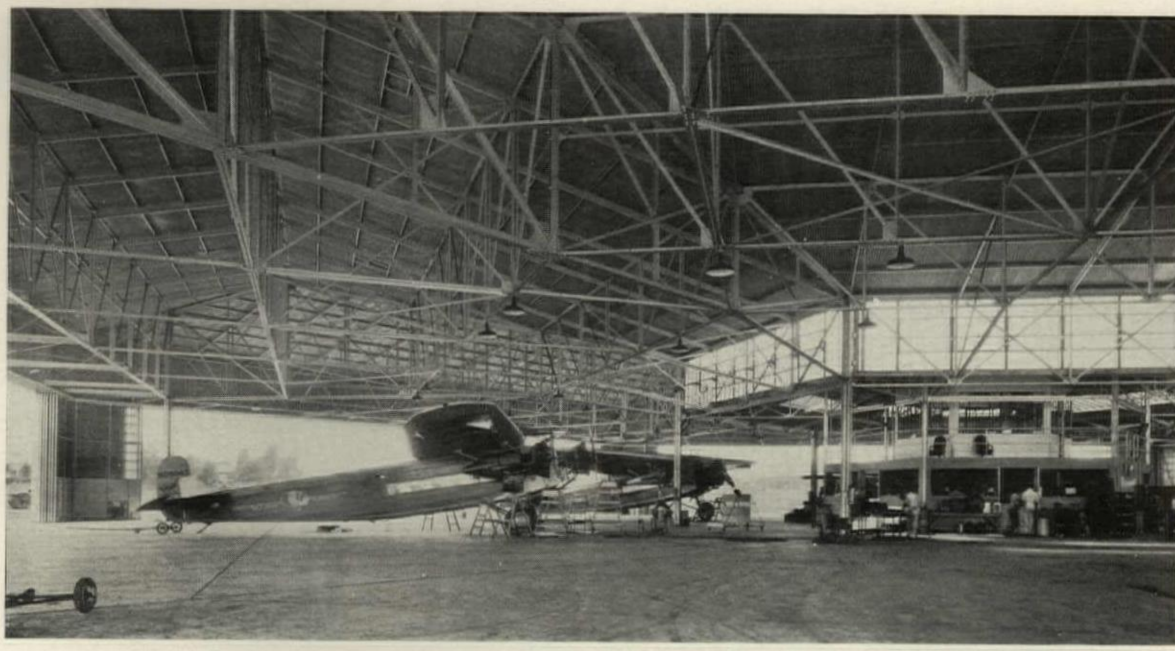


HEXAGONAL HANGAR AT THE WESTERN AIR EXPRESS, INC., AIRPORT, LOS ANGELES



PART PLAN AND SECTION AT TRUSSES T1-T2. HEXAGONAL HANGAR AT THE WESTERN AIR EXPRESS, INC., AIRPORT, LOS ANGELES

A. M. EDELMAN AND A. C. ZIMMERMAN, ASSOCIATED, ARCHITECTS



Interior View of Hexagonal Hangar at The Western Air Express, Inc., Airport, Los Angeles

and wing spread. The length of the hangar depends upon the number and size of the airplanes to be housed. The repair shops, storerooms, washrooms, heating plant and other facilities are usually housed in a lean-to section built along one side of the hangar, or at the rear of the building.

A radical departure from the rectangular hangar plan was made in a building erected recently, which has a hexagonal plan. It was designed by A. M. Edelman and A. C. Zimmerman, associated, architects for the Western Air Express, Inc., at Los Angeles. The hangar was designed for servicing airplanes between their scheduled flights. The building is designed to accommodate six airplanes having a wing spread of 99 feet and a depth of 70 feet. Connecting the four extremities of this vehicle produces a quadrilateral figure which, except for the obtuse-angled area in front of the wing axis, is triangular in shape. To accommodate this shape of ground coverage in the most economical manner, a building hexagonal in plan was designed to house six airplanes of that size.

The sides of the hexagon are 143 feet, 6 inches in length, the minimum or normal diameter is 248 feet, 6⅞ inches and the maximum diameter is 287 feet, all center to center of columns. The roof is supported on 24 columns. There are six door openings 122 feet, 4 inches wide and 20 feet high. In each opening there are 12 doors supported on rails and sheaves, with the tops confined in guide channels. A hexagonal stockroom, washroom and office, having sides 20 feet, 6 inches long, is placed in the center of the building. Work benches are placed around these rooms. The roof of the central portion, having sides 41 feet long, is dropped about 6 feet below the main roof. Vertical windows are placed between the two roof levels, and there are six skylights in the lower roof around the stock and washrooms. These windows and skylights, with the glass in the exterior doors, provide well distributed daylight illumination over the entire floor area.

It is not necessary to heat this building because of its location in southern California, and for that reason the structure is enclosed with corrugated iron. Therefore, the cost of the structure is quite low, $1.69 per square foot. The building covers 53,800 square feet, in which 270 tons of structural steel were used.

The low cost of this hangar is attributed to its plan and construction and to the lack of heating apparatus and non-insulated roof. Another factor which contributes to the low cost of this hangar is the intensive utilization of floor space, which is shaped to the form of the airplane floor coverage.

At present the airplanes used have a wing spread of 80 feet and a length of 50 feet. Three of these vehicles can be placed in each section of the hexagon. Future hangars for storage purposes will be built. These will consist of a row of triangular units with doors on each side of the row.

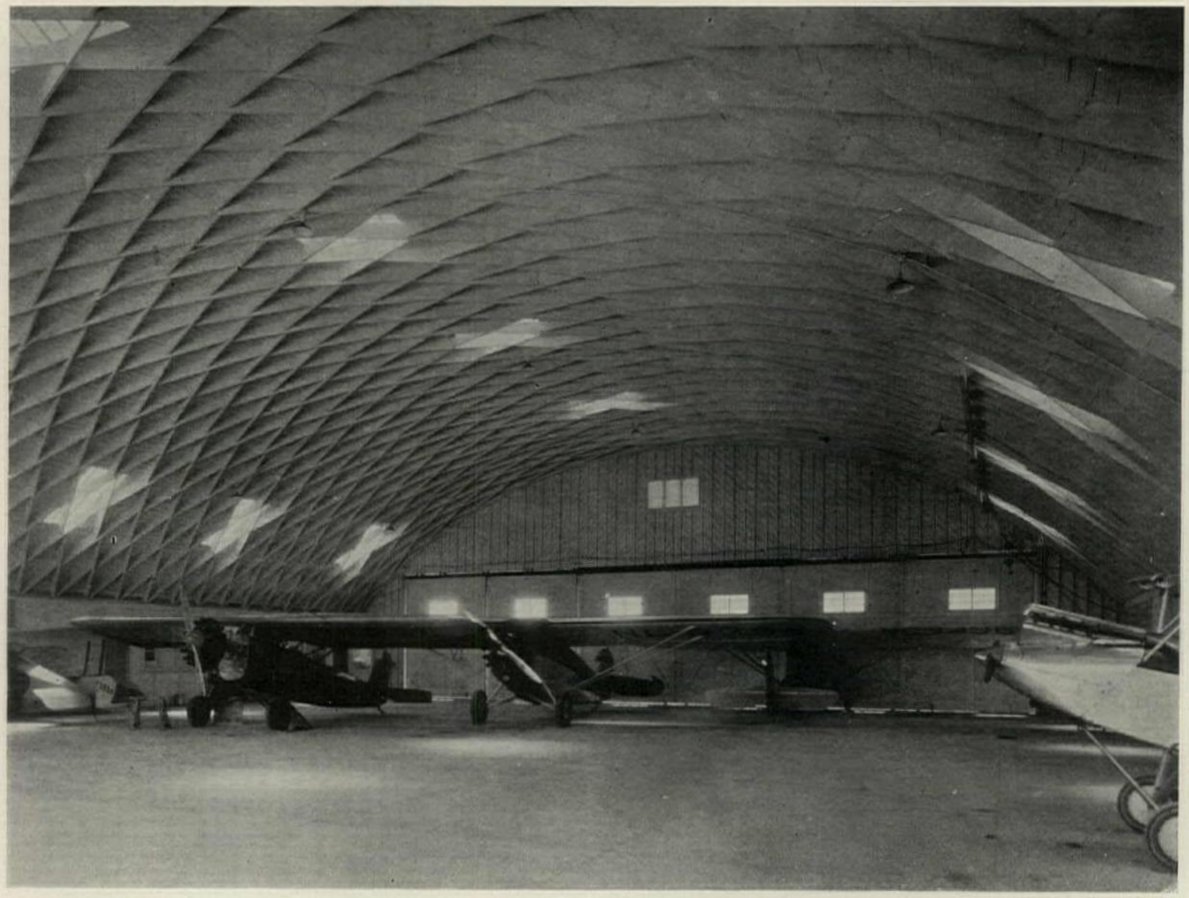
The designing of hangar doors, owing to the unusual size of the door openings, presents an unusual mechanical problem. Aside from the construction of the door itself, its air-tightness when closed and the means of operating it, require special consideration. Air-tightness has an important

Hangar at The Municipal Airport, Pontiac, Mich.

Hangar and Service Station, Bridgeport Airport, Bridgeport, Conn.

effect on the designing of the heating system. Planning the operation of the doors constitutes an important item of labor and time. The large size and great weight of each section of the multiple door cause a large amount of frictional resistance to movement which must be reduced to a minimum by the use of correctly designed motion elements placed either above or below the door. In localities subject to snowfall and ice, it is advisable to have the motion parts on tracks placed above the doors and protected. In other climates, floor-level tracks are suitable.

With extra heavy door sections, especially those opened and closed on the accordion principle, the operating load accumulates so that it requires the use of steel cables operated by hand or electrical motor-driven winches. Although the door is practically the only movable part of the hangar, it is one of its most important features. The manufacturers of operating mechanisms have made a special study of the hangar door problem, and have produced them in satisfactory forms.



Clover Field Airport, Santa Monica, Cal. Interior View of Hangar Showing the Laemella Wood Roof Construction

AIRPORT AND HANGAR HEATING

BY

WILLIAM HULL STANGLE

OF THE OFFICE OF KENNETH FRANZHEIM, ARCHITECT

THE problem of heating the buildings in a modern airport has called for the exercise of no little ingenuity on the part of architects and engineers. Although somewhat similar to those of a large industrial plant or a multi-building institution, the conditions of airport heating are sufficiently different, and the lack of precedent is so pronounced as to call for considerable research and for more pioneering.

Aviation is a new industry, and the airport a new kind of traffic terminal. What applies to industrials does not always apply to aviation. What applies to railroad terminals, steamship terminals or bus terminals does not always apply to airports. The unknown size of the future air-liner alone precludes obtaining definite solutions to the problems of airport engineering. The writer has discussed with prominent pilots the future of the terminal. Indications so far seem to divide air transportation into three classes, i.e., (1) the long haul by lighter-than-air machines, (dirigibles); (2) the short haul by heavier-than-air machines, (aëroplanes); and (3) the field-to-city hauls by autogyro or heliocopter machines, the latter type to allow nearly vertical ascent or descent to permit landing on a large building in the heart of a large city. The public is not yet air-minded enough to trust planes for long hauls, particularly inter-continental transportation, but it has already demonstrated its faith in flying.

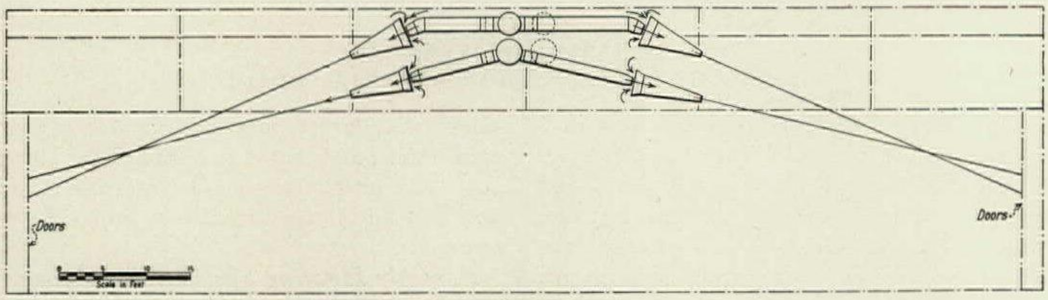
The greatest handicap to aviation today, in influencing the public mind to the greater use of airways, is the usual distant location of the airport from the heart of the urban community it serves. The chief selling point of the aviation service is time saved for the passenger. Only too frequently, however, that saved time is lost in getting the passenger from the airport to the near-by city. It is predicted that with perfection of the autogyro this condition will be improved and the service more quickly accepted by the public.

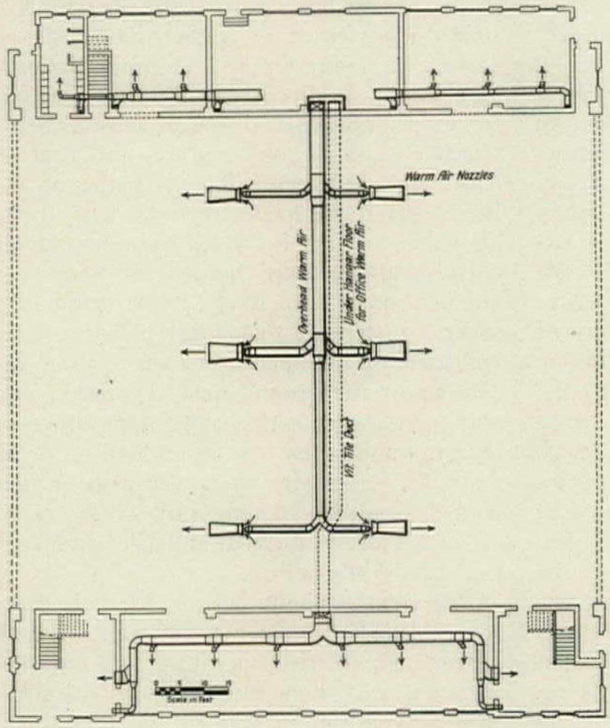
But what has all this to do with airport heating? It has much to do with the problem. When one pioneers, one must have all known factors. A glance at the plot plan of a modern airport will show several things of paramount importance in influencing the heating design. It is noted that an airport covers a vast area; that as at present planned the buildings are comparatively small; and that these buildings are spaced at a considerable distance from one another. The contour of the ground cannot be shown, but it does affect conditions. Briefly, a port will contain hangars, terminal or administration building, and concessions. The larger ports will include repair bases, dope shops, and motor test buildings. The greater ports will ultimately include restaurants, garages, taxi and bus terminals, hotels, and even railway terminals.

Possible Heating Systems. The first thought as to heating has naturally to do with a central steam plant with an underground distribution system of steam supply and condensation return pipe lines. In the larger ports this at once becomes prohibitive for several reasons,—the high initial cost, high maintenance, and, last but not least, the nearly impossible prediction as to future needs. Here we are confronted with the lack of knowledge of the future of the new industry. It is true that operating cost may show up very well, but it is more than likely, as has been proved in several instances, that local physical conditions will increase the operation cost. In one case, the contour of the ground made necessary considerable pumping of condensate. One other point to bear in mind is that the steam load is for heating, and that practically no power load or industrial load is needed. In only rare cases are railroad sidings available for coal and ash handling, or for the supply of fuel oil.

The next thought has to do with developing several smaller central steam plants, but this involves high salaried operators, and only in a rare instance will it work out economically. The third suggestion is that of an individual steam plant for each building. This, of course, means a low-pressure system to eliminate the necessity of employing licensed operators. For certain of the buildings this will work out satisfactorily. With an individual plant for each building, the first concern is as to the fuel to be used. The experience already gained has proved that it is nearly impossible to get proper attention for heating plants. Coal and ashes have to be trucked to and from the buildings, and good housekeeping is well nigh impossible. Careful investigation has shown that automatic firing of each plant with gas or fuel oil is advantageous. Where gas is available and where an economical rate can be obtained, it is most desirable, but gas is rarely available at an airport. Fuel oil has been accepted as a satisfactory solution to the fuel problem.

Hangar Requirements. But we are particularly interested in the heating of the hangars, for they have offered unusual problems to the heating engineer. A hangar is a garage for planes, with shops, offices and space for mechanical equipment. The accompanying sketch shows a modern

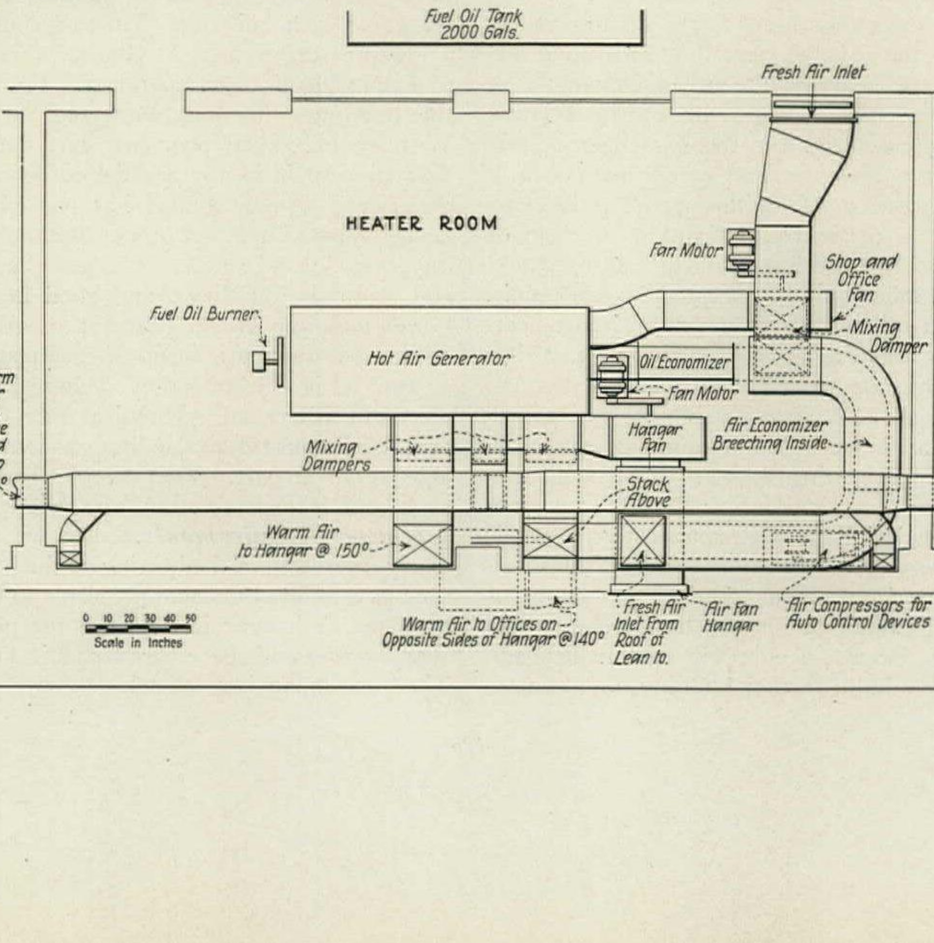




(Above) Sectional Diagram Showing the High Velocity Hot Air Nozzles Directed Toward the Doors

(Left) Plan Showing the Heating Room and the Distribution Ducts

(Below) Plan Showing Heating Apparatus and Arrangement in the Heating Room



hangar. The average space for housing planes is approximately 100 feet square, and the clear height, under bottom chords of trusses, is 20 feet. This gives a minimum free volume of 200,000 cubic feet. Where no hung ceiling is used, the volume will run from 250,000 to 300,000 or more cubic feet.

When a plane is housed in zero weather, the doors, which open the full width of the hangar, give a free opening of some 2,000 square feet. In a few moments the entire hangar temperature drops to the outside temperature. Here is the real problem of hangar heating. The hangar must be quickly re-heated. The accepted temperature is 50° Fahr. The shops should be heated to 60°, and the offices to 70° Fahr. It can be seen that there is considerable danger of freezing any water lines in a hangar if a careless pilot or attendant fails to close the hangar doors in zero weather. The time in which to re-heat the hangar has been arbitrarily set at approximately 20 minutes, as no serious damage can result in this length of time. Many planes have water-cooled engines, and there is danger in possible freezing. Another danger is in a cold motor.

Since we have a very large volume and desire to heat it quickly, the first thought is to rapidly propagate the heat throughout the hangar. Convection of heat is the quickest means. To do this it is best to rapidly circulate and re-circulate hot air. This can be done by heating air over steam coils or by directly heating the air in a hot air generator and circulating it with fans and ducts. To properly circulate and re-circulate warm air, a duct system must be employed to evenly distribute the heated air and maintain an even temperature. Planes are relatively large bodies; their wings and fuselage present large surfaces, and it is necessary to get the warm air to all points to melt off snow or ice.

The two greatest factors in heat losses are in the infiltration at the huge doors and in the roof losses. Too little attention has been paid to the designing of hangar doors, and too much emphasis has been placed on the low initial cost of roof construction and hung ceilings. It is recommended, as shown in the practical application indicated on the accompanying sketches, that the hot air be directed down in front of the doors (inside the hangar) to warm the air at the points of infiltration, and that the air in the attic be re-circulated to maintain a lower even temperature under the roof.

Circulation System. Since convection is necessary, it becomes apparent that rapid circulation of warm air is required. A most economical system has been developed, as indicated, wherein, by aspiration, a maximum re-circulation is produced with least power consumption. The aspirating nozzle shown in the accompanying sketches was originally designed for a re-circulation of 100 per cent air,—that is, for every cubic foot of air furnished through the high velocity nozzle, another cubic foot of air is circulated by aspiration. Actual tests of this nozzle have resulted in from 200 to 300 per cent aspirated air, definitely proving the reliability of the aspirator.

To meet these conditions, it is of course necessary to supply heated air. The most inexpensive method found is a hot air generator which is a direct-fired unit. The firing in the present cases is with fuel oil. The fans for circulating the air are motor-driven. Automatic control is provided and is described in the accompanying diagram. The fuel oil burners are designed for full automatic control and may be arranged for a graduated high and low flame as well. It is best to consider a variable flame, since better control and greater efficiency will probably result. Ignition is accomplished by dual gas-electric ignition. Where gas is not available at a port, gas supplied in containers is used. The type of burner for these installations will burn a heavy 14-16° Baume oil and give excellent results.

Features in connection with the design are the air economizer and the oil economizer. Waste gases give up some of their heat to the air and oil, making for greater efficiency. An emergency electric automatic heater is used, and a manual electric heater is provided for extreme emergencies and for starting the system after a long shut-down.

The automatic control provides thermostatic control for the hangars and office space, wherein the temperature of the room activates the system. A remote push-button control is also provided, should it be required, to shut down the system or start it up under unusual circumstances. In addition, the oil burner valve is controlled by the temperature of hot air supply to the hot air plenum, and mixing damper control is provided to allow control of the final temperature of the pre-heated air as admixed with cooler air. Air is re-circulated by the hangar supply fan from the hangar. Air for offices and shops is furnished fresh from the outside, but pre-heated over the air economizer. The offices and shops always receive fresh warm air, whereas the hangar receives re-circulated air. There is ample infiltration in the hangar doors to offset any normal vitiation.

A system of this type will cost in the neighborhood of $10,000 per hangar installed, dependent upon location, and when using 14-16° oil the cost of operation is low, considering the requirements. In only rare instances has lighter oil been recommended. With this system little attention is required, and the temperatures necessary are automatically maintained.

POLICY AND OPINION

A.D. 1930

THE annual forecast of architectural and building activity, published on the pages following, is generally optimistic in tone. Once again, the importance to the architect of a knowledge of economics and financial arrangements is brought strongly to our attention, since the amount of building, and therefore of architectural prosperity, is dependent on available funds,—easier and plentiful mortgage money means more work for the architect. Other things being equal, the architects who are equipped to aid clients to obtain money for building, both through financial knowledge and financial contacts, are in the strongest position to go ahead with their work. Those who have not these assets, nor clients with ready cash, may have time to use in introspection.

It becomes more and more apparent that the practice of architecture has become a business and that the successful conducting of that business demands more than the ability to design and plan (though that is the prime essential); it requires an organization equipped with knowledge and ability in engineering and business. Architecture is following the modern trend of organization along the lines of "big business," which it serves. Efficient architectural service now demands knowledge of so many fields and ability of so many kinds that a well rounded group rather than an individual is the rule for successful large practice. The architect has become the executive of an architectural organization coördinating the work of designers, engineers, draftsmen, superintendents, contact men, clerks and even salesmen. THE ARCHITECTURAL FORUM recognizes this complexity of architectural practice today and has established a program for 1930 that is comprehensive. The problems of architecture for 1930 have been analyzed into five groups, each with its major and minor sub-divisions, and each problem will be treated authoritatively and in the most useful way possible in these pages. *K.K.S.*

NEW CODES FOR OLD

BUILDING codes become obsolete proportionately to the improvement of the materials and methods of construction and the growth of technical knowledge. This fact is of importance because the building code is a tremendous factor in the economics of construction, realty ownership and public welfare. The antiquated and now obsolete building code of New York is a handicap to the building industry and militates against progress in that city in the same manner that obsolete building codes affect other cities.

Recognizing the gravity of the situation, the Merchants' Association of New York initiated a revision of the New York Building Code. The recommendations of six technical sub-committees have been presented to the Advisory Committee which is authorized to obtain suggestions and criticisms and secure public support for its adoption when presented to the mayor. The Association is to be commended for its understanding and initiative in this important matter, and its committee and sub-committees are equally to be commended for their unselfish contribution of technical knowledge and work.

Some questions have been raised as to the true purport of certain administrative sections contained in the reports on Minimum Loads and Structural Steel, and Foundations. In them, it is stipulated that all structural and foundation plans shall be accompanied by an affidavit of the designing engineer saying that he is familiar with the building code and that to the best of his knowledge and belief the design conforms to it. Also, that he shall file an affidavit saying that the work has been executed according to the plans before a certificate of occupancy is granted.

These stipulations have been construed by some to affect the position of the architect as the responsible agent in all of the phases of building designing. THE ARCHITECTURAL FORUM has always maintained that it is the proper function of the architect to coördinate all of the plan, construction and equipment elements that are required for the erection of a building, to supervise its construction, and make sure that all of the contractual relations involved eventuate successfully.

The complexities and intricacies of modern building construction necessitate the architect's delegation of certain functions to others of his own selection and for whom he is properly responsible. It is a well established principle of business, professional and military practice, that final responsibility must lie with one and not with several dissociated units. This principle is demonstrated by experience to be necessary in the successful consummation of large building projects.

Assurance is given by architect members of the Committee that the filing of plans and specifications with the authorities for approval will remain, as heretofore, with the architect, and that in the execution of the plans, he will be the only architect of record. All affidavits and calculations pertaining to the plans are to be filed with the building department by the architect as part and parcel of the plans and specifications. The building permits may be procured by others.

In some instances, the architect contracts to make and file the plans and specifications only. Under these conditions he has nothing to do with the construction or inspection of the work, and to safeguard the stability of the structure it is proposed that the designing engineer, or other licensed engineer, shall make affidavit to the effect that he has inspected the foundations during construction and that they comply with the plans of the designing engineer. A similar affidavit is required as to the steel or other structural features. Under the conditions of the limited employment of the architect, these requirements are not an invasion of his rights.

The place and manner of filing these affidavits should be clearly defined, as should the conditions under which they should be filed by a designing engineer instead of by the architect of record. In some cities the required affidavits are made on the tracings, appear on the blue prints, and are accepted by the building department. This method has the advantage of publicity, which the mere filing of a document lacks.

Of course, honest opinions on many points will vary, but when the personnel of the various committees and the close attention of their members given to the development of the code are taken into consideration, it seems assured that all material factors are correctly appraised and that the proposed code is representative of the best current practice. In every city there is a potential danger of inadvisable changes in a building code actuated by special interests. There is also danger in the delegation of interpretation of the code and in the provisions made for allowing exceptions and special rulings. The tremendous financial investment in building construction in New York offers a field for special privilege exploitation which is very tempting, and as a matter of ordinary business precaution, this code must be safeguarded throughout its entire course by its proponent, the Merchants' Association of New York, and by the organized effort of those interested in economic and public welfare. *A. T. N.*

FINANCE AND ARCHITECTURE

ARCHITECTURE is dependent on capital which makes building possible. The amount of capital available for construction is therefore a determining factor in the amount of business on the boards of architects. A study of recent financing discloses the fact that much of the money invested in buildings becomes "frozen" capital which has not the advantages of more liquid capital invested in readily marketable securities, such as stocks and bonds listed on the large exchanges. Realty and building securities have not been easily marketable, nor could these securities be used readily as collateral,—distinct disadvantages both.

To provide a liquid market for realty securities, to stabilize values and to make such securities as attractive to investors as stocks and bonds of other kinds, is necessary to realty, to building and to architecture. For some 16 years effort has been directed to this end,—culminating in the opening of the New York Real Estate Exchange, Inc., on December 16, 1929. It is probable that similar exchanges will be established in other cities, and therefore the progress of the New York exchange will be watched with interest. A detailed account of this exchange was published in THE ARCHITECTURAL FORUM for August, 1929 in an article entitled "Wall Street Enters the Building Field" by John Taylor Boyd, Jr.

The significance of the new exchange, the reasons for its establishment, and its probable effects were again brought out at the luncheon celebrating the opening. "We are adding another basic unit to the financial system of the country, and by strengthening and expanding this system we are contributing to national economic welfare," said Peter Grimm, President of the Real Estate Board of New York, Inc., sponsors of the exchange. "As a primary market for securities, the exchange will be an influence at the very root of business. The opening culminates a long program of painstaking study and meticulous planning. Sixteen years ago, after four years of preliminary discussion, the Real Estate Board of New York began its first efforts to provide real estate with an exchange for its securities. The work has been going on ever since. We celebrate today the result of thorough research into the problem.

"The reasons for establishing the exchange were: modern real estate development's requiring huge capital; the necessity for raising this money through liquid securities, the character of which must be investigated and made known, and the market value recorded daily. In fulfilling these purposes, the exchange is destined to stimulate the pulse of real estate, bridging the gap between the investing public and realty investment and distributing the profits more widely."

Cyrus C. Miller, president of the new exchange, presided at the luncheon, and voiced the hope that operation of the exchange would be "reflected in better homes and commercial buildings as a result of stabilized values for real estate securities." Certainly the profession of architecture will benefit, and architects will inform themselves of this new factor in the financing of construction which has a direct bearing on their projects. *K. K. S.*

WILL ARCHITECTS BE BUSY IN 1930? NINTH ANNUAL BUILDING SURVEY AND FORECAST

BY

C. STANLEY TAYLOR

TO a great extent the architects of this country represent the advance guard of its building construction. They constitute, perhaps, the first group which records changing trends in the volume and type of building construction. The reasons for this condition are obvious, because architects are the first to hear of most projects and the first to discuss them in any detail outside of the owner's immediate circle of business contacts. The architect works on plans and specifications long before there is any general knowledge of the project, and he knows approximately when the project will be offered for contractors' bids.

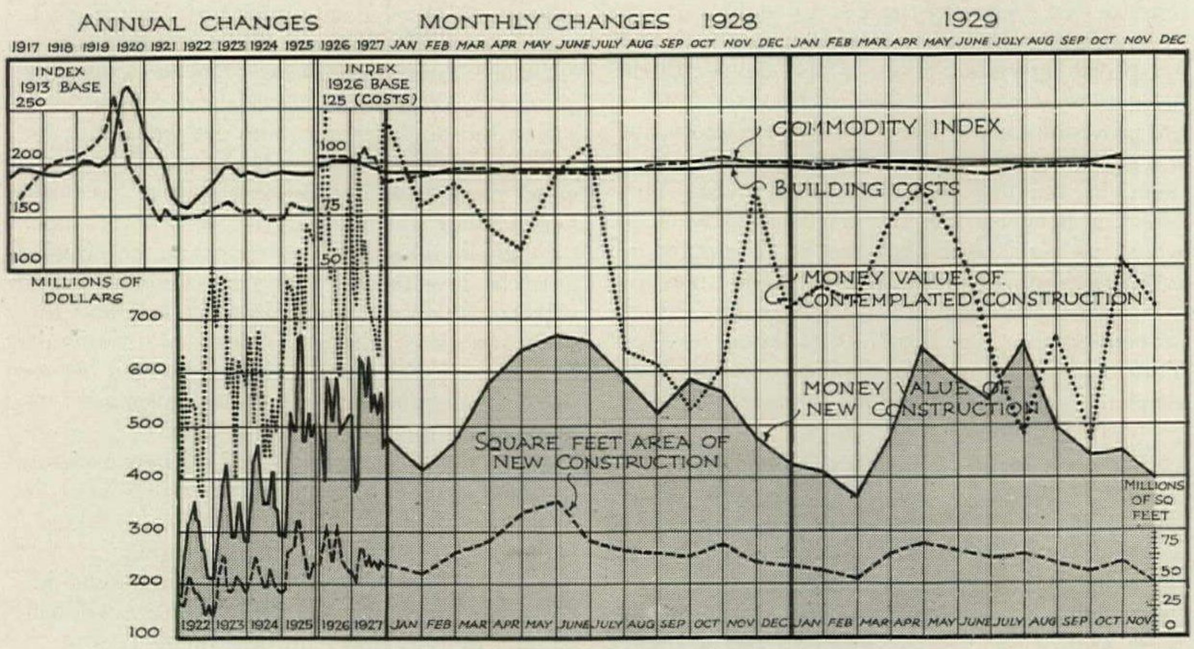
The building industry, including its advance guard of architects, is looking forward to 1930 with what might be termed tremulous expectancy. Opinions as to the building activity which may be expected during the year 1930 vary considerably and are so entangled with unusual economic developments that there seems to be no positive average opinion, such as we have had in previous years. If the new building projects which are on the architects' boards and under discussion for 1930 *do* eventuate,—even if 60 per cent of them become actualities,—the architectural profession will enjoy a prosperous year.

Readers of THE ARCHITECTURAL FORUM are quite familiar with the annual survey and forecast which has been made for the past eight years in an effort to predict building conditions. This year one of the significant facts disclosed by the survey has been the hesitancy of many architects to predict their own future activities. The reason is obvious,—lack of mortgage money, also somewhat complicated by the fact that no one seems to be able to predict the trend of public confidence in business conditions. There are a vast number of projects under planning now by architects which are going ahead in 1930 if they can be financed, and if owners do not lose confidence.

Realizing the logic of this condition THE ARCHITECTURAL FORUM has just conducted a telegraphic survey of mortgage conditions. Questionnaires were sent to the leading officials of savings banks, building and loan associations, title companies, insurance companies, and other mortgage-lending institutions in every part of the country. The questions asked are these:

1. Have there been indications of easier mortgage money since the Wall Street readjustment?
2. Do you anticipate easier mortgage conditions in 1930?
3. Do you anticipate many applications for building and permanent mortgage loans in 1930?

The result of analyzing the large number of



THE BUILDING SITUATION

The Various Index Lines are Designated on the Chart, which is Developed from Reports of the United States Department of Commerce, the F. W. Dodge Corporation Reports, and the *Engineering News-Record* replies sent in by the officials of mortgage-lending interests has been the formation of a fairly definite picture as to mortgage money conditions for 1930. The replies which were received were in general encouraging because they were conservative and carefully considered. The average opinion indicated that there has already been some signs of easier mortgage money during the short period since the recent Wall Street collapse. As a rule, these indications varied consistently according to districts of the country. In the area of metropolitan New York the first signs have already appeared in the development of a number of large building projects. Mortgage money, however, has not yet become easier for smaller projects nor for projects in the outlying suburban districts. This same condition holds true for the middle west. On the Pacific coast optimism is the rule rather than the exception, and this is perhaps a natural condition because the stock market situation did not affect the Pacific coast as drastically as in the states of the east and central west. Upper New York state and most of New England has shown relatively little change, while in the south mortgage money conditions show definite signs of improvement.

It must be realized that for a period representing probably the first half of 1930 mortgage money channels are seriously blocked by two obstacles. In the first place, savings banks and possibly even building and loan associations, were recently drained heavily for funds to meet stock margin and collateral loan requirements. The funds which might ordinarily go for mortgage purposes have been used to meet demands of the Wall Street collapse. Thus this important channel of mortgage money is temporarily dammed and will reëstablish itself only as savings and conservative investments mount again. But they will surely mount, because the public has learned a lesson. The second obstacle is the fact that many mortgages coming due at this time are being called by mortgagees who wish to use the money to cover their own situations. These mortgages on existing buildings must be replaced, and as a rule they take precedence over loans for new construction. These may be cleared out of the way, and this readjustment has already begun. It would seem obvious that there will be a great increase in the amount of money placed through mortgage channels. There is always a swelling tide mortgage money after any great economic adjustment, but it will take time and patience before the last obstacles are cleared away and before

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U.S.A.
Automotive	$23,361,800	$47,580,500	$6,519,000	$18,978,900	$56,575,900	$16,859,200	$169,875,300
Banks	37,806,100	31,602,800	2,029,500	10,688,700	48,515,300	7,281,600	137,924,000
Apartments	27,765,200	325,954,100	9,114,300	26,026,800	95,407,000	68,355,200	552,622,600
Apartment Hotels	2,980,700	65,050,600	8,466,500	24,571,300	73,156,300	36,367,000	210,592,400
Clubs, Fraternal, etc.	5,797,400	44,653,100	2,242,700	17,978,500	75,891,000	15,243,800	161,806,500
Community and Mem.	6,437,000	26,486,000	861,000	5,608,800	26,670,500	26,752,500	92,815,800
Churches	12,685,400	44,665,400	30,262,100	34,784,400	70,876,700	23,993,200	217,267,200
Dwellings (Below $20,000)	24,751,700	33,968,500	10,245,900	11,676,800	41,323,900	15,846,500	137,813,300
Dwellings ($20,000 to $50,000)	11,877,700	44,362,000	8,269,700	9,983,500	45,628,900	15,571,800	135,693,600
Dwellings (Over $50,000)	13,300,400	39,524,000	6,642,000	6,810,100	34,739,300	11,041,300	112,057,100
Hotels	13,919,500	78,941,400	31,910,300	76,711,000	87,649,800	104,468,000	393,600,000
Hospitals	33,488,800	161,523,600	11,500,500	46,649,800	94,025,300	24,190,000	371,378,000
Industrial	14,358,200	58,634,100	23,985,000	21,381,500	141,060,500	29,725,000	289,144,300
Office Buildings	56,662,000	250,788,800	1,107,000	41,922,500	255,930,200	72,426,500	678,837,000
Public Buildings	14,296,700	88,182,800	7,293,900	18,876,400	146,062,500	44,062,700	318,775,000
Schools	47,855,200	188,395,000	30,053,000	77,174,300	223,003,100	74,374,000	640,854,600
Stores	15,485,700	74,136,200	8,790,400	10,282,800	43,726,500	14,509,900	166,931,500
Theaters (all types)	11,808,000	21,250,300	10,036,800	15,260,200	30,167,800	9,056,900	97,580,000
Welfare, Y.M.C.A., etc.	29,151,000	59,749,300	5,817,900	8,581,300	34,517,900	5,510,400	143,327,800
TOTAL VALUE OF NEW BUILDINGS	$403,788,500	$1,685,448,500	$215,147,500	$483,947,600	$1,624,928,400	$615,635,500	$5,028,896,000

New Construction Under Architects' Supervision $5,028,896,000

Buildings of All Types—Excluding Public Works and Utilities—Not Designed by Architects 1,972,000,000
(Estimated from Averages of Previous Years)

TOTAL ESTIMATED CONSTRUCTION FOR 1930 . . . . $7,000,896,000
(Exclusive of Public Works and Utilities)

we reach again a normal condition in this field.

A glance at the accompanying chart showing building activity during 1929 immediately reflects the influence of mortgage money in establishing the volume of building construction activity. The year 1929 would have represented a very large volume of construction business if its foundation of mortgage money had not been almost entirely destroyed. The building industry cannot compete with high priced call money. It cannot show the dramatic profits which the ticker tape has spelled out through this past period of blind speculation, but the building industry can and will compete with any line of legitimate investment or even speculative profit, and it looks very much as though it were about to have its chance again.

When we reflect upon these conditions we can understand why architects were hesitant this year in predicting their own activities. We can understand why even with excellent projects in actual stages of plans and specifications the architect could not be sure of reaching contract stages. We can also understand the conservative statements of bankers and the fact that the mortgage financing survey, which has just been conducted, reflects as the average opinion:

(1) That there have been some signs, although not many, of easier mortgage money in certain sections of the country;

(2) That it will take the early part of 1930 for adjustments to clear away the obstacles already described as blocking the mortgage money channels, but that we may confidently expect much easier conditions in the second half of the year, and

(3) that there are a large number of building projects which will be ready for financing during 1930.

General business conditions are becoming more and more encouraging. The panic idea has already been discounted by the fact that hundreds of thousands of people have gone to work more seriously than ever to maintain personal and general prosperity. It is probably quite true that some industries will show an extensive falling off in business. Perhaps the demand in 1930 will be less for luxuries and more for practical improvements. The building industry will benefit rather than suffer from such a condition, because all the buildings of this country are not luxuries,—they are practical machines developed for practical purposes. There will unquestionably come a positive reduction in the amount of speculative building because the facilities for gambling of this nature will not be present. On the other hand, legitimate building for profit to meet known demands may be expected to increase as financing becomes easier and cheaper.

In considering the possible building program of 1930, an immeasurable factor has been introduced suddenly into the picture. This is the great construction program fostered by the government and supported in theory at least by states and municipalities. President Hoover turned in a very natural manner to the construction industry as a means of stabilizing the business welfare of the American public. There exists today a tremendous demand for public buildings and civic improvements. There is great pressure being exerted for public utilities, for increased facilities and service. There is great need for better roads, bridges, transportation facilities, and various other types of engineering projects which come within the scope and control of national, state and city officials. So definitely has this program been presented and so enthusiastically has it been supported that it cannot help but contribute a great volume of building activity to the total of 1930.

Summing up the general situation, therefore, and considering the figures of The Forum forecast as presented herewith, we find these significant facts arrayed for consideration:

1. The general demand for new building construction is approximately the same as it was at the beginning of 1929.
2. The trend toward there being a far greater supply of mortgage money is very definite.
3. The deliberate program of construction which is being started by the government, by states and by municipalities will evidently assume very large proportions.

This combination of factors would seem to provide reasons for optimism regarding the building activities of 1930. It would seem that we can assume at least as much building construction during this new year as we had in 1929, and probably more. In fact if mortgage money becomes really much easier, and if the contemplated great schedules of public improvements are carried out, it would seem to be quite within reason that 1930 might exceed all construction years. Probably it will not do this, because the contributing factors may not get under way strongly enough during 1930 to swell the totals beyond past records.

It is true that never before has the human element entered so strongly into the picture of the building industry. Who can foretell what will be mass psychology? We believe that everyone senses a returning spirit of confidence based on hard work and intelligent planning. The signs of the times are pointing favorably. Even in the self-sustaining statements of captains of industry there is to be found an intelligent realization of the great things which can be accomplished by the American public when it really goes to work, —and it has gone to work. For the American public to work it requires tools, and the chief tools of industrial and commercial activity are the buildings which house the multi-fold operations.

Before turning to an analysis of the change in public demand for buildings of various types, we cannot well leave the stage of prophecy without commenting on the existing trends which are under way in the field represented by the designing of buildings and the materials and equipment which are required. In the first place, the influence of mortgage loaning interests on plans and specifications has never represented such significant control as it is now assuming. The very scarcity of mortgage money assumes that the collateral on which it is placed must be most carefully scrutinized. There is coming a far greater volume of mortgage money financed through bond issues and certificates issued by large loaning companies. This is a more flexible type of mortgage investment from the point of view of the individual investor, and as it is handled through large central organizations it is obvious that the facilities for provision of plans and specifications will be greatly improved. It it quite apparent that as mortgage money mounts again in volume it will be more scientifically handled, and the natural result will be better quality in design and in the types of materials and equipment selected. We are to have better buildings, regardless of type, first, because of a more intelligent demand on the part of the public and, second, because of the more carefully scrutinized control of mortgage money.

This is a significant condition for architects, because it means a constantly increasing demand for the better type of architectural service. An investing public is learning more of the value of good architectural service, because the architectural profession is learning to render a more valuable service. The economic condition of the architectural profession is strengthening constantly as architects assume a broader relationship with building projects and with the economic structure which casts its shadowy lines over the drafting board. More and more in successful building projects of all types the architect and the engineer are finding the recognition which always develops for practical contributions. Withal there is no decline in the art of this great profession. The æsthetic phase is mounting too in its practical contribution to American business and social life.

There have been tremendous developments in the manufacturing side of the building industry. Not only have great capitalists become actively interested, but the very size of the industry has forced vision, and together with an intricate combination of research and technical improvements, which is completely changing many of our construction methods, materials and equipment, some of the great basic divisions of the building industry, such as those supplying steel and lumber, are being forced to the development of hundreds of specialties for the building industry. There has been a tremendous increase in the application of engineering skill to the solution of building problems. All of these things, while they require far greater study and more comprehensive understanding on the part of the architect, contribute in turn to the quality of finished buildings. Good accounting is showing the fallacy of cheap construction. The competition of building against building is rapidly elevating standards of service and æsthetic requirements. The costs of maintenance and depreciation are more thoroughly understood than ever before as factors which determine building investment profits. In every direction it seems that forces are gathering which may show the year 1930 as a very profitable year for architects, and perhaps as the beginning of an interesting cycle of active years as the public turns again to mortgage financing as an outlet for its money and to buildings as an important factor in maintaining prosperous business conditions.

In establishing a forecast of building activity it is of definite interest to analyze the changes in public demand evidenced for the coming year as compared with that of a year ago. In order to show this condition there will be found herewith a detailed tabulation in which the percentages of public demand for the various types of buildings which made up the total forecasts for 1929 and for 1930 are compared. Both forecasts were based on the figures presented in the large number of detailed questionnaires sent in by architects from every part of the country. The actual figures of THE ARCHITECTURAL FORUM forecast of building activity for 1930 are shown in the accompanying table and indicate total construction activity exclusive of public works and utilities to the value of \$7,000,896,000 as compared with \$7,308,793,200 forecast for the year 1929.

The changes in the trend of public demand are indicated in tabulations which present a comparison of requirements for new buildings by the public in the year 1929 as compared with those of the year 1930. The total amount of building construction represents 100 per cent, and the figures shown in each column are the percentages based on total values for each individual type of building. The figures given under the column headed "Change" represent the change in percentage figures. For instance, in the column of national percentages the change shown for automotive buildings is plus 6. This figure is obtained by subtracting the 1929 figure of 2.8 from the 1930 figure of 3.4 and signifies that an apparent demand for automotive building in this country has increased almost one fifth at the beginning of the year 1930 as compared with the beginning of the year 1929. Some of these figures show startling changes in the public demand for new structures.

In analyzing these figures, it must be remembered that they apply only to the types of buildings which come under architectural control; but after all they represent the bulk of better building construction, and lend considerable interest to the forecast as to what types of buildings will show less or greater activity in this year of 1930.

CHANGES IN PERCENTAGES OF PUBLIC DEMAND FOR NEW BUILDINGS IN 1930 COMPARED WITH 1929

National Percentages, U. S. A.

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.8	3.4	+ .6
Banks	2.9	2.7	− .2
Apartments	13.1	11.0	−2.1
Apartment Hotels	4.8	4.2	− .6
Clubs, Fraternal, etc.	3.4	3.2	− .2
Community, Memorial	1.2	1.9	+ .7
Churches	4.2	4.3	+ .1
Dwellings (under $20,000)	3.6	2.7	− .9
Dwellings ($20,000 to $50,000)	2.3	2.7	+ .4
Dwellings (over $50,000)	1.9	2.2	+ .3
Hotels	6.7	7.8	+1.1
Hospitals	4.9	7.4	+2.5
Industrial	7.5	5.8	−1.7
Office Buildings	13.5	13.5	....
Public Buildings	6.7	6.3	− .4
Schools	11.7	12.8	+1.1
Stores	3.4	3.3	− .1
Theaters	3.2	1.9	−1.3
Welfare, Y. M. C. A., etc.	2.2	2.9	+ .7

North Atlantic States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.1	2.8	+ .7
Banks	2.7	1.9	− .6
Apartments	18.5	19.3	+ .8
Apartment Hotels	1.0	3.9	+2.9
Clubs, Fraternal, etc.	3.5	2.6	− .9
Community, Memorial	1.1	1.6	+ .5
Churches	2.8	2.7	− .1
Dwellings (under $20,000)	4.2	2.0	−2.2
Dwellings ($20,000 to $50,000)	2.0	2.6	+ .6
Dwellings (over $50,000)	2.2	2.3	+ .1
Hotels	4.8	4.7	− .1
Hospitals	5.6	9.6	+4.0
Industrial	6.6	3.5	−3.1
Office Buildings	12.3	14.9	+2.6
Public Buildings	9.4	5.2	−4.2
Schools	8.4	11.2	+2.8
Stores	4.0	4.4	+ .4
Theaters	3.2	1.3	−1.9
Welfare, Y. M. C. A., etc.	2.4	3.5	+1.1

Northeastern States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	5.4	5.8	+ .4
Banks	5.9	9.4	+3.5
Apartments	6.3	6.9	+ .6
Apartment Hotels	1.0	.7	− .3
Clubs, Fraternal, etc.	2.7	1.4	−1.3
Community, Memorial	1.3	1.6	+ .3
Churches	7.9	3.1	−4.8
Dwellings (under $20,000)	4.1	6.1	+2.0
Dwellings ($20,000 to $50,000)	3.9	2.9	−1.0
Dwellings (over $50,000)	2.5	3.3	+ .8
Hotels	8.1	3.4	−4.7
Hospitals	7.1	8.3	+1.2
Industrial	7.6	3.6	−4.0
Office Buildings	4.7	14.3	+9.6
Public Buildings	5.8	3.5	−2.3
Schools	16.8	11.8	−5.0
Stores	2.4	3.8	+1.4
Theaters	2.4	2.9	+ .5
Welfare, Y. M. C. A., etc.	4.1	7.2	+3.1

Southeastern States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	5.3	3.0	−2.3
Banks	.8	.9	+ .1
Apartments	7.5	4.2	−3.3
Apartment Hotels	3.6	3.9	+ .3
Clubs, Fraternal, etc.	1.1	1.0	− .1
Community, Memorial	1.1	.4	− .7
Churches	16.3	14.1	−2.2
Dwellings (under $20,000)	4.8	4.8	....
Dwellings ($20,000 to $50,000)	4.2	3.8	− .4
Dwellings (over $50,000)	4.0	3.1	− .9
Hotels	10.1	14.8	+4.7
Hospitals	3.3	5.4	+2.1
Industrial	11.2	11.2	....
Office Buildings	3.5	.5	−3.0
Public Buildings	4.4	3.4	−1.0
Schools	9.3	14.0	+4.7
Stores	3.2	4.1	+ .9
Theaters	2.7	4.7	+2.0
Welfare, Y. M. C. A., etc.	3.6	2.7	− .9

Southwestern States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.9	3.9	+1.0
Banks	1.6	2.2	+ .6
Apartments	5.7	5.4	− .3
Apartment Hotels	4.3	5.1	+ .8
Clubs Fraternal, etc.	3.6	3.7	+ .1
Community, Memorial	1.6	1.2	− .4
Churches	6.6	7.2	+ .6
Dwellings (under $20,000)	3.1	2.4	− .7
Dwellings ($20,000 to $50,000)	2.1	2.1	....
Dwellings (over $50,000)	1.6	1.4	− .2
Hotels	12.5	15.9	+3.4
Hospitals	3.5	9.6	+6.1
Industrial	9.8	4.4	−5.4
Office Buildings	11.4	8.7	−2.7
Public Buildings	5.1	3.9	−1.2
Schools	16.5	15.9	− .6
Stores	2.2	2.1	− .1
Theaters	2.1	3.1	+1.0
Welfare, Y. M. C. A., etc.	3.8	1.8	−2.0

Middle States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	3.2	3.5	+ .3
Banks	3.2	3.0	− .2
Apartments	9.7	5.9	−3.8
Apartment Hotels	5.5	4.5	−1.0
Clubs, Fraternal, etc.	3.8	4.7	+ .9
Community, Memorial	1.0	1.6	+ .6
Churches	3.9	4.4	+ .5
Dwellings (under $20,000)	2.3	2.5	+ .2
Dwellings ($20,000 to $50,000)	2.1	2.8	+ .7
Dwellings (over $50,000)	1.4	2.1	+ .7
Hotels	5.7	5.4	− .3
Hospitals	4.1	5.8	+1.7
Industrial	8.7	8.7	....
Office Buildings	17.0	15.7	−1.3
Public Buildings	4.9	9.0	+4.1
Schools	14.4	13.7	− .7
Stores	3.1	2.7	− .4
Theaters	4.2	1.9	−2.3
Welfare, Y. M. C. A., etc.	1.8	2.1	+ .3

Western States

Type of Building	Requirements for New Buildings by Percentages		
	1929	1930	Change
Automotive	2.4	2.7	+ .3
Banks	2.2	1.2	−1.0
Apartments	14.3	11.1	−3.2
Apartment Hotels	7.1	5.9	−1.2
Clubs, Fraternal, etc.	2.7	2.5	− .2
Community, Memorial	1.9	4.3	+2.4
Churches	3.4	3.9	+ .5
Dwellings (under $20,000)	4.1	2.6	−1.5
Dwellings ($20,000 to $50,000)	2.5	2.5	....
Dwellings (over $50,000)	2.2	1.8	− .4
Hotels	11.2	17.0	+5.8
Hospitals	5.6	3.9	−1.7
Industrial	4.9	4.8	− .1
Office Buildings	14.8	11.8	−3.0
Public Buildings	4.7	7.1	+2.4
Schools	9.8	12.1	+2.3
Stores	3.9	2.4	−1.5
Theaters	1.5	1.5	....
Welfare, Y. M. C. A., etc.	.8	.9	+ .1

ILLUMINATING THE BARCELONA EXPOSITION

BY

K. W. JOHANSSON*

ELECTRICAL ENGINEER

THE engineering section of the International Exposition at Barcelona took special interest in giving to the illumination of the central decorative area an effect more elaborate than has been accomplished heretofore. The attainment of this objective has been evident from the many favorable comments of Spanish officials and patrons regarding the effects achieved.

In planning lighting of this nature the essential considerations are the general layout of effects desired, æsthetic design of fountains, cascades, crystal elements, etc., and the procuring of lighting units and control equipment so that this mass of light may be varied in intensity and color from a central point overlooking the whole area.

The original fundamental idea governing the project was the absolute suppression of direct lighting by electric lamps in the whole of the decorative area. Illumination was obtained in all cases by indirect means,—either by concealing, in the case of piazzas and facades, the lamps or reflectors in cornices or decorative motifs of the building, or by mounting them within luminous crystal elements of æsthetic design in many and varied forms, imitating at times, in the avenues and open spaces, fantastic flowers or plants. To the amount of lighting thus obtained was added that produced by underwater units which threw light on and through the water in cascades and in several fountains in the central area. One of these fountains played a stream of water 200 feet into the air, and with electrically-controlled pumps the shape could be changed into 32 different designs. To take care of this program, powerful electrically-driven pumps circulated water at a rate of 200,000 cubic meters per day.

This mass of lights may be made to have varied rhythmically, or at the dictates of fancy, intensity and color by use of centrally located control equipment. The difficulty in putting these ideas into practice was a very serious problem, when it is considered that the total energy put to work for the illumination and cascades was about

*Westinghouse Electric & Manufacturing Company

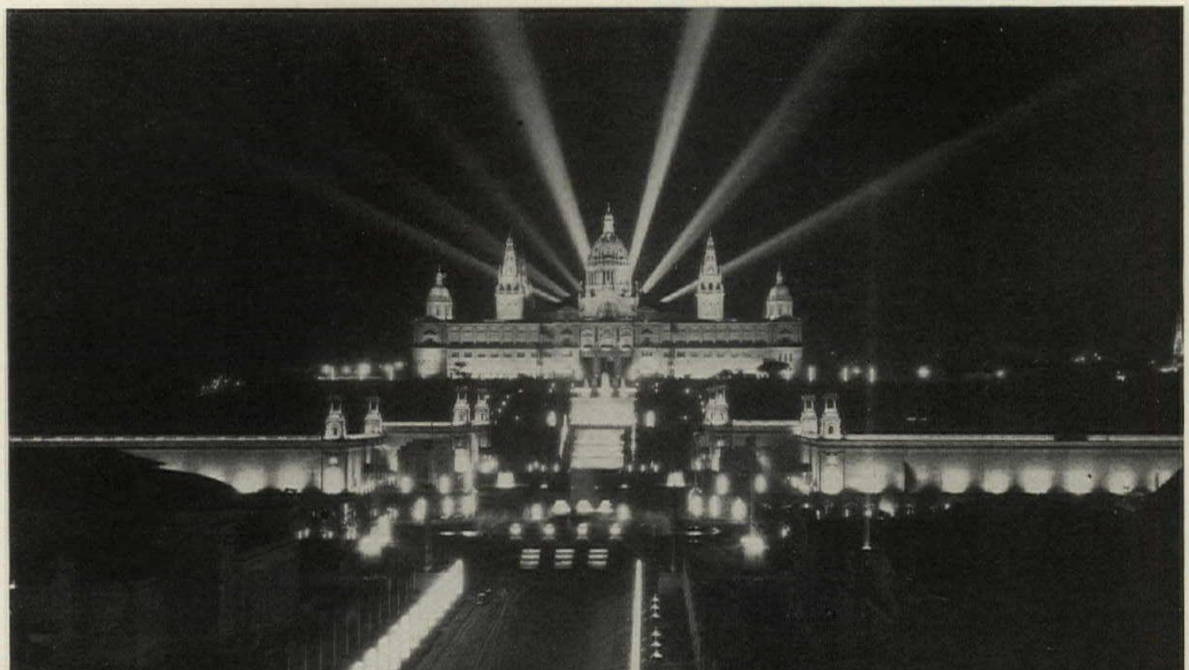


Fig. 1. General View of the Illumination of the Decorative Area of the Barcelona Exposition

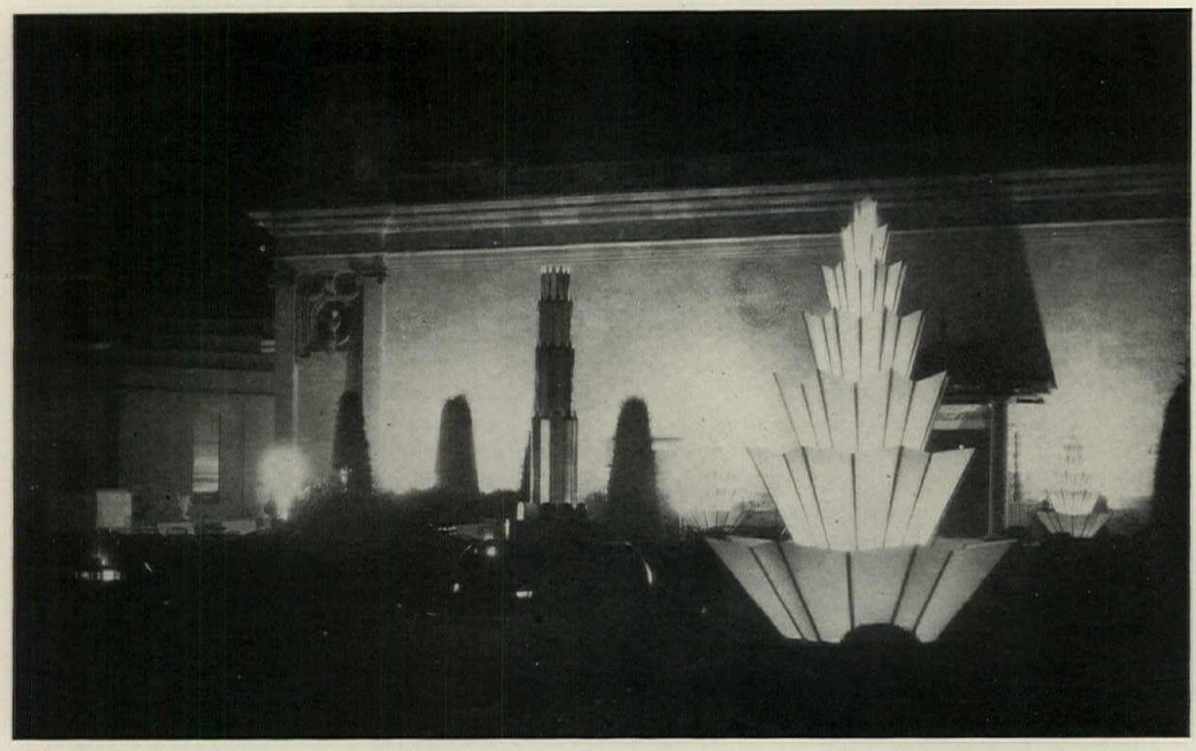


Fig. 2. Illuminated Crystal Elements in Front of the Reina Victoria Eugenie Palace, Barcelona Exposition

5,252,000 watts. It was almost impossible to think of regulating the consumption current by direct means, as it would have necessitated the use of cable of inadmissible section, and control apparatus of extraordinary dimensions.

Lighting Control. The control for the whole lighted area was divided into one central control station, re-actor substations, and five manhole re-actor stations, properly located. The central control station was located in the top of the right tower at the entrance at the Plaza de Espana, overlooking the whole Exposition. This control station was the nerve center of the controls and contained the manually-operated switchboard and contactor board, the automatic controls and motor generators sets for direct-current excitation of the re-actors. The re-actor substations contained, as the name indicates, the re-actors and the necessary switching equipment for handling the alternating-current circuits, going out to the lighting.

The fundamental idea of this whole plan was indirect control by means of pilot wires of extremely small section, and specially designed units for regulating the intensity of the light. These units are called re-actors and look very much like three-phase transformers, but carrying on two coils the outer cores, one on each core, connected in series, and interposed in the lighting circuit. The center core carried a third independent coil, which was connected in a direct-current circuit. When no current flowed in this direct-current coil, the two alternating-current coils possessed a high re-actance in series with lights, and the whole was so calculated that, when there were enough lights in circuit corresponding to full load of the re-actors, the lights were practically extinguished. Upon passing current through the direct-current coil, the flux in the core of the re-actor would increase, and upon reaching saturation point the outer coils would have practically no effect, there being no variation in the flux, and the lights would reach their full brilliance. Between these two extremes any intermediate degree of brilliance could be obtained. Since the current absorbed by the direct-current coil was very small, a small rheostat with very fine wires could control a very large amount of power. The re-actors used varied is size from 16kw., 125 volts, air-insulated, to the largest ever built, 200 kw., 6,000 volts, oil-insulated.

Operation. With the exception of the units for the cascades and the fountains which had specially constructed color controls, all lighting units were composed of groups of lamps in four colors, —white, yellow, red and blue,—all individually controlled, so that it was possible to obtain any blending of colors. The intensity of each group of colors was controlled by reactance units, the direct-current coils of which were controlled by dimmer plates located at the central control station as has been already explained in detail.

The general scheme for lighting the central dec-

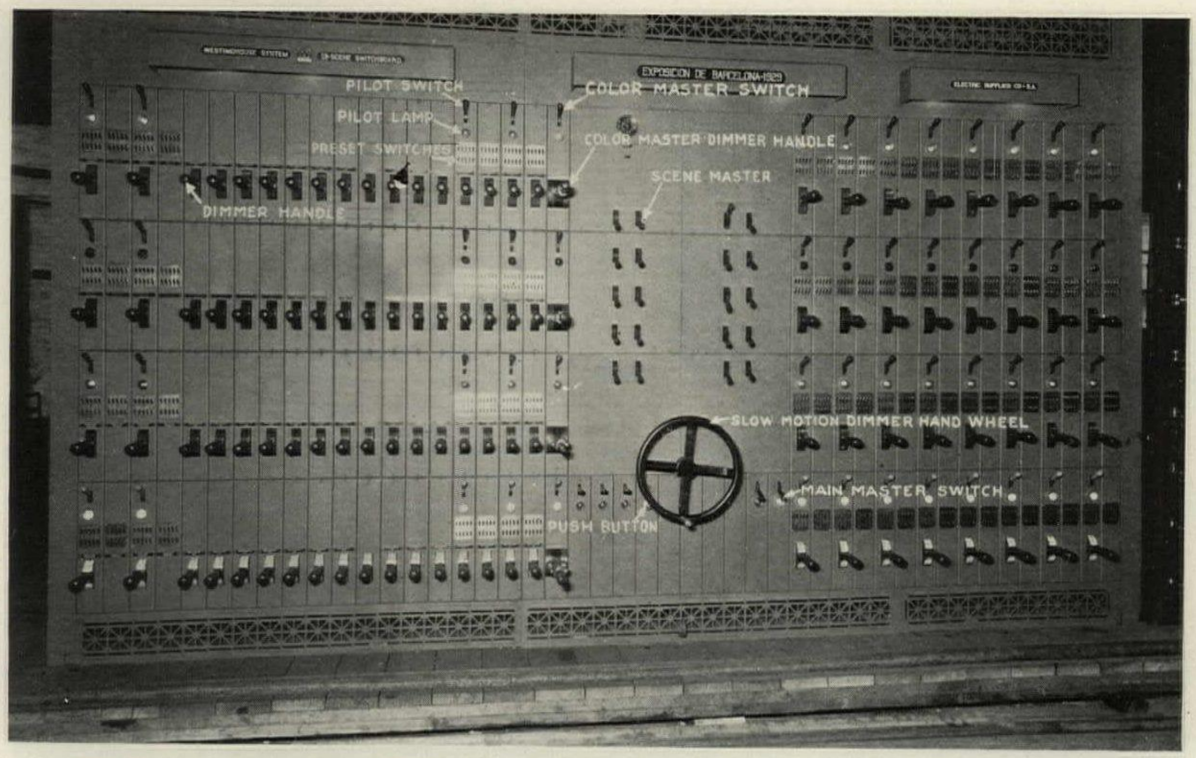


Fig. 3. Manually Operated, 20-scene, Multi-preset Switchboard, with Main Switches Used for Operation Specified

orative area of the Exposition could be segregated into the two distinct classes of programs:

1. The mobile-automatic lighting program.
2. The manually-operated program.

The Automatic Program. This program, as the name indicates, showed a flow of light proceeding from the National Palace located at the top of the hillside, down the central ornamented area, down Reina Maria Cristina Avenue, to the Plaza de Espana. Beginning at the National Palace, the white color went down slowly through the cascades, descending to Reina Maria Cristina Avenue and the entrance at Plaza de Espana at a rate of 7½ feet per second. As the white wave reached Reina Maria Cristina Avenue, the yellow color commenced at the National Palace and proceeded at the same rate, followed by red and blue. The whole automatic program lasted about 10 minutes. The blue light finished the wave action, and the control was so arranged that the entire area would be lighted in blue. At this time a bell would ring, indicating to the operator that the controls should be transferred to the manually-operated board.

The control for the mobile lighting consisted of a flasher (Fig. 4) and several motor-operated dimmer banks. The flasher had 128 contactor brushes, 76 of which controlled the individually-driven dimmer plates; 36 controlled the color screen motors of the fountains, and 16 were provided for spare controls. The contacts of the flasher were arranged to provide waves of color 1,300 feet long from dim to bright and then back to dim. The speed of the wave could be changed by means of variable resistance in the field of

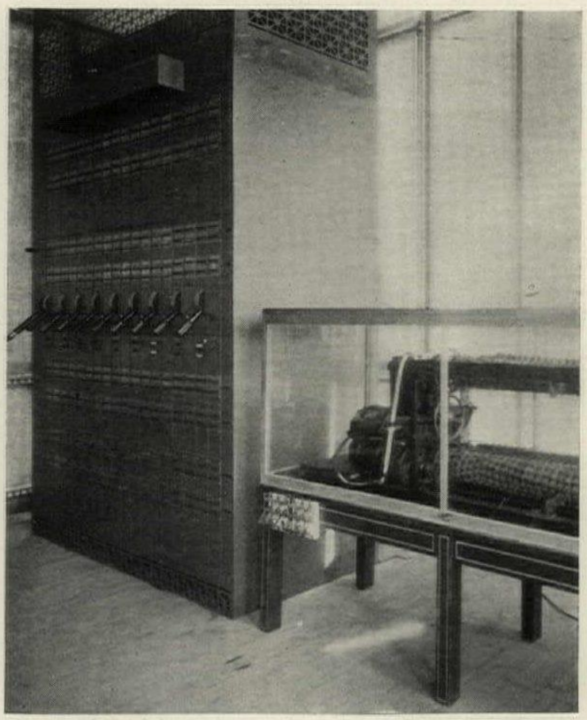


Fig. 4. Flasher and Color Screen Control Board Located in the Tower

Fig. 5. Illuminated Fountains in Square Below Reina Victoria Eugenie Palace

the flasher motor. An additional contact was provided on the flasher to ring a bell to notify the operator that the wave action had been completed. The flasher stopped automatically after the program was completed. The motor-operated dimmer bank consisted of 76 individually-driven dimmer units, each unit being operated by a ¼-h.p. 115-volt motor (Fig. 6). These dimmer plates controlled the current in the direct-current coils of the re-actors located in the sub-station and thereby controlled the intensity of the lights. This bank was 28 feet, 2½ inches long, 90 inches high, and 32⅝ inches deep. The approximate weight was 18,000 pounds.

The Manually Operated Program. After the control had been transferred to the manually-operated switchboard, the whole lighting area might be illuminated in all white, all yellow, all red, and finally all blue, and all the color screens might be synchronized with this color scheme. After this, a program followed mixing the colors and varying in intensity and location. A 20-scene, multi-preset switchboard was used for this program. Twenty different scenes varying in color could be set up in advance, and by closing only one master switch a special lighting effect could be obtained.

The board embodied the dimmer bank, the dimmer-operating mechanism, and all switching equipment for producing the lighting effects. The dimmer bank was mounted on a heavy angle iron frame. Each dimmer or set of dimmers for one circuit had a handle for individual operation.

Four color groups were furnished, and the switches and dimmers for each color were mounted in a horizontal row, while the switches and dimmers for each circuit were mounted in a vertical row. (See Fig. 3.) All colors for a single circuit were thus placed in a vertical row with the blue control at the top and the red, yellow and white controls in that order. Each pilot unit, which consisted of a pilot switch, pilot lamp, preset switches, and dimmer levers, was provided with a separate cover plate.

Despite the great number of complex switching setups possible, and the distinctive effects which could be created, the operation of the multi-preset board was exceedingly simple. All the controls for a single circuit, (which included the pilot switch, pilot lamp, preset switches and circuit dimmers), were mounted together on a small section of the board. There were 20 preset switches for each circuit. The preset switches were arranged in horizontal rows of ten switches.

To set up a circuit, the preset switches for the

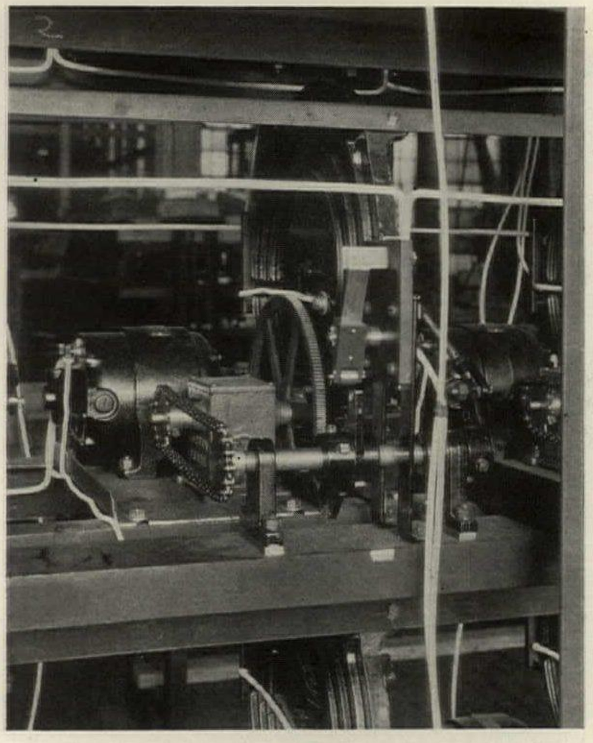


Fig. 6. Detail Showing One of the Motor-operated Dimmers

scenes, in which that circuit was to be used, were thrown to the "on" position, and for the scenes in which the circuit was not to be used, they were moved to the "off" position. This procedure was followed for all the circuits on the board, and when completed the board was ready for the performance. The setting up could be done in advance, and the effects could then be given serious attention and changed until just the right lighting was obtained.

The pilot switch handles were pushed up into the setup position, closing the lower contacts. This is the position in which they were ordinarily left for production, and it placed the circuit under the control of the color master switch. The middle position was the "off" position, and the lower position connected the circuit to the hot bus. Pushing the color master switch handle up, placed the color circuits under the control of the scene master switches. There was a scene master switch for each scene that could be set up, or a total of 20 switches. To change from one scene to another without a black-out, it was necessary to close the scene master switch for the next scene, before opening that for the scene in progress.

The color master dimmer handles, the color master, the scene master switches, and slow-motion dimmer handwheels were all located at the center of the board, so that the operator did not have to run back and forth in handling the lighting. The individual circuit dimmer could be interlocked with the color master handle and the color master handle in turn interlocked with the slow-motion master handwheel. A cross control was provided so that each color master handle could be interlocked in such a way as to brighten or dim the lighting of its color group as might be desired, irrespective of the direction of motion of the other color dimmers.

Scene master switch No. 1 was used for the cycle dimmer only, and the other 19 scene master switches were used for normal operation. A transfer was provided so that when this switch was closed for the cycle dimmer operation it was not possible to operate the other 19 scene master switches until the transfer switch was thrown over to the other position.

The main master switch and the lock switch controlled both the cycle dimmer and the manually-operated board. Therefore, in order to start the cycle dimmer, this setup was necessary: close the lock switch, the main master switch, the scene master switch, and throw the transfer switch to the cycle dimmer position. By pressing the push-button, the mobile program would begin and run till the end, when it would automatically stop and ring the bell.

A separate control board was provided for the color screens in the fountain, and was so interconnected with the manually-operated switchboard that it was possible to make setups in advance and control the board by means of the master scene switches on the main pilot board. Setup No. 1 was for the flasher control, the same as on the main board, and provision was made for manual operation independent of the main board using a special 8-point switch, each point on this switch controlling an individual color screen.

This description has covered only the main points of the equipment involved in illuminating this vast area. Without this control apparatus an operator would have had to make and break an electric contact every few seconds, and time his work perfectly. No operator could possibly have run off the amazing array of color effects at the Exposition without the help of the control apparatus described here.

STADIUM DESIGNING IN RELATION TO SEAT PREFERENCES AT FOOTBALL GAMES

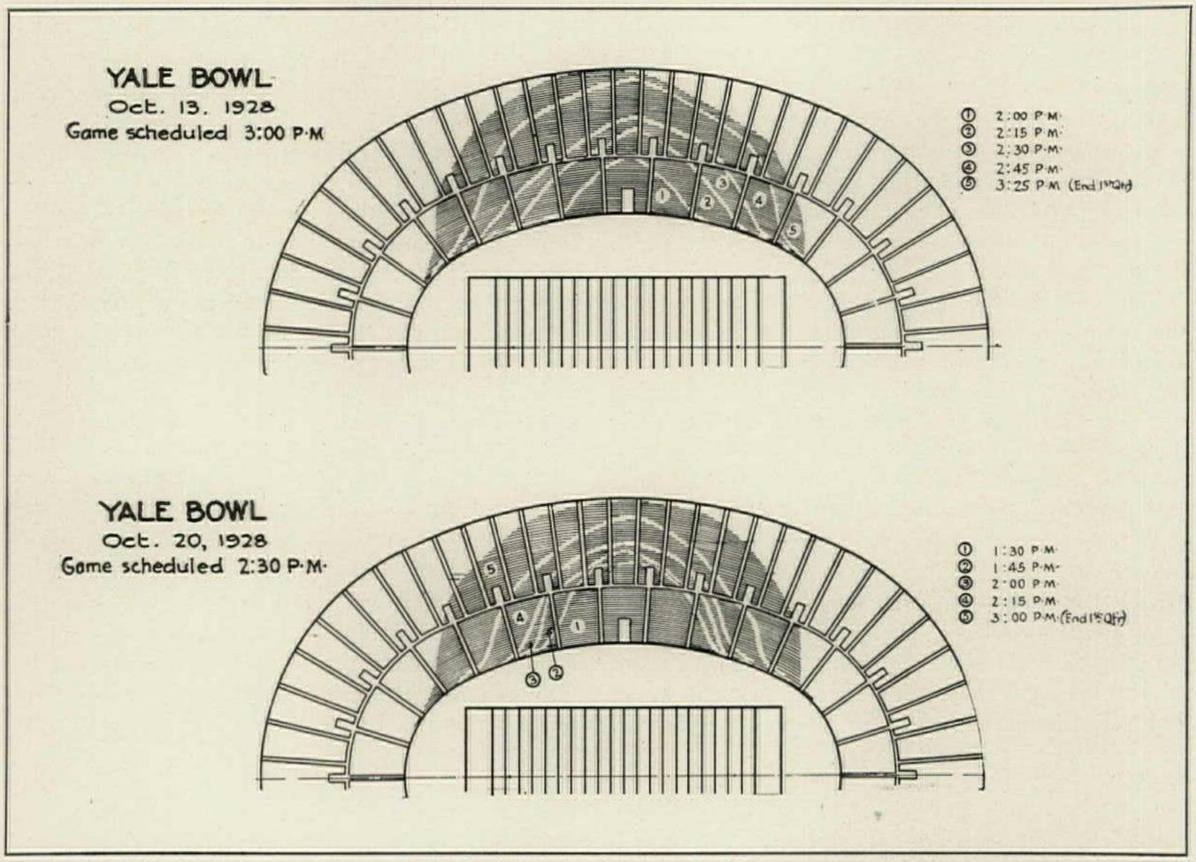
BY

GAVIN HADDEN

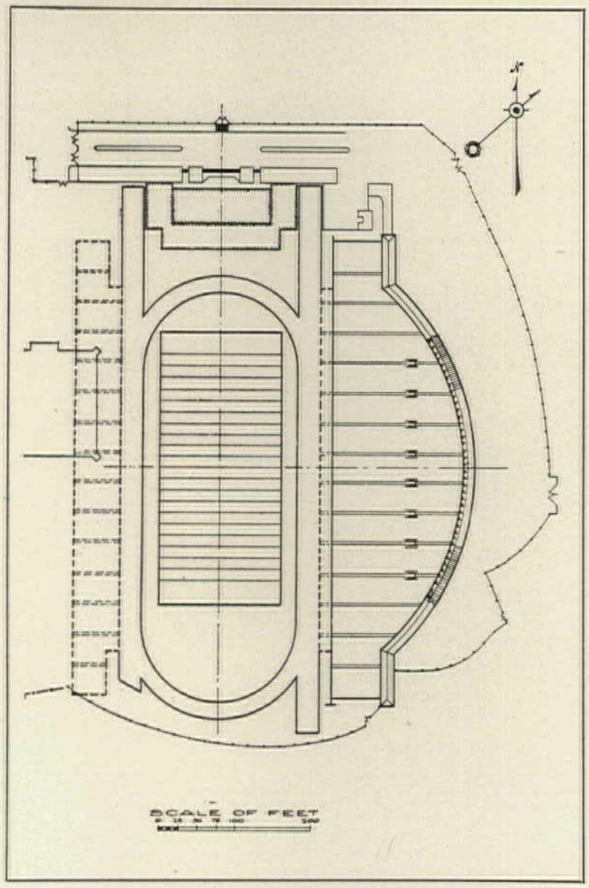
DURING recent years the increasing number of football stadium structures of considerable size have made it more than ever desirable to make accurate observations and studies of the relative desirability of different locations for seats, based on the actual wishes of average spectators. The habits and expectations of spectators have in the past been influenced from time to time to a certain extent by changes in the rules of play; they have also, more recently, been influenced partly by the very fact that more large stadia have been built, thus providing wider ranges of experience in seat locations.

Anyone who has been concerned with the sale or distribution of seats for football games knows that seats on the transverse center line of the field,—the 50-yard line,—are in general universally preferred by spectators. What has not always been known, however, is that the average spectator will definitely prefer a seat on or near this center line, even though located at a considerable distance from and at a height above the field, to a seat at or near the end of the gridiron, even though this seat may be right down close to the field of play. Some who have not studied the subject of seat preferences for football still believe that the order of preference is substantially dependent upon the distance from the boundary lines of the field of play, and that the best locations for any large number of seats will be found in uniform rows completely surrounding the field.

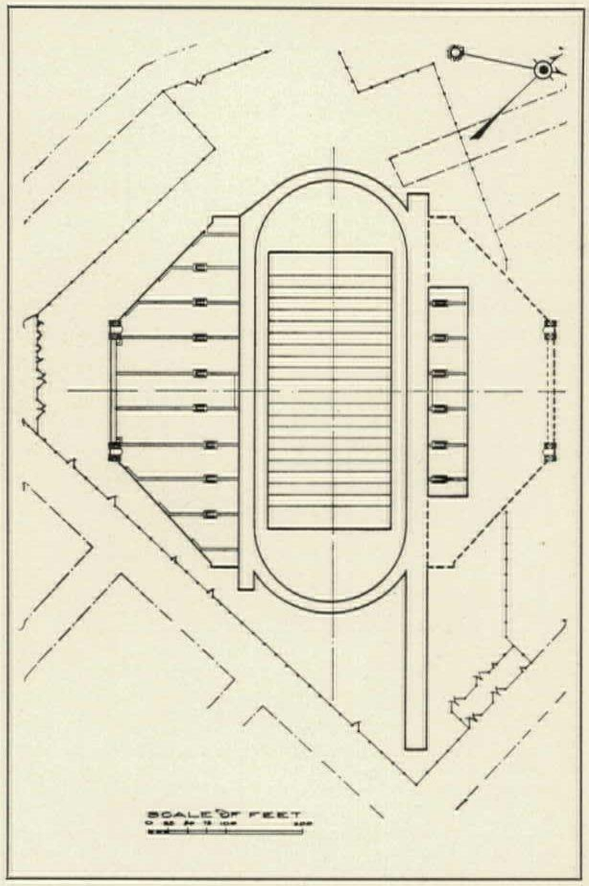
Some years ago the author made careful studies of the seat preferences of average spectators, by observations of crowds taking unreserved seats, when each entering spectator exercised complete freedom of choice of those seats not yet occupied. These studies, made at widely scattered fields, showed that for any sized crowds within the limits of the seating capacities of existing structures, the most desired seats were generally found lying within a circle centered on the center of the gridiron, with a radius of sufficient length to en-



Diagrams Showing the Seats Chosen by Spectators at the Yale Bowl. Shaded Areas Indicate Seats Taken at 15-Minute Intervals



Plan of the Cornell Crescent, Ithaca



Plan of the Brown Stadium, Providence

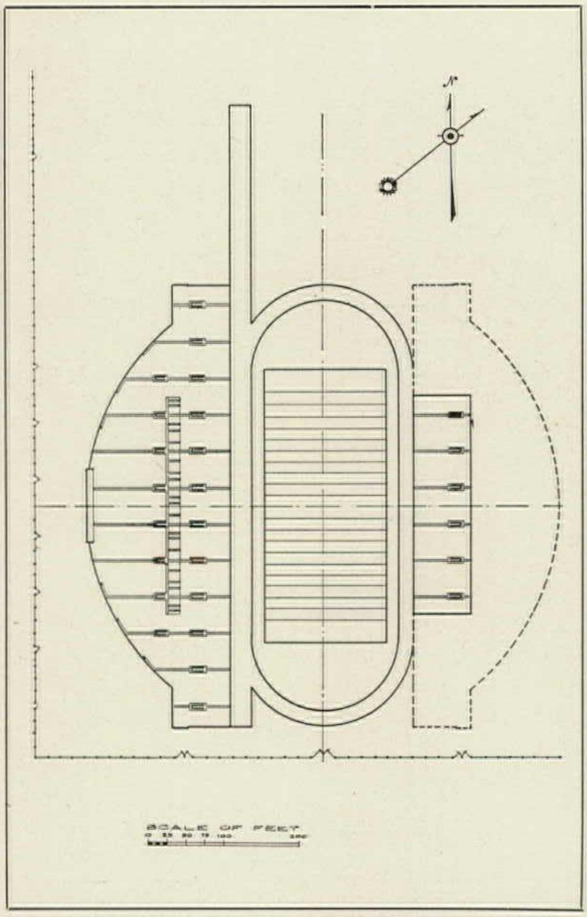
close the required number of seats. From these studies there was also evolved the theory that for still larger crowds the enclosing curve would probably be somewhat altered by the influence of the "maximum" view (the view to the most distant corner of the field) as compared with the "average" view, to the center of the field. No structure, however, has yet attained sufficient size to enable this latter theory to be definitely proved, although continued study of the subject has furnished convincing indications of its soundness.*

The author first applied these principles of seat location in designing the Cornell Crescent, followed by a number of other stadium designs. Proofs of the correctness of these principles have been multiplying year by year, and among the most convincing of these proofs are observations made at the Yale Bowl last fall. These observations were made of the visitors' side of the field only, at two mid-season games (on October 13 and October 20) when only a negligible number of seats were reserved. The reserved seats were too few to have any effect on the observations and on the results shown, so that every spectator involved may be regarded as having exercised complete freedom of choice of available seats on this side of the field. The end sections reserved for small boys were not included in the observations.

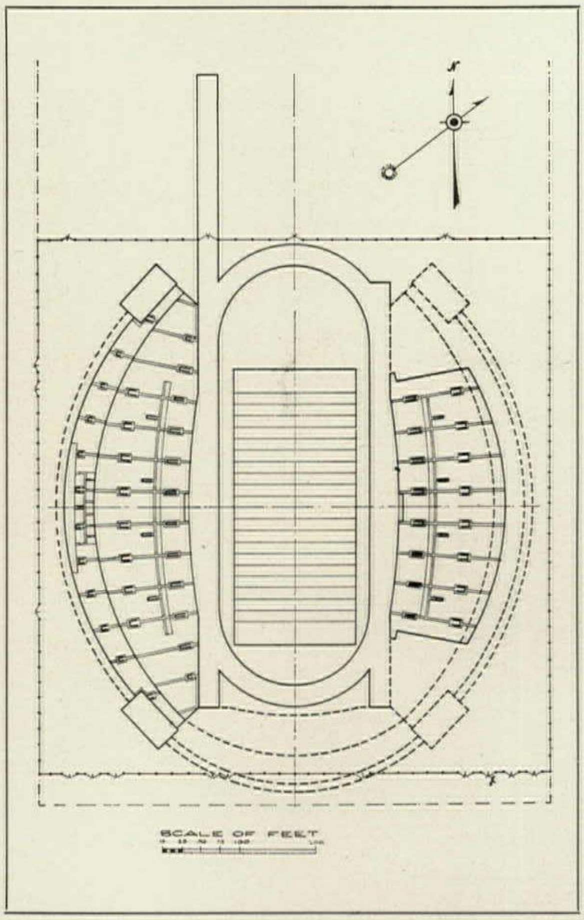
The results of the observations are shown on accompanying diagrams on the preceding page. It will be noted that in each case the general outlines of the crowd at four 15-minute intervals prior to the game, and at the end of the first quarter are shown. The general outlines were sketched with reasonable accuracy, using the portals and aisles as definite and accurate guides. While all seats within the sketched boundaries were of course not occupied, the outlines were in each instance very definite and complete. It was astonishing how very few spectators chose to sit at a distance from the main concentrations;—in some cases there would be less than 20 persons altogether scattered over the empty sections of the Bowl.

Analysis of the diagrams shows that the general outline of each increment of spectators approximated generally a circular curve centered on the center of the gridiron, except that until the central part of the crowd was restricted by reach-

*The results of these studies are described in some detail in the paper "Stadium Design," presented by the author before the New York Section of the A.S.C.E., May 20, 1925, published in the *Athletic Journal* in September and October, 1925, pp. 11 and 12.



Plan of the University of Denver Stadium



Plan of the Dyche Stadium, Northwestern University

ing the top of the deck, there was a tendency to greater preference for the center line and near-center line seats, causing a hump in the center of the curve. At the October 13 game a definite eccentricity of location was observable, particularly with the later arrivals, with a larger proportion seated at the north side of the center line than at the south side. This eccentricity was, as observed, attributable to the fact that a majority of the later spectators entered through the northerly portals (coming presumably from the parking spaces) and walked around on the deck from this end. When it became more difficult to filter through the occupied part of the deck, these later spectators took seats nearer the north end, even though somewhat more desirable seats were still unoccupied on the other side of the center. Mere inspection of these diagrams will show beyond the possibility of a doubt just about where seats should be located if they are to be placed where they are most desired by spectators. Assuming that seats are placed symmetrically on both sides of a gridiron, the diagrams indicate the ideal seating plans for crowds varying from about 4,000 to about 40,000.

With the experience gained during past years at structures of the new type, such as the Cornell Crescent, the Brown Stadium, the Denver Stadium, and the Dyche Stadium, at Northwestern, the soundness of the extension of the same principles to crowds of 50,000 and 60,000 and more has been amply demonstrated. Diagrams which are given here show plans of these structures and indicate how, with modifications of various kinds, the author has applied in practical design the principles herein demonstrated.

FOUNDATIONS OF THE WILLIAMSBURG SAVINGS BANK, BROOKLYN

BY

FRANK W. SKINNER
CONSULTING ENGINEER

THE most interesting structural feature of this 40-story building is probably the somewhat unusual foundation of reinforced concrete on dry sand, which, with the massive steel grillage, eliminates girders for the support of the 85 columns.

The Williamsburg Savings Bank Building, at the corner of Ashland Place and Hanson Place, has street frontages of 210 feet and 99 feet, covers an area of about 20,000 square feet, and has 325,000 square feet of floor space. It has three and one half stories below the street level, and 40 stories in all above the street level. The steel framework rises 513 feet above the curb, or 569 feet above the lowest point of the footings, making this, it is claimed, the tallest building in Brooklyn. There are 25 main stories in the body of the structure besides 15 in the tower, which rises 122 feet above the 27th floor; the exterior walls are of brick, limestone and granite. The principal materials included 7,100 tons of structural steel; 3,000,000 bricks; 6,300 yards of concrete and 523 tons of reinforcement steel. In the basement there is a 35 x 82-foot bank vault, 12 feet high, with 20-inch reinforced concrete walls, lined with 1-inch battleship steel, and there are three entrance doors, weighing with their vestibules 65 tons each.

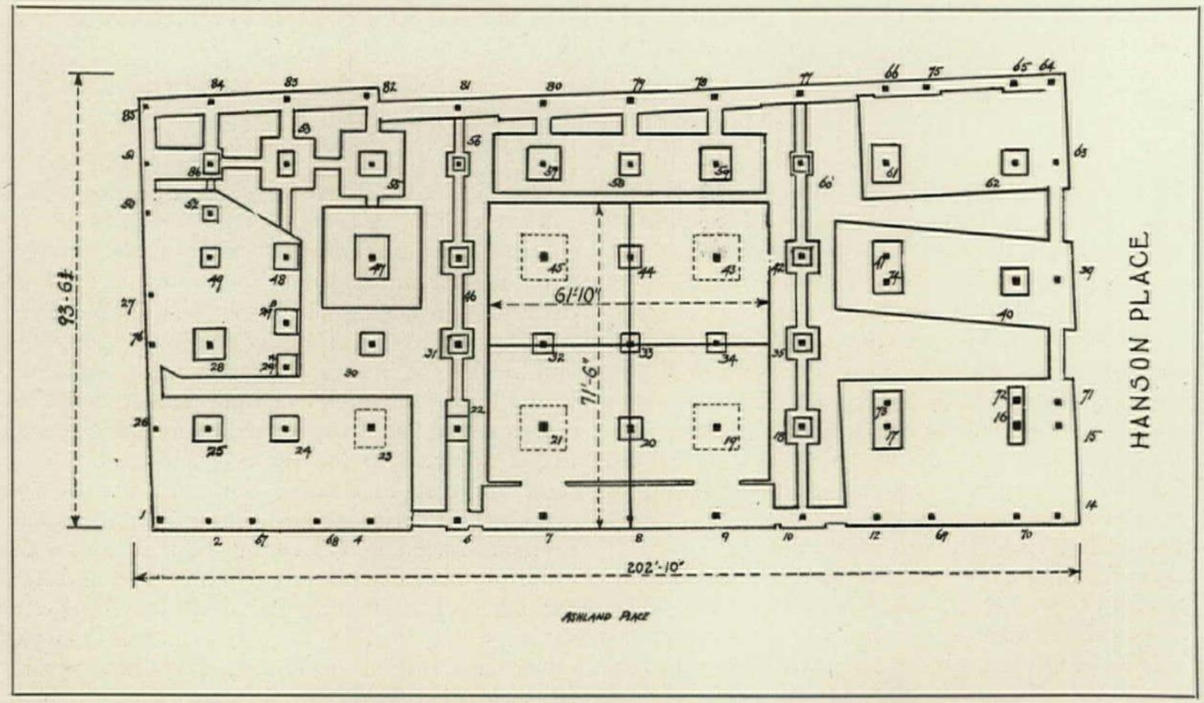
Besides the main and auxiliary banking rooms, the former having a very large unobstructed floor space and a ceiling height of about 60 feet, there is, in the upper stories, a large amount of rentable office and commercial space. The original estimated cost of the building was about $5,000,000, and it was completed in 1929.

Construction Conditions. The location of this building on dry, sandy soil far above hard stratum, the very heavy concentrated column loads, the deep general excavation, and the treacherous condition of the adjacent soil, most of it consisting of imperfectly compacted backfill to a considerable depth, made the substructure work unusually difficult and costly. On Ashland Place the main excavation extended to the Sea Beach Line subway 54 feet below the curb, and 100 feet beyond the opposite side of the lot in St. Felix Street is the Brighton Beach subway, 62 feet below the curb. On a third side of the lot, in Hanson Place, is a 16-foot sewer, 38 feet below the curb. Of the entire 210 x 304 feet area around the bank building, all had been excavated and backfilled, excepting the 83 x 210-foot site,—about one sixth of the entire area,—of the Hanson Place Methodist Church, and even there, the soil conditions were considered very treacherous.

During the construction of the Brighton Beach subway in 1917, a section of its trench timbering collapsed, and caused a movement of the soil that extended far underground to the line of this excavation, displacing old walls 4½ inches horizontally. In Ashland Place, the street pavement had settled 14 inches, and it was subsequently found that much of the old permanent timbering underground had decayed, and many cavities were found adjacent to the existing subways. Under these difficult conditions, the utmost care was necessary in designing and proportioning the new foundations, and in excavating and maintaining the cellar pit with a maximum depth of 56 feet below the curb. Fortunately, the deep trenching and drainage provided by the adjacent subways and sewer had lowered the ground water level several feet below the bottom of the excavation, enabling the foundation work to be carried on in the open, and without pumping. Explorations made by a considerable number of test borings demonstrated the presence of a deep stratum of sand and gravel, with a good bearing power.

Spread Footings. It was therefore decided to adopt spread footings of reinforced concrete on the dry sand at subgrade to support the 85 columns. These footings are continuous under the outer walls of the building, and those for the interior columns vary from 5 feet x 5 feet to 62 feet x 62 feet, with thicknesses of from 2 to 9 feet, all of them calculated to reduce the unit pressure on the sand to a maximum of 8,000 pounds per square foot. These footings support from 1 to 12 columns each, and, except those for the wall columns, are entirely separate and independent, except as connected by transverse struts that prevent the possibility of horizontal displacement, while they allow for possible slight irregularities of settlement without injury to adjacent footings. The required combined area of all the footings is about 17,200 square feet, leaving unloaded intermediate spaces aggregating about 3,600 feet, or 17 per cent of the total lot area.

The very heavily loaded columns are seated on single and double tiers of plate girders, with bases reducing the unit loads to less than the working compressive strength of the concrete. The smaller columns are seated on concrete pedestals on the footings. When two or more columns are seated at the opposite ends of a footing, the latter is designed as a continuously loaded girder, distributing the column loads over the entire lower surface, thus eliminating the use of cantilevers and other

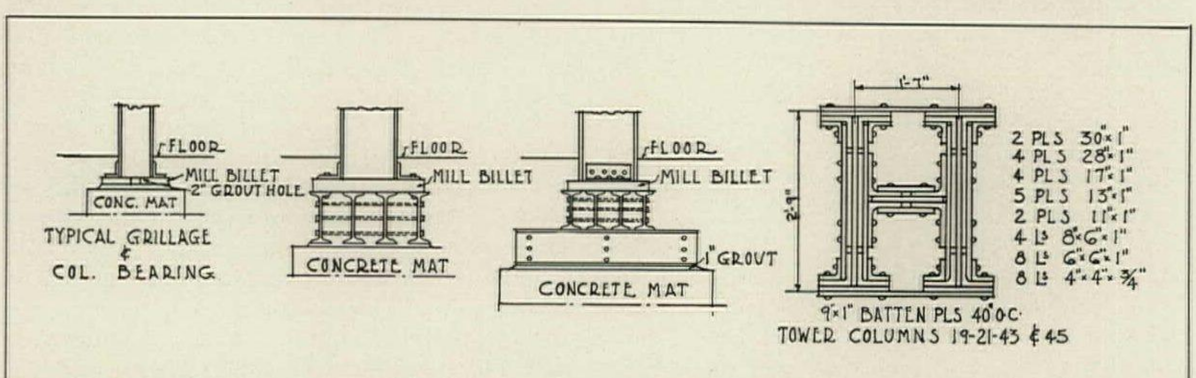


Plan Showing the Column Locations and Reinforced Concrete Mat Foundations

very heavy steel girders often interposed between columns and their footings. The stresses were very carefully computed and the substructure completely detailed; great pains were taken to secure the highest quality of concrete and the most accurate, reliable work in placing it and the reinforcement bars.

Although these footings are perhaps more massive than have been used in any other office building, they are so simple in design, accurately proportioned, and so accessible for construction and inspection that, involving only uniform standard materials and ordinary operations, they are believed to be more satisfactory and reliable than the more expensive types of deep heavy foundations that are often constructed at greatly increased cost.

Underpinning, Bracing, and Steam Shovel Excavation. Construction operations were commenced by the removal of a dozen four-story brick and brownstone front dwellings that occupied the site, with their cellar floors and rubble stone footings on earth about 9 feet below the curb level. Below the street level the debris was removed by the ¾-yard bucket of a steam shovel delivering into trucks that descended from the street to subgrade on a ramp, and continued the excavation of the loam, sand and gravel with sloping sides inclined about 3 horizontal to 4 vertical. At a depth of 20 feet dry sand and gravel were encountered, and the steam shovel continued the excavation to a maximum depth of about 5 feet more, excavating in all about 12,000 cubic yards in about 15 working days. Before excavating the sloping sides of the pit, the 60-foot front of the four-story Hoover Building at one corner



Typical Column Bases Resting on the Concrete Mat Foundations; Also Section of One of the Larger Columns of the lot, and the 38-foot front of the four-story church parsonage on the opposite diagonal corner were needled, and the walls were underpinned with concrete piers extending 2 feet below subgrade of the final excavation.

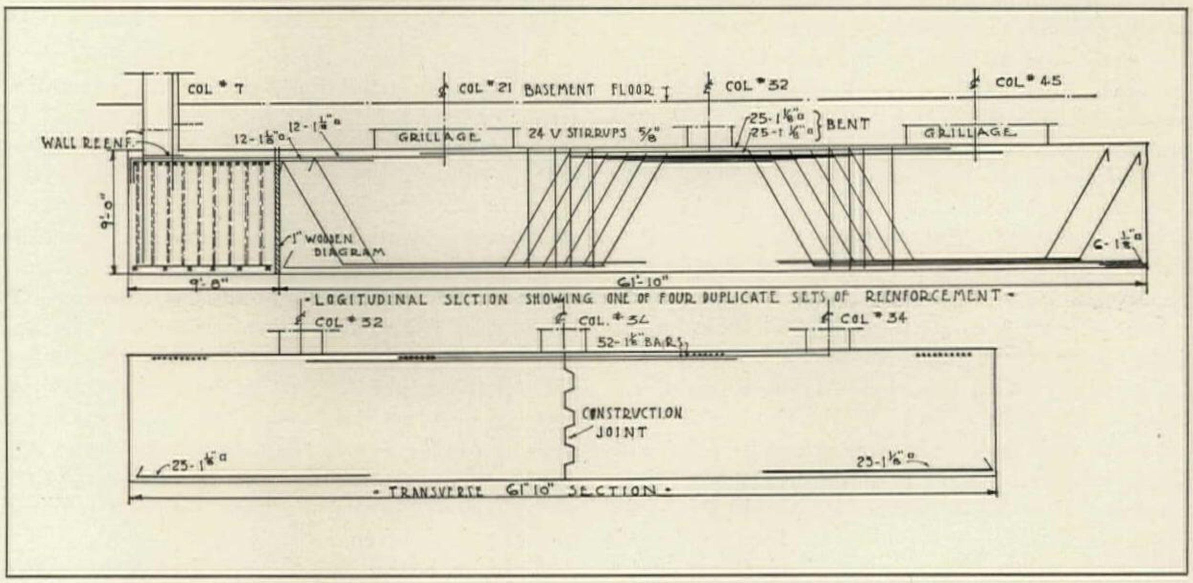
Permanent Concrete Marginal Piers. At intervals of 14 feet on centers, there were excavated on all four sides of the lot more than forty 4 x 5-foot pits sheeted down with horizontal boards to a depth of about 5 feet below curb level, and 8 feet above ground water level, which was found to be about 19 feet below high tide. Below subgrade of the main excavation, the sides of these pits were extended 12 inches in every direction.

In each pit there was built a 60 x 30-inch full height marginal pier of 2:3:5 concrete with four full length rods of ¾-inch diameter. The piers located under the front walls of the buildings served to underpin them, and all the piers were used as buttresses to take the bearings of the ends of four tiers of longitudinal and transverse cross lot timber struts.

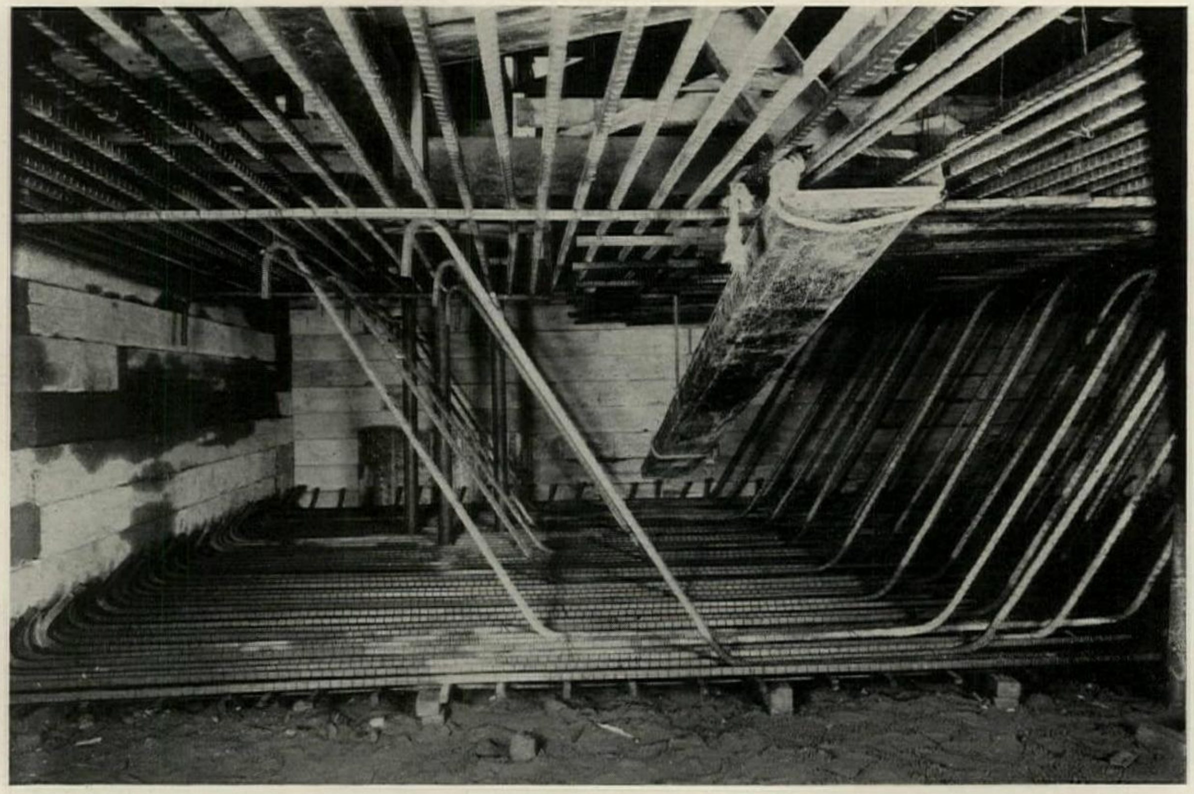
Cross Lot Bracing. The struts in the two upper tiers, about 10 feet apart vertically, were each made with a pair of 6 x 12-inch timbers splicing each other's staggered joints and separated 3 inches. Between them were bolted 3 x 8-inch diagonal braces connecting the first and second tier struts in the same vertical plane, and making them respectively the top and bottom chords of trusses intended to resist the horizontal thrust of the embankment on each side of the pit. All of the trusses were 99 feet long, forming a series of transverse braces below which there were two more tiers of single 12 x 12-inch continuous struts in the same vertical planes. The longitudinal struts consisted of four corresponding tiers of 12 x 12-inch single timbers in the same horizontal planes that were wedged to bearing with the transverse struts at their intersection. The struts were installed successfully from the top down as the side slopes and bottom of the pit were excavated by hand, making this procedure possible.

General View, Williamsburg Savings Bank Building, Brooklyn

Halsey, McCormack & Helmer, Architects



Sections Through the Reinforced Concrete Mat Foundation of the Tower



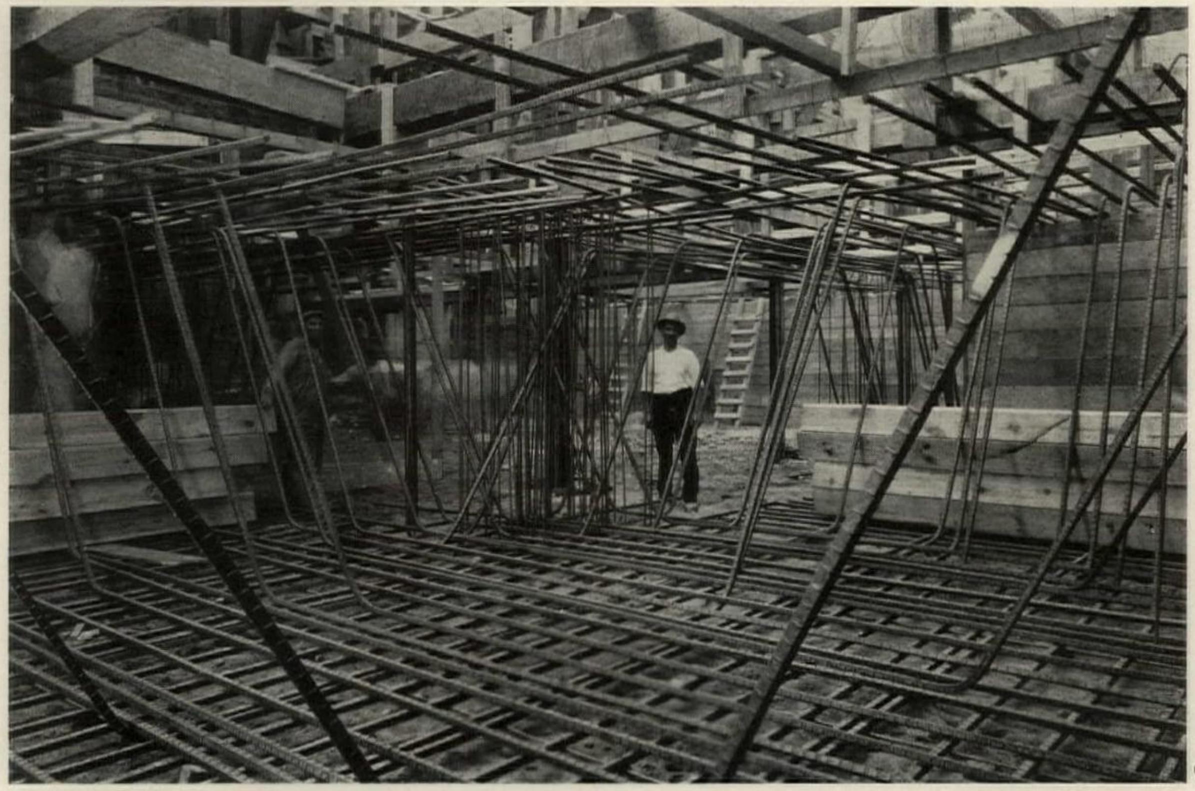
Part of Reinforcement for Tower Mat. Bars Accurately Spaced, Wired Together and Suspended from Temporary Overhead Beams. Steel Chute for Concreting

Sheeting and Hand Excavation. The earth between the vertical buttress piers was retained by 3-inch horizontal planks bearing against the outer faces of the concrete piers and placed from top down, as the excavating progressed. The muck was excavated by hand and mostly shoveled into wheelbarrows that were placed on a three-barrow electrically-operated platform hoist, from which they were dumped into an elevated hopper in the street, delivering to trucks. About 20 per cent of the excavated material was shoveled into buckets handled by a 60-foot boom of a derrick that usually delivered directly to the trucks. The total amount of excavation was about 42,350 yards.

Soil Test. The bottom of the pit was carefully trimmed and leveled to subgrade, and the soil which would be under the tower was subjected to a test load, placed on a 10 x 10-foot platform of horizontal 2 x 8-inch planks laid flat on the surface of the ground, forming the bottom of a bin having sides made of vertical 2 x 10-inch planks 13 feet long braced on the exterior. Accurate level readings on the four corners of this bin were taken and recorded, and the bin was gradually filled with sand delivered from the street through a chute, and leveled as fast as it was deposited. When the sand was 3 feet, 6 feet, and 9 feet deep, level readings were taken, the average of which showed a settlement under full load of ⅜ inch, which after 24 hours increased to about ¾ inch. This load corresponded to an average pressure of slightly more than 8 tons per square foot of the surface covered, and was acceptable to the building department, which allowed a working load of 4 tons per square foot on the soil. During the construction of the building, and subsequently, the contractor and his engineer took level readings, that have, so far, indicated no settlement of the finished structure.

Concrete Plant. Just below street level there were installed in the upper part of the excavation two wooden hopper bottom storage bins, one of about 500 yards capacity for coarse aggregate, and the other of 200 yards capacity for sand, both of them filled directly by dumping from trucks in the street. Materials from both bins were delivered by gravity through chutes with measuring boxes to wheelbarrows on runways supported by the bracing timbers. These wheelbarrows charged six 1-yard and ½-yard portable concrete mixers, shifted from time to time as convenient, and located at different heights to receive the aggregate direct from the wheelbarrows, or from chutes into which the barrows dumped. All concrete was chuted directly from the mixers to the required positions in the foundation forms.

Reinforcement Steel. All the reinforcement steel was 1⅛-inch square bars, except the ¾-inch



Part of the Reinforcing Steel for the Mat 62 feet by 71 feet, 9 feet thick, Supporting Four Tower Columns and Five Basement Columns

round stirrups. It was cut to length at the mills, and was bent by hand on the site. A substantial wooden platform 50 feet long and 30 feet wide was built at the site, and on it were bolted angle iron templates to which the bars were bent with hickeys. The forms for the foundation mats were made with horizontal 2-inch planks nailed to 2 x 4-inch verticals about 3 feet apart. The reinforcement bars were suspended by wires from a system of 2 x 4-inch joists laid on the lower tier of cross lot braces. They were carefully assembled, and tie-wired at intersections.

Tower Foundations. The 19,416-ton weight of the central or tower section of the building was almost entirely carried through the four main columns, 19-21-43-45, at the corners of a 37½ x 37½-foot rectangle, to the 62 x 62-foot main foundation mat 9 feet thick, which contains 51 tons of reinforcement bars, and 2,812 tons or 40,176 cubic feet of concrete. This mat was heavily reinforced by four sets of bars, one set being shown in the accompanying longitudinal section of the mat.

After the erection of the four sides of the concrete form on the carefully leveled subgrade, all of the reinforcement was assembled and fixed in position, and interior transverse and longitudinal bulkheads were built dividing its area into four equal parts with three horizontal keyways through the full length of each vertical partition. All of the available mixers were concentrated to deliver concrete through steel chutes to the first section of this mat, which was completed in one 11-hour shift. The next day the bulkhead was removed from one side of this section, and a second section was concreted in 11 hours, and so on, for the two succeeding days, until the entire mat was finished, great care being taken to maintain the reinforcement bars in exact position, and to keep them 4 inches within the outer surfaces of the concrete. Tampers and wooden paddles were used to compact the concrete, and to force it under and around all pieces of reinforcement steel.

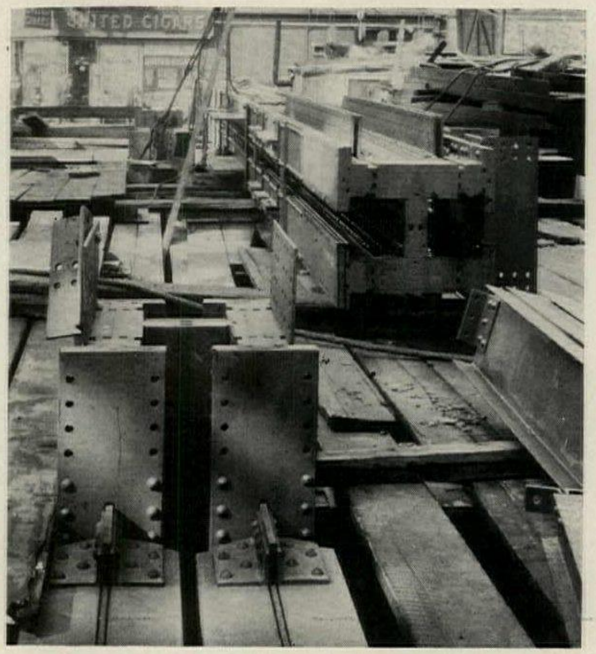
This mat was separated from the footing for the Ashland Place wall columns 7-8 and 9, by a vertical diaphragm of 1-inch boards built permanently into the concrete, and having in it two openings 10 inches wide providing physical connection between the mat and the wall footing, so as to resist transverse displacement. The supports for the cross lots bracing timbers over this and other large mats included many 12 x 12-inch verticals located within the area of the mat, which were temporarily shored and the lower portions cut off, and permanent concrete footings below subgrade were made on their centers before the concrete was placed in the mat. On these footings Lally columns were set and wedged to bearing against the lower ends of the vertical timbers, the shoring removed, and Lally columns were concreted into the mats, and after completion of the latter were cut off level with their upper surfaces.

As some of the footings projected beyond the building line, they encroached on the permanent concrete piers of the cross lot bracing system, and in some cases the latter were shored by inclined H-beams and their inner faces undercut to clear the concrete mats. All mat concrete was proportioned 1:2:4 with a maximum of seven gallons of water per bag of cement, and a mixture of hydrated lime. All hooks on reinforcement bars had a minimum of 9 inches.

Other Principal Footings. Besides the tower mat already described, which carries four main columns, and five smaller columns, there are six other principal mats carrying from four to 12 columns each. The four largest mats together carry 12,874 tons column loads. One 32¾ x 52½-foot mat 6 feet, 8 inches thick, contains 11,400 cubic feet of concrete, and 30 tons of reinforcement. Another mat, 23 x 60 feet, and 6½ feet thick, contains 8,970 cubic feet of concrete, and 18 tons of reinforcement steel, and supports six columns. A 19½ x 53-foot mat 7 feet thick contains 7,238 cubic feet of concrete, and 15 tons of reinforcement, and transmits a total load of 4,030 tons to soil having a bearing capacity of 4,136 tons. A 26 x 46-foot mat 7½ feet thick contains 8,970 cubic feet of concrete, 20½ tons of reinforcement, and loads the soil beneath it to about 4,800 tons, which is substantially its full bearing value. The proximity of quicksand made it necessary to drive interlocking corrugated sheet piles before completing the excavation for this mat. The seventh large mat is 34½ x 40 feet and 5 feet thick, containing 6,900 cubic feet of concrete, and 20½ tons of reinforcement, and carries nine columns, with a total load of 4,900 tons distributed over soil having bearing capacity of 5,520 tons.

The heavily loaded columns are seated on single- and double-tier grillages distributing their load over the surface of the concrete mat. Those with lighter loads are set directly on the surface of the concrete. The loads of the four main tower columns vary slightly, the largest being 3,322 tons exclusive of wind loads, and the smallest 3,141 tons, also exclusive of wind loads. Each of those four columns weighs about 2,000 pounds per linear foot, and their 65-foot sections passing through the very high banking room, were each loaded on four heavy automobile trucks for night transportation through the city, where they broke many manhole covers, and were twice stalled in the streets. Two trucks were lashed together, moving forward under the front end of the column, and two were lashed together moving backwards under the rear of the column. The columns were erected by a steel derrick, with a 75-foot boom of 70 tons capacity.

The architects were Halsey, McCormack & Helmer; Lange & Noska were the structural engineers, and the William Kennedy Construction Company the general contractor.



Main Tower Columns Having Maximum Cross Section of About 600 Square Inches, Weighing 1 Ton per Lineal Foot

THE SUPERVISION OF CONSTRUCTION OPERATIONS

CHAPTER 13

ROUGHING-IN BY PIPE TRADES

CONTRACTS for heating and plumbing for the school building, which forms the basis of these discussions, were awarded shortly after the arrival of the superintendent. Local concerns had bid on both items, but the heating contract had gone to a large outside corporation whose low bid had been approved by the architect. This company was prompt in filing a surety bond made out on the architect's form, and equally prompt in submitting a schedule of kinds of material proposed to be used. Not so with the plumber, who was a local dealer of a distinctly different type. The confidential report on this individual, sent by the superintendent to his employer, declared him to be deficient in several important particulars. He was under-financed and could buy from only one supply house. His reputation as a substituter was bad, and his workmen did not rate the best. But, for reasons such as were given in a preceding chapter in THE ARCHITECTURAL FORUM for May, 1929, the architect had not interfered to prevent the awarding of the contract to him, nor had formal objection been made to the filing of a personal bond.

The day after the bond was filed, the plumber was on hand with his trench diggers, ready to start the sewer trench, and was much taken back when the superintendent refused to allow him to proceed until the bond had received the formal approval of the board. The plumber was so persistent in his efforts to begin the work that the superintendent had to threaten arrest in order to make him understand that he meant business. Again there appeared the hardware dealer to urge a special concession in view of the excellent weather conditions. To this the superintendent rejoined that he would insist upon the manholes being constructed ahead of the laying of sewer (and after approval of the bond), the recent heavy rains having demonstrated the harm that might result from leaving undrained trenches open indefinitely.

A week later, the bond having been accepted, the plumber put in his water connection and would also have installed the gas supply, but this was so premature and would have interfered so much with other work that the superintendent prevented it by the simple expedient of holding up the board's application for the gas service connection. This unwonted eagerness on the part of the plumbing contractor to get all parts of his work under way was presently explained by his filing a padded statement of cost of work done, in order to obtain a certificate for a substantial May 1 payment. This was duly pared down by the superintendent. It was some time in May before the general contractor's mason completed the sewer manhole in Orchard Street, and then the plumber was permitted to proceed with the installation of the sewer. This was closely watched and stopped twice because of the careless manner of bedding the tile and cementing the joints. The plumber finally employed a more experienced man, who replaced several sections and laid the remainder in accordance with the specifications. The two sumps were constructed at the same time, at the southwest and southeast corners of the building for receipt of seepage from the lines of farm drain tile discussed in Chapter 11, "Waterproofing and Dampproofing," in the November issue of THE ARCHITECTURAL FORUM. With this tile the setter proceeded systematically from the low points, at connections into sumps, the fall being only 12 inches from the high points, midway on lines of north and south wall footings. This slight fall was carefully equalized by frequent tests with straight edge and level. Each piece of pipe was carefully laid on a full, firm bed of natural earth, the joint covered with a half-circle band of galvanized iron and then embedded in a 12-inch layer of coarse gravel, after the outside of the foundation wall had had its approved coat of waterproofing.

In cities where plumbing ordinances are in force, architects are accustomed to depend to a great extent upon official inspectors to see that all piping for sanitary work is as it should be, the superintendent merely supervising it in a general way, guarding against interference, and making sure that all such work is promptly installed. Where no such city inspection is provided, necessity of his supervision of the work of the pipe trades is increased. He must know that:

(1) All material is of the kind, make, grade and weight called for.

(2) It is located in accordance with approved pipe diagrams.

(3) It is level or properly inclined in all cases.

(4) All joints are well made, with proper materials of sufficient quantity, — calked, threaded, shoved, wiped or flanged and bolted, as case may be.

(5) All pipes are rigidly supported with due allowance for expansion and contraction, where it is called for or is necessary.

(6) All exposed work is properly aligned and left in the finished condition specified.

(7) All testing is properly conducted and all

indicated corrections made in proper way.

(8) All reports, certificates and guaranties are filed as stipulated.

Knowing that this particular plumber would need watching at every stage of the work, our superintendent started weighing the pipe and fittings, using a heavy spring balance which he secured for the purpose. The cast iron pipe was specified to be "extra-heavy," but many pieces were found to be under weight, according to a standard table. The contractor claimed that all pipe heavier than "standard" must be extra-heavy, and that he had never before heard of its being weighed. It developed that he had bought the pipe from a wrecking company and had no knowledge of its make, except in the case of a few marked pieces.

Owing to the fact that every plumbing and steam heating concern is a retail supply house, they naturally desire to use materials they carry in stock or can easily procure through their regular sources of supply. A superintendent must know when this is permissible and, *per contra,* when it is incumbent upon him to insist upon "the letter of the law." Frequently, he will find that (in this as in other lines) the contractor has deliberately allowed himself to run short of time, so as to facilitate substitution. This should be foreseen and circumvented, which demands a lot of time in the case of a confirmed offender.

The correct location and proper incline, alignment and support of piping are not matters that are difficult to check, but they do demand careful attention, as all such details are easily slighted. This intensive inspection begins with the placing of inserts in concrete forms, as related in Chapter 10, in The Architectural Forum for November. Another frequent source of trouble arises from careless spotting and leveling of floor drains and of those pipe cleanouts which are supposed to finish flush with floor surfaces. Inasmuch as the general contractor is responsible for correctness of finished floor levels, he should give the plumber (and others), on demand, the necessary information as to such levels. But, if the superintendent is not careful to check the heights to which the plumber is working, he may later find him wrong and trying to throw the blame on the man who gave him the information. The superintendent must *know* which is right. He must also see that no exposed plumbing parts, drains, cleanouts, valves, etc., are located where they will be covered or will interfere with subsequent work; also that pipe that is intended to be covered is not crowded into corners nor against walls in such a manner as to leave insufficient room for applying the covering.

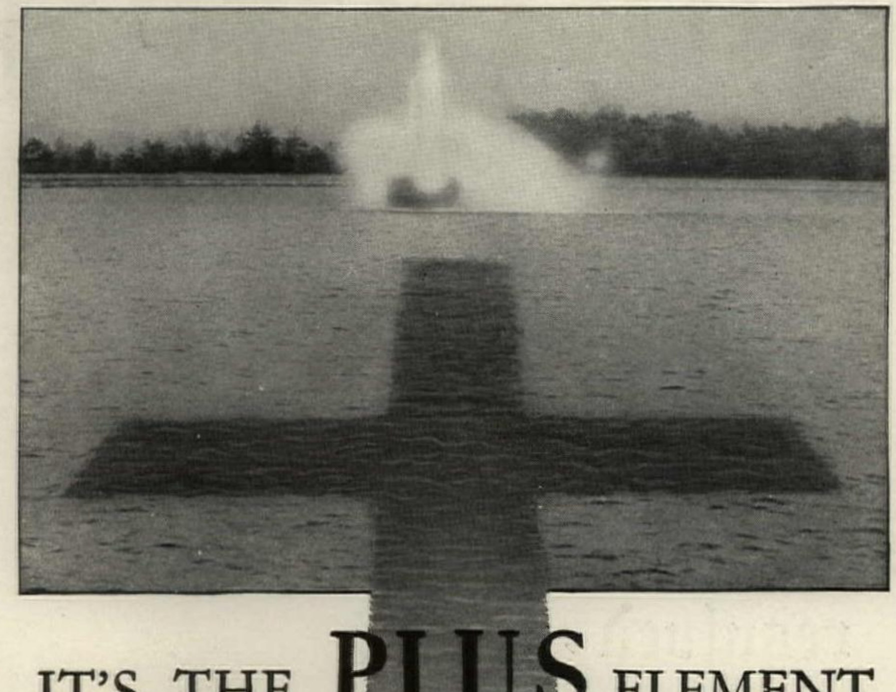
The foregoing is intended to apply chiefly to plumbing piping, but is equally applicable to that for steam or hot water heating. Since much of such piping is exposed, its alignment (especially its verticality) is of the utmost importance. Particular caution must also be exercised where such pipes extend through ornamental ceilings, to see that they occur where they will cause the least damage to decorative members.

The three customary methods of testing soil pipe are by smoke, peppermint fumes, and water. The latter method is most generally used and is effected by merely plugging all outlets before sewer connection is made, then filling all connecting lines with water up to the tops of the roof vents. If the water fails to hold its level, the leakage is traced and due corrections are made. Sometimes the faults are hard to find, but no excuse can be accepted. The water must hold. This test is considered too severe for standard pipe in buildings of more than two stories in height, because the hubs will not stand the character of calking needed to provide the resistance to such a head of water. Hence, if tests of standard piping are called for, smoke or peppermint is resorted to. But *all* soil piping should be satisfactorily demonstrated to be free from leaks.

Water piping is easily tested by turning on the supply and submitting the piping to full pressure. This should, of course, be done before the pipe is covered. This is true likewise of piping in heating systems. They should be amply tested by prolonged demonstration, then duly covered only after all is found satisfactory.

Gas piping is always tested by inspectors of the local service company. The superintendent should insist upon receiving a certificate of approval on this work before permitting it to be covered by lathing or other permanent construction. This is a frequent bone of contention between workmen, the lather always appearing desirous of working in the particular place where a gas or electric outlet is yet to be located. It therefore behooves the superintendent to make it plain to the pipe trades that they will be held responsible for delaying the lathers (or others) after a certain time,—and to the lathers that they will have to replace at their own expense any of their material that has been put in place over unaccepted work.

Pipe covering is generally specified so definitely that the superintendent has merely to see that it is fully attended to, with the proper material, and neatly secured and finished. Specifications are sometimes lax in not particularly stating how pipe connections are to be covered. This point should be made clear. The superintendent should also give particular attention to such pipe covering as is to be permanently exposed, as it is generally specified to be finished in better manner than that intended to be concealed.



IT'S THE PLUS ELEMENT

that makes water *Different*

THERE is more to water than hydrogen and oxygen—a plus element—which makes it necessary for the architect to do more than just specify brass pipe. He should specify the kind of brass pipe which is best adapted to give dependable service under the water conditions peculiar to the locality.

Rain, the source of all water, in soaking through the ground, absorbs minerals or compounds. Depending upon geographical location, their action upon water in relation to plumbing pipe, is very different. In some localities they make water highly corrosive—in others, only normally so. This chemical action—this plus element—varies so that even within 25 miles the water supply may vary in corrosiveness.

Brass pipe will outlast rustable pipe under any water conditions. But because of this plus element in water, not all alloys of brass pipe will give the same satisfactory service everywhere. Continuing in its efforts to be of service to architects, The American Brass Company has developed *two* alloys of Anaconda Brass Pipe to give adequate service under any local water conditions.

For normally corrosive waters—Anaconda 67 Brass Pipe. This pipe contains 67% copper. It is guaranteed to be structurally sound and physically perfect. It is semi-annealed and seamless.

For highly corrosive waters—Anaconda 85 Red-Brass Pipe. This pipe contains 85% copper, and is offered as the best corrosion-resisting pipe obtainable. It, too, is fully guaranteed.

These two alloys have been proven in 16 years of exhaustive research in the laboratory and in actual use.

An Important Service to Architects

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

ANACONDA
from mine to consumer

ANACONDA BRASS PIPE

FOR HOT AND COLD WATER LINES

Specify

WALWORTH
VALVES
FITTINGS
AND TOOLS

for

PLUMBING AND HEATING

● In the Chrysler Building Walworth furnished all the valves and fittings for the heating installation and also the fittings on the fire lines. ● In this age of standardization a complete line of products offers unequalled opportunity for the architect and builder to turn over a building to its owner completely equipped with one make of valves and fittings on every piping system in the structure. ● For the modest residence or largest hotel, the most elaborate hospital or the towering skyscraper, there is a Walworth valve or fitting for every requirement of the piping system.

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General Sales Offices: 51 East 42nd St., New York
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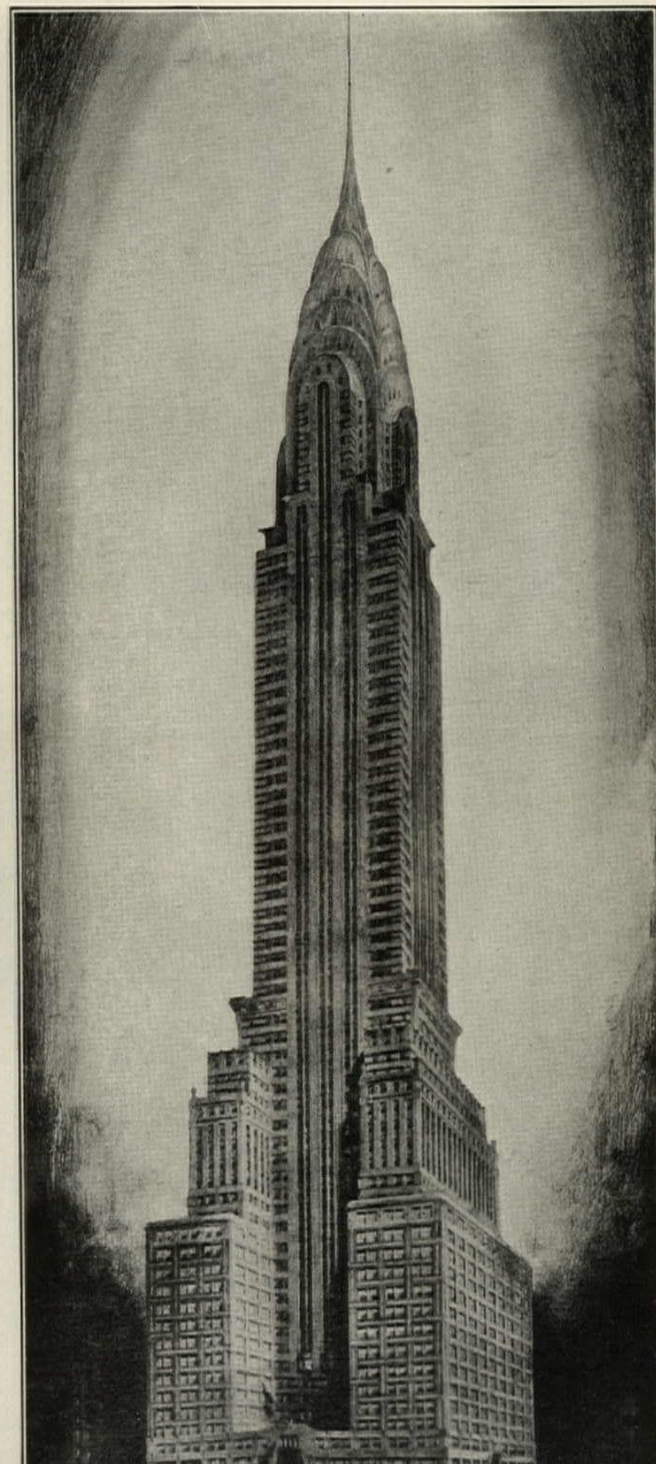


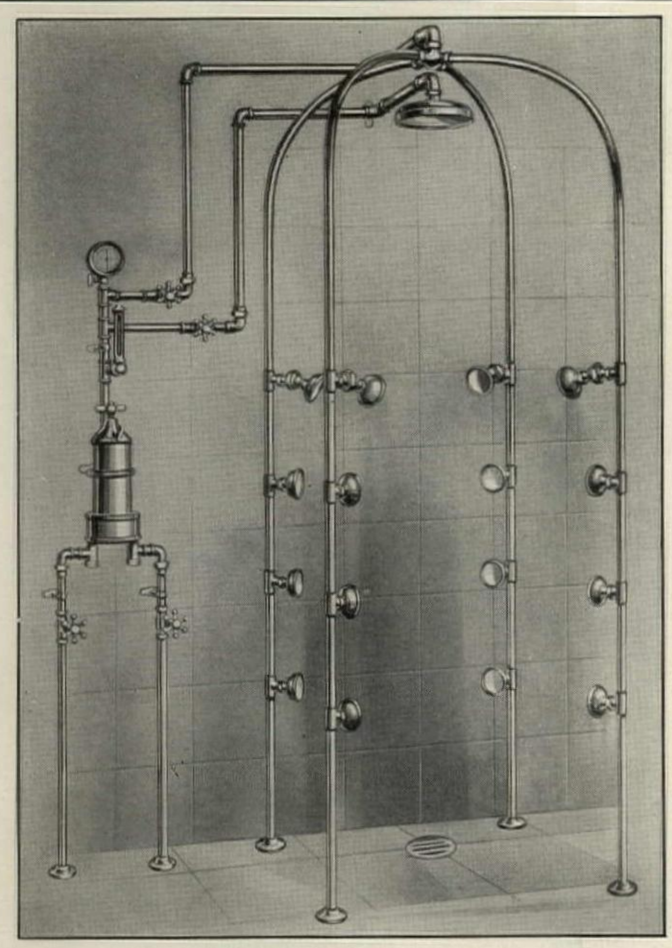
CHRYSLER BUILDING ● New York

Architect, William Van Alen   Consulting Engineer, Louis T. M. Ralston
General Contractor, Fred T. Ley & Co., Inc.
Plumbing Cont., John Weil Co.   Heating Cont., Baker Smith Co.

WALWORTH

VALVES - FITTINGS - AND TOOLS

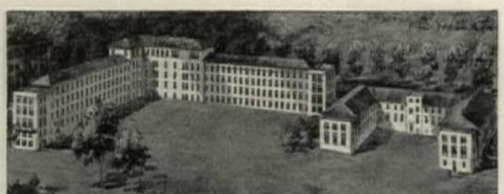
MEETING ARCHITECTURAL STANDARDS OF QUALITY



Solid Nickel Silver hydro-therapeutic shower in U. S. Naval Hospital, Mare Island, Calif. Manufactured by THE JOHN DOUGLAS CO., Cincinnati, Ohio. In this installation the tubing is Solid Nickel Silver which matches in lustre, color and finish the beauty of the cast fittings.

SOLID NICKEL SILVER FIXTURES BY DOUGLAS—FOR U. S. NAVAL HOSPITAL

WHERE the service requirements of plumbing fixtures are unusually severe—where fixtures must always be sanitary, clean-looking and attractive during constant daily use—there you will find a need for the properties offered by Solid Nickel Silver plumbing fixtures. The rich, lustrous beauty of Solid Nickel Silver is comparable to that of Pure Nickel and other high Nickel Alloys. It is corrosion-resistant and is therefore easily cleaned. In hardness, toughness and strength Solid Nickel Silver resembles tough bronze. These properties assure wear-resistance to valve seats and render Solid Nickel Silver fixtures difficult to mar or break either during installation or use... Because of their permanent beauty, long life and economy in service, Solid Nickel Silver plumbing fixtures meet the highest architectural standards of quality.



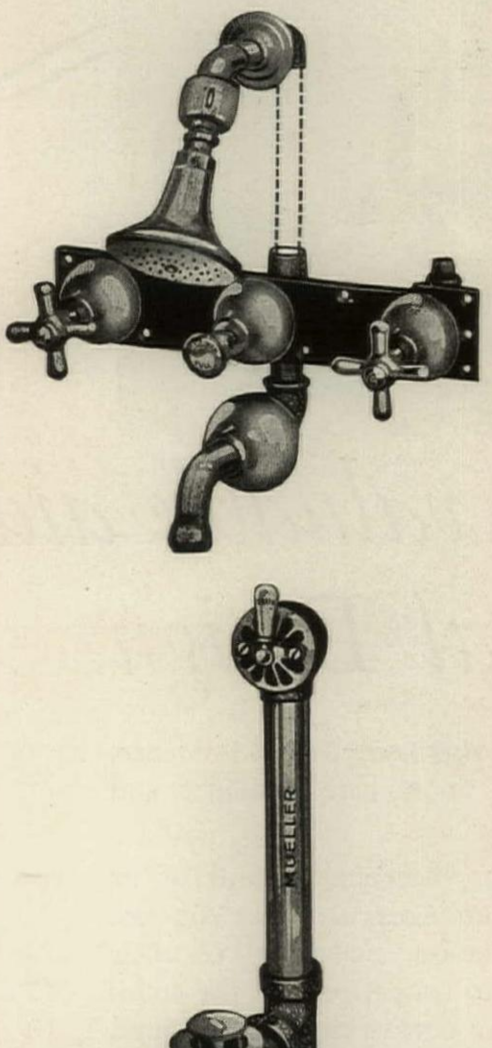
U. S. Naval Hospital, Mare Island, Calif., equipped with Solid Nickel Silver plumbing fixtures by The John Douglas Co., Cincinnati, Ohio.

18%/22 Nickel SILVER

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


REPUBLIC

No more surprise showers *with* Mueller Automatic Diverter Valve



A NEW Mueller feature especially desirable for hotel and apartment tub and shower installations.

The MUELLER *Automatic Diverter Valve* eliminates all danger of an unexpected shower for anyone not familiar with the operation of the fitting. It assures of the flow remaining diverted to the tub when the side or control valves have been shut off.

Four styles to choose from—send for complete information on this new, improved Mueller quality fitting.

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

MUELLER

PLUMBING BRONZE AND VITREOUS WARE

Architecture and Furniture by Herbert R. Lippmann. Decorations by Francis T. Miller, Inc., Chromium Plating by Carlton Plating Co.

CRODON—*a valuable aid to Architectural Design*

In the architectural treatment of this Long Island residence, moldings around windows and doors, base moldings and the bed are all CRODON Plated.

Licensees of United Chromium, Incorporated and of its affiliated companies; the Chromium Corporation of America and General Chromium Corporation, are proud of their products...proud of their ability to cooperate with the architect and designer who are creating new styles in architectural treatment.

CRODON may be a solution to your problem!

Names of licensees will be furnished on request.

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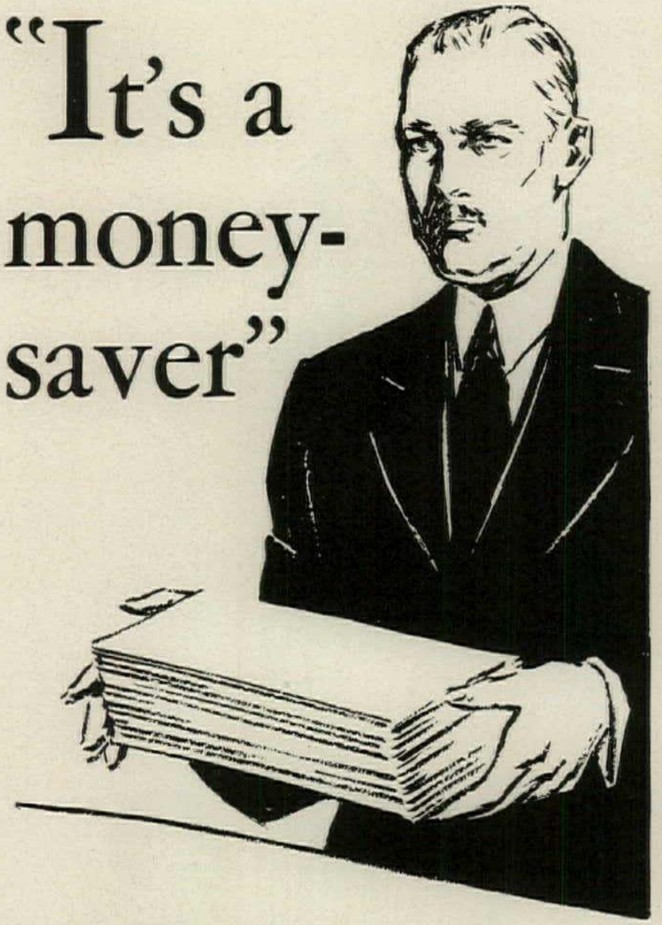
Licensees of

UNITED CHROMIUM

INCORPORATED

Executive Offices: 51 East 42nd Street, New York City

"It's a money-saver"



THERE'S real economy in Onliwon paper towels. Proven economy. Because they're extra-quality towels. Yet so efficient that they mean a real saving.

Onliwons are more economical—because they do a better, quicker drying job. They're extra large—with 34% more drying surface to the case. Served fresh one at a time from Onliwon cabinets. Double folded. Just one towel dries the hands completely. That means less waste.

Wonderful towels. Absorbent—they drink up the moisture instantly. Extra soft. Easy on hands or face. Yet strong and sturdy. Longer fibres make them harder to tear. Quality towels. Economical.

Let us show you how Onliwons save you money in your washrooms. Mail coupon below today.

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Please send us full information on the greater economy of A. P. W. Onliwon paper towels.

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MINERAL WOOL

The Perfect Insulator

- ✓COLD PROOF
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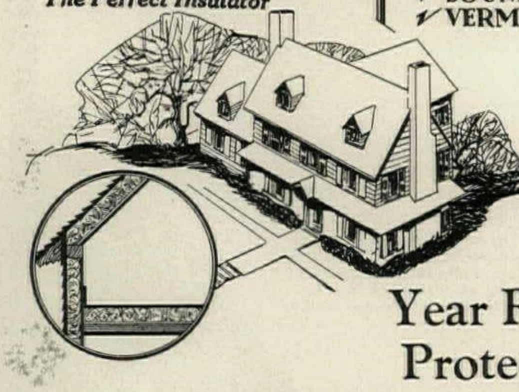

for
Year Round Protection

Prospective home owners can greatly reduce the upkeep of their homes and add untold comfort by insisting that they be properly insulated.

Mineral Wool, placed in the walls, floors and rafters of a building, will keep it many degrees warmer in Winter and cooler in Summer, in addition to making it thoroughly sound proof.

Its first cost is its last cost—and this is quickly offset by the saving it effects in Winter fuel.

Mineral Wool is a sanitary, indestructible, entirely mineral material, easy to apply and low in cost.

We will gladly send you a free sample of Mineral Wool and our illustrated booklet upon request.

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280 Madison Avenue, New York

Western Connection:
COLUMBIA MINERAL WOOL CO.
South Milwaukee, Wis.

YEOMANS PUMPS

NEW YORK SKYLINE

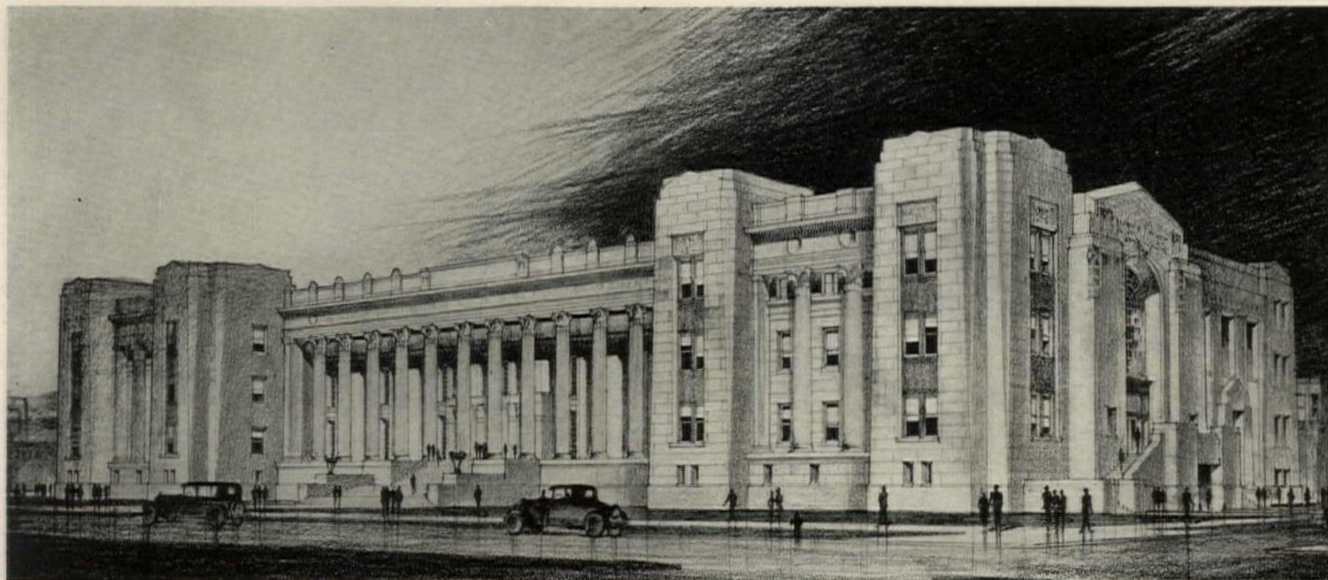
THE faith that New York Architects and Engineers place in Yeomans Sewage and Drainage Pumps is the result of years of dependable and economical protection rendered to this city's most prominent buildings.

Yeomans pumps have so unfailingly proved their ability to function perfectly that the name "Yeomans" has become standard in the specifications of foremost Architects and Engineers the world over.

Write for bulletins.

Representatives in principal cities and in foreign countries

YEOMANS BROTHERS COMPANY
1424 Dayton Street, Chicago



Criminal Courts and Jail Building at New Orleans, La. Equipped with Douglas Plumbing Fixtures and Solid Nickel Silver Trimmings. Diboll & Owen, Ltd., *Architects.* E. A. Christy, *Associate Architect.* James M. Todd, *Mechanical Engr.* Sciambra & Masino, Inc., *Plumbers*

Finer Fixtures for Finer Buildings

DOUGLAS PLUMBING FIXTURES

trimmed with SOLID NICKEL SILVER

Douglas Solid Nickel Silver Trimmings retain their bright, silver-like finish forever. They are nickel color through and through—no plating to wear off. Easy to keep clean and spotless—will not corrode.

Douglas "Juno" vitreous china flat rim lavatory, with integral back, open overflow, and china indexed Solid Nickel Silver compression basin faucets.

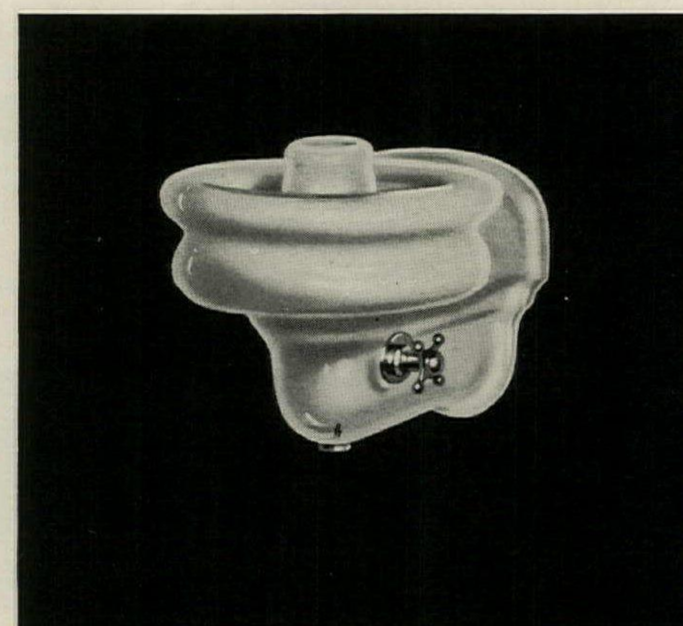
Chromium or nickel plated trimmings have a thin skin of plating — 1/5000 of an inch thick—over a brass base. This plating soon wears off and the trimmings become very unsightly.

DOUGLAS Plumbing Fixtures with Solid Nickel Silver Trimmings are specified for the finer, modern buildings where enduring beauty, cleanliness and utmost dependability are essential. Year after year, throughout the country—in leading hotels, hospitals, schools, office buildings, industrial plants, apartments and residences — they are proving their ability to meet these requirements to the satisfaction of both architects and clients.

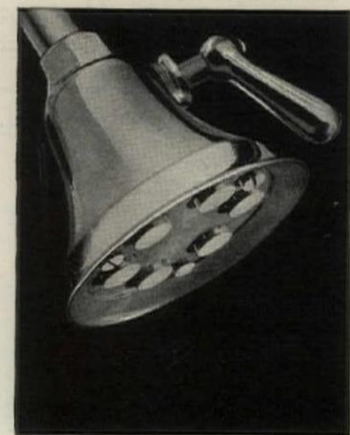
SOLID 18%22 Nickel SILVER

If you haven't all of the helpful data concerning this supreme combination in quality plumbing fixtures, send for it before writing your next specifications.

THE JOHN DOUGLAS COMPANY
Cincinnati, Ohio



K-3395—*New Self-Cleaning Shower Head*



K-5502M—*Diamond Sink Fixture*

K-3375—*Anyforce Shower Head*

GOOD TASTE

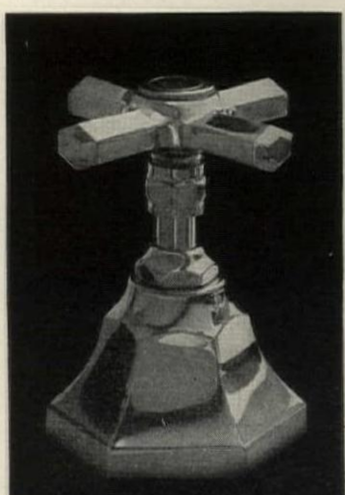
No one is more conscious of the vast difference deft touches of good taste can make in a house than the architect.

And no one is more adept at creating, for bathroom and kitchen, fixtures which combine fine workmanship and practical utility with good taste than Speakman.

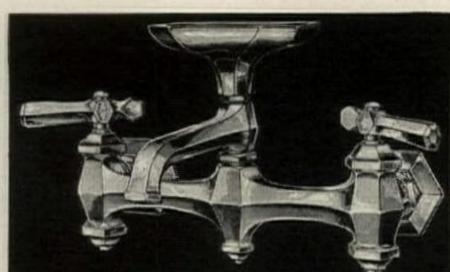
The reward of the architect who specifies Speakman showers and fixtures is an assurance of lasting beauty and faultless, permanent performance.

SPEAKMAN COMPANY, *Wilmington, Del.*

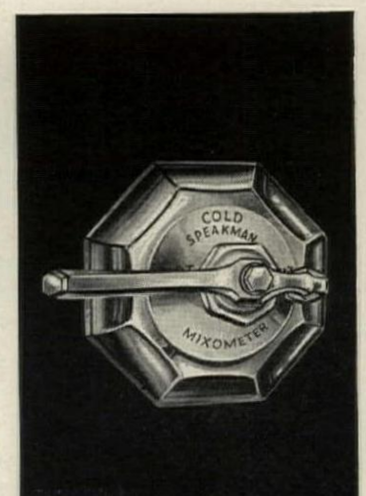
K-4017—*Artline Tub and Shower Combination*



Artline Trim for Bath, Lavatory and Shower



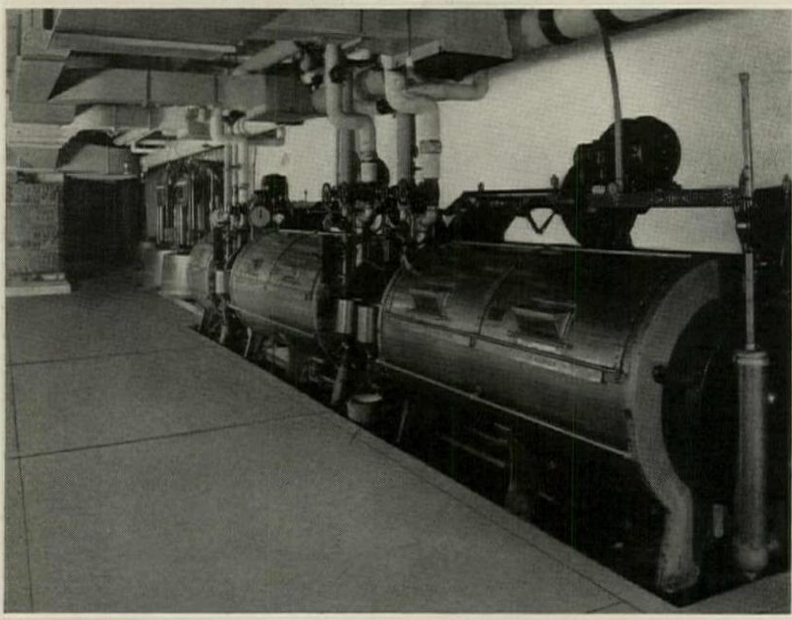
K-5512—*Artline Sink Fixture*



Artline Mixometer

No. 63 of a series of advertisements featuring prominent laundry installations

The *famous* PENN Athletic Club



The nationally famous Penn Athletic Club, Philadelphia, where the very highest standards of comfort and service prevail.
—Zantzinger, Borie & Medary, Architects, Philadelphia.

The laundry at the Penn Athletic Club, on the "All-American" list. In accordance with modern architectural practise, it was included in the original plans for the building.

has an "All-American" laundry

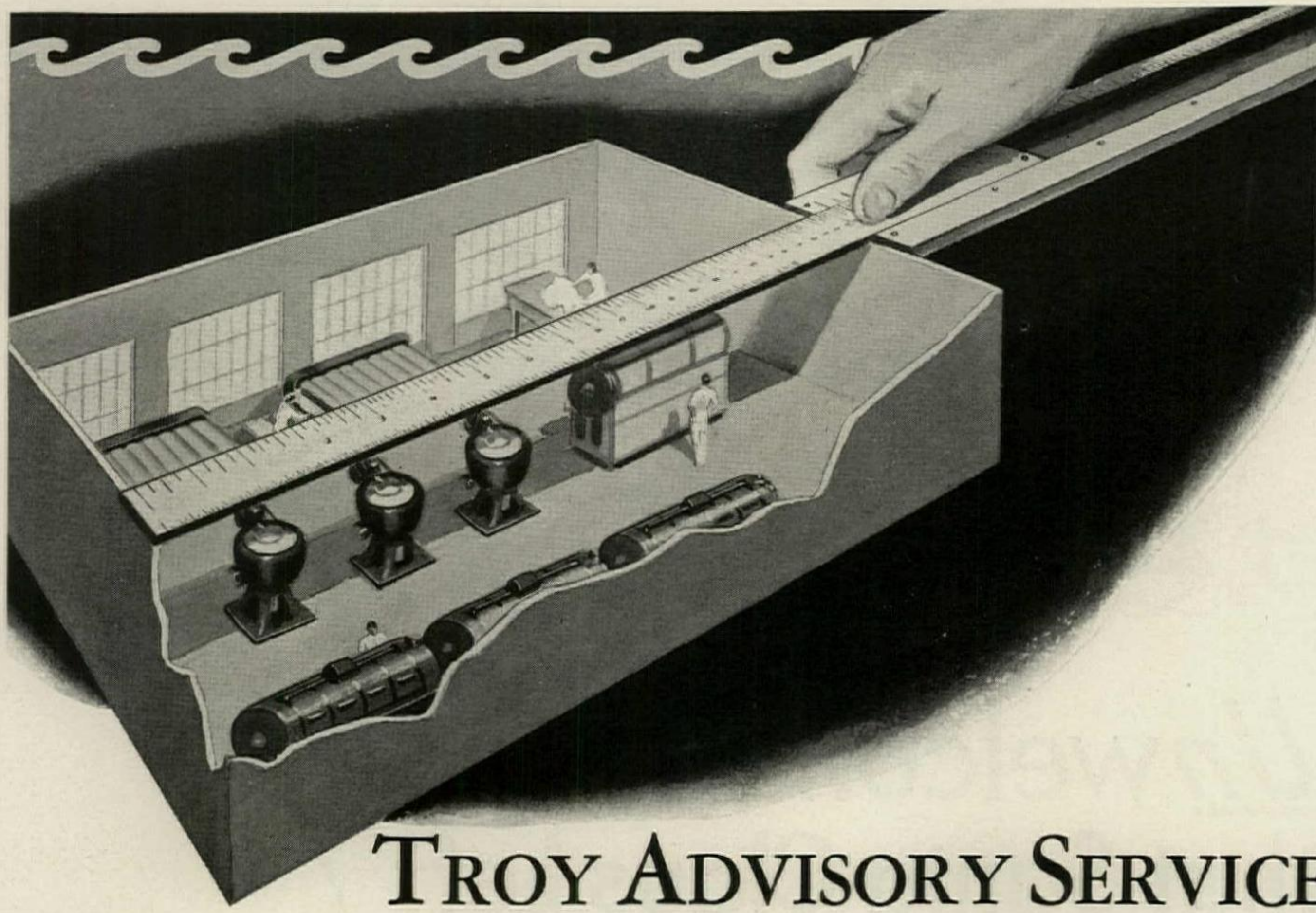
THE imposing exterior of the Penn Athletic Club, Philadelphia, lives up to the splendid interior of this famous institution. And with its high standards of comfort and service—the daily wash for this Club is handled in the most practical and economical way—in its own modern laundry, completely "American"-equipped—and included in the original plans.

The American Laundry Machinery Company has had the honor of working with architects in the design of scores of laundries, institutional and commercial, of every conceivable type and size. If you have any questions regarding club installations or modern laundry practise, the services of our engineering department are at your disposal.

The American Laundry Machinery Company *Norwood Station,* Cincinnati, Ohio

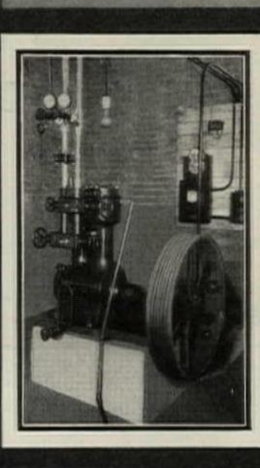
The Canadian Laundry Machinery Co., Ltd.
47-93 Sterling Road, Toronto 3, Ont., Canada

Agents: British-American Laundry Machinery Co., Ltd.
Underhill St., Camden Town, London, N. W. 1, England



THE MULTIPLE UNIT IN SMALLER BUILDINGS

The Casa Bonita Apartments, Chicago, Illinois



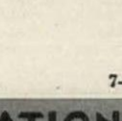
Apartment house installations by Vilter afford each dweller the ideal refrigeration via "remote control". ℂNot only ice cubes and food storage... Vilter refrigeration serves each apartment with chilled water and cool, fresh air. ℂA simple unit such as is shown above, installed in the basement and automatically controlled, gives satisfactory service indefinitely. ℂThe engineering department of "Refrigeration Headquarters" will be glad to work with architects, builders and their engineers to secure the desired result for any type or size of building. ℂEconomical first cost and decidedly low upkeep are characteristics of every Vilter installation. ℂWrite at once for details.

THE VILTER MANUFACTURING COMPANY
812 CLINTON STREET - MILWAUKEE, WIS.

Vilter REFRIGERATION

7-30

Data and bulletins will be sent gratis... just ask! Or send your blue prints for recommendations.

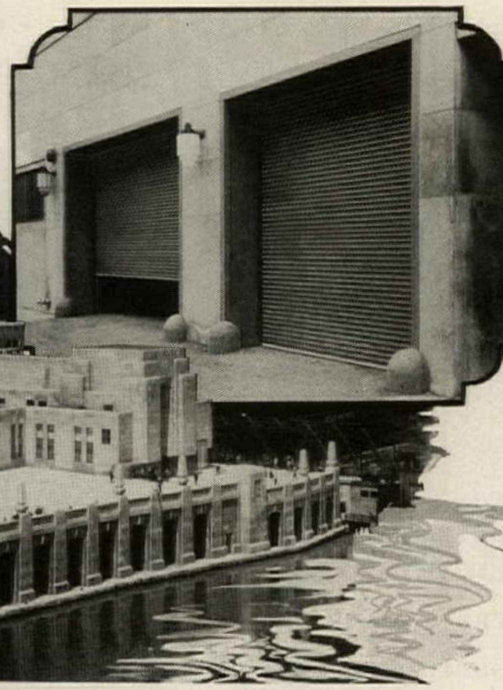


SINCE 1867

Architects
HOLABIRD & ROOT

General Contractors
HEGEMANN, HARRIS CO., INC.

Two of the nineteen Kinnear Rolling Doors used; 16 service doors, 3 Underwriters' automatic type. Even the largest (16 ft. wide and weighing 3,500 pounds) is easily raised or lowered with one hand.



As Usual, Holabird & Root Specified Kinnear Rolling Doors for the Ultra-Modern Chicago Daily News Building

As impressive, from a standpoint of appearance, as the new home of the Chicago Daily News is, even a most casual inspection of this masterpiece of architectural design reveals the fact that its beauty is not merely skin deep. From foundation to roof, it is quite obvious that the materials and products used in its construction were chosen with the idea of the utmost in permanence ever in the fore.

So, it was but natural that the product of the pioneer rolling door manufacturer were chosen to insure the owners of life time fire and service door satisfaction. Their third of a century's reputation and record make them the preferred equipment of their kind by every architect and contractor who design and build for ultimate economy. Kinnear Rolling Doors do cost a trifle more, but are worth many times more.

Every Kinnear Rolling Door is "Engineered." There are no stock patterns.

KINNEAR
ROLLING DOORS
There IS No Equal

New catalog showing modern uses for Kinnear Doors free on request.

THE KINNEAR MANUFACTURING CO.
1310-1320 FIELD AVENUE, COLUMBUS, OHIO, U. S. A.

BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT
NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH KANSAS CITY WASHINGTON

Guaranteed for 10, 15 or 20 years!

Bonded by

The United States Fidelity and Guaranty Co., Baltimore

THOSE who look ahead to 1940, 1945 and 1950 want Genasco Trinidad Bonded Roofing.

First, because Genasco roofs are made with alternate layers of Genasco Trinidad Lake Roofing Asphalt, produced from Trinidad Lake Asphalt, nature's own waterproofer, and layers of Genasco all-rag felt.

And secondly, because Genasco Trinidad Bonded Roofing, when applied in accordance with our specifications, is guaranteed for ten, fifteen or twenty years, dependent upon the type of construction. The guarantee is backed by a Surety Bond issued by The United States Fidelity and Guaranty Company, Baltimore.

Listed below are the different types of Genasco Trinidad Bonded Roofing:

Genasco Trinidad 20-year Bonded Roofing with slag, crushed stone or gravel surfacing. Class A Underwriters' Laboratories Classification—guaranteed twenty years by The United States Fidelity and Guaranty Company, Baltimore, Maryland.

Genasco Trinidad 15-year Bonded Roofing with slag, crushed stone or gravel surfacing. Class A Underwriters' Laboratories Classification—guaranteed fifteen years by The United States Fidelity and Guaranty Company, Baltimore, Maryland.

Genasco Trinidad 10-year Bonded Roofing with smooth surface. Guaranteed ten years by The United States Fidelity and Guaranty Company, Baltimore, Maryland.

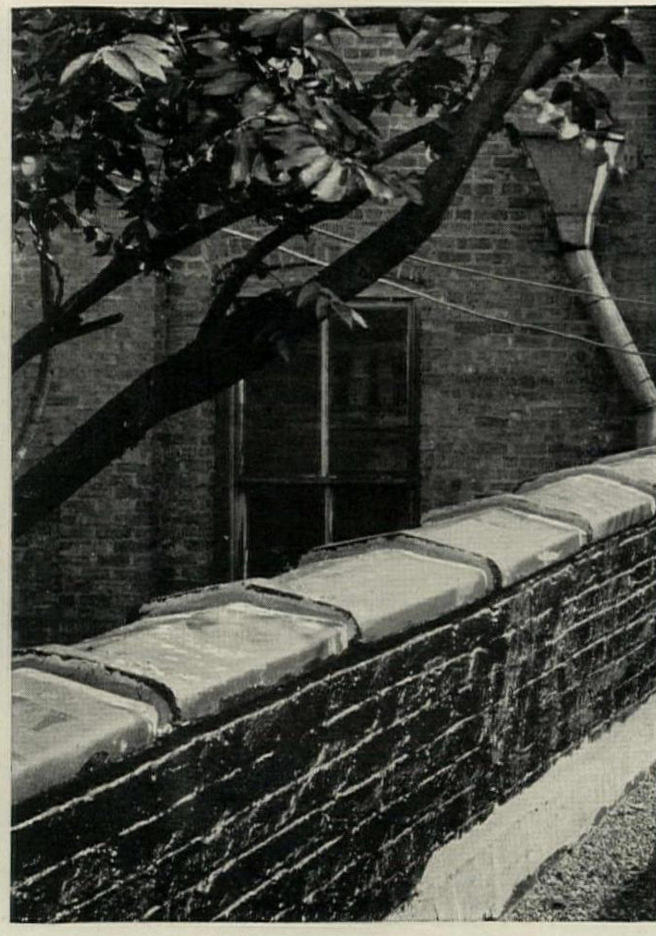
Write today for information and specifications.

THE BARBER ASPHALT COMPANY
Philadelphia
New York Chicago Pittsburgh St. Louis
Kansas City San Francisco

Genasco
Reg. U. S. Pat. Off

TRINIDAD BONDED ROOFING

See complete specifications in volume B, pages 1604 to 1608, inclusive, 1930 edition Sweet's Architectural Catalog

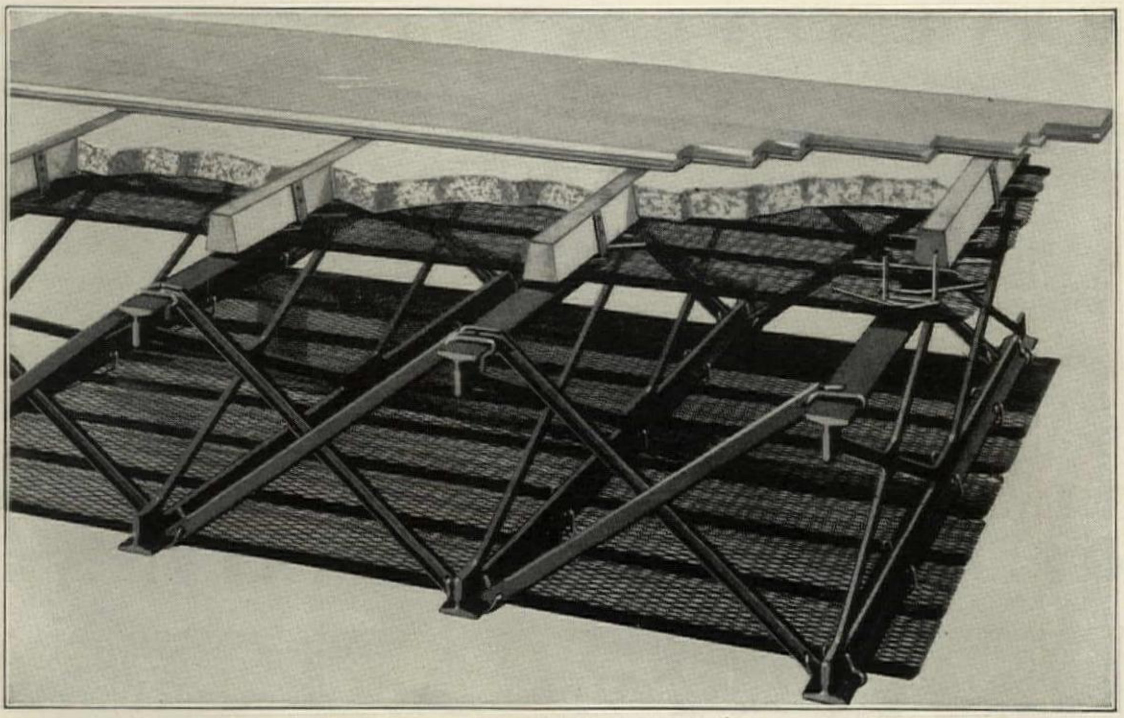


The most economical overhead for brick walls

CLAY PRODUCTS ASSOCIATION
CONWAY BUILDING
Chicago

VITRIFIED *Salt Glazed* CLAY
Wall Coping

AF1-Gray



The Floor and Roof Construction of Tomorrow

Through engineering genius and modern manufacturing methods Kalman is able to offer the architects this new and improved method for building fire-safe floors and roofs.

In this construction the principle of the old wood floor and roof construction is maintained—but the materials used are greatly improved.

Kalmantruss Steel Joists are made by a new and different method—a rolling process. As a result, joints are one-piece and the joist has unusual dependability.

Kalmantruss Rigid Bridging follows the engineering principles of wood cross bridging, but it is fire-safe.

In addition, the application of Kalmanlath and the distinctive line of Kalman accessory products, such as ceiling and floor lath clips, result in producing the improved fire-safe floor and roof construction of tomorrow.

KALMAN STEEL COMPANY

Successors to Sykes Metal Lath Company

KALMAN STEEL

MODERN, FIRE-SAFE BUILDING PRODUCTS

Atlanta
Baltimore
Boston
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Dayton
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Minneapolis
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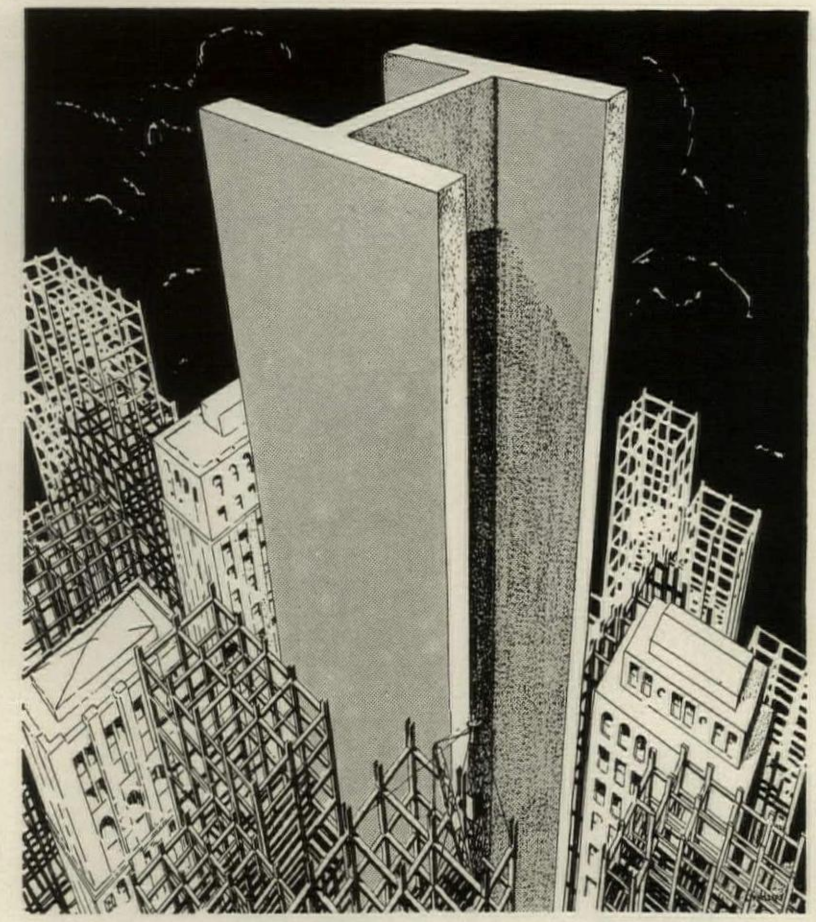
New Haven

New York
(Export Office—New York)

Niles
Philadelphia
Pittsburgh
St. Louis

St. Paul
Syracuse
Washington, D. C.
Youngstown



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 St., Boston.
Akoustolith Plaster. Brochure, 6 pp., 8½ x 11 ins. Important data on a valuable material.

Johns-Manville Corporation, New York.
Sound-Absorbing Treatment in Banks and Offices. Booklet, 18 pp., 8½ x 11 ins. Illustrated.
Sound-Absorbing Treatment in Churches and Religious Institutions. Brochure. 22 pp., 8½ x 11 ins. Illustrated.

U. S. Gypsum Co., 205 W. Monroe St., Chicago, Ill.
A Scientific Solution of an Old Architectural Problem. Folder, 6 pp., 8½ x 11 ins. Describes Sabinite Acoustical Plaster.

ASH HOISTS

Gillis & Geoghegan, Inc., 544 West Broadway, New York.
G & G Telescopic Hoist catalog, 8½ x 11 A. I. A. Standard Classification 30il, contains complete descriptions, method of selecting correct model to fit the building's needs, scaled drawings showing space requirements and specifications.

ASH HOISTS—TELESCOPIC

Gillis & Geoghegan, Inc., 544 West Broadway, New York.
G & G Telescopic Hoist catalog, 8½ x 11 A. I. A. Standard Classification 30il, contains complete descriptions, method of selecting correct model to fit the building's needs, scaled drawings showing space requirements and specifications.

BRICK

American Face Brick Association, 1751 Peoples Life Building, Chicago, Ill.
Brickwork in Italy. 298 pp., size 7½ x 10½ ins., an attractive and useful volume on the history and use of brick in Italy from ancient to modern times, profusely illustrated with 69 line drawings, 300 half-tones, and 20 colored plates, with a map of modern and XII century Italy. Bound in linen. Price now $3.00, postpaid (formerly $6.00). Half Morocco, $7.00.
Industrial Buildings and Housing. Bound Volume, 112 pp., 8½ x 11 ins. Profusely illustrated. Deals with the planning of factories and employes' housing in detail. Suggestions are given for interior arrangements, including restaurants and rest rooms. Price now $1.00 postpaid (formerly $2.00).

Hanley Company, Bradford, Pa.
General Catalog. 16 pp. 8½ 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.
Driwood Period Mouldings in Ornamented Wood. Brochure, 28 pp., 8½ x 11 ins. Illustrated.
Ensemble Offices for the Banker and Broker. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Luxurious Office Partitions in Walnut, Mahogany and Quartered Oak. Folder. 4 pp., 8½ x 11 ins. Illustrated.

CEMENT

Carney Company, The, Mankato, Minn.
A Remarkable Combination of Quality and Economy. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Important data on valuable material.

Kosmos Portland Cement Company, Louisville, Ky.
Kosmortar for Enduring Masonry. Folder, 6 pp., 3½ x 6¼ ins. Data on strength and working qualities of Kosmortar.
Kosmortar, the Mortar for Cold Weather. Folder, 4 pp., 3¾ x 6¾ ins. Tells why Kosmortar should be used in cold weather.

Louisville Cement Co., 315 Guthrie St., Louisville, Ky.
BRIXMENT for Perfect Mortar. Self-filing handbook, 8¾ x 11 ins. 16 pp. Illustrated. Contains complete technical description of BRIXMENT for brick, tile and stone masonry, specifications, data and tests.

Portland Cement Association, Chicago, Ill.
Concrete Masonry Construction. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Deals with various forms of construction.
Town and Country Houses of Concrete Masonry. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
Facts About Concrete Building Tile. Brochure, 16 pp., 8½ x 11 ins. Illustrated.
The Key to Firesafe Homes. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
Design and Control of Concrete Mixers. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Portland Cement Stucco. Booklet, 64 pp., 8½ x 11 ins. Illustrated.

CEMENT—Continued

Concrete in Architecture. Bound Volume, 60 pp., 8½ x 11 ins. Illustrated. An excellent work, giving views of exteriors and interiors.

CHURCH EQUIPMENT

John Van Range Co., Cincinnati.
Practical Planning for Church Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CONCRETE BUILDING MATERIALS

Concrete Steel Company, 42 Broadway, New York.
Modern Concrete Reinforcement. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

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

CONCRETE COLORINGS

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

CONSTRUCTION, FIREPROOF

Master Builders Co., Cleveland, Ohio.
Color Mix. Booklet, 18 pp., 8½ x 11 ins. Illustrated. Valuable data on concrete hardener, waterproofer and dustproofer in permanent colors.

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

North Western Expanded Metal Co., 1234 Old Colony Building, Chicago, Ill.
North Western Expanded Metal Products. Booklet, 8½ x 10¾ ins. 16 pp. Fully illustrated, and describes different products of this company, such as Kno-burn metal lath, 20th Century Corrugated, Plaster-Sava and Longspan lath channels, etc.
A. I. A. Sample Book. Bound volume, 8½ x 11 ins., contains actual samples of several materials and complete data regarding their use.

CONSTRUCTION, STONE AND TERRA COTTA

Cowing Pressure Relieving Joint Company, 100 North Wells St., Chicago, Ill.
Pressure Relieving Joint for Buildings of Stone, Terra Cotta or Marble. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Deals with preventing cracks, spalls and breaks.

DAMPPROOFING

The Master Builders Co., 7016 Euclid Ave., Cleveland.
Waterproofing and Dampproofing Specification Manual. Booklet, 18 pp., 8½ x 11 ins. Deals with methods and materials used.
Waterproofing and Dampproofing. File. 36 pp. Complete descriptions and detailed specifications for materials used in building and concrete.

Minwax Company, Inc., 11 West 42nd St., New York.
Complete Index of all Minwax Products. Folder, 6 pp., 8½ 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., 4½ x 7½ ins.

DOORS

David Lupton's Sons Company, Philadelphia.
Lupton Commercial Steel Doors. Folder. 8½ x 11 ins. Illustrated.
Lupton Steel Industrial Doors. Brochure. 8 pp., 8½ 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., 8½ x 11 ins., illustrating and describing more than 2,000 standard bronze shapes of cornices, jamb casings, mouldings, etc.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 169*

DOORS AND TRIM, METAL—Continued

The Kawneer Company, Niles, Michigan.
Detail sheet, 8½ x 11 ins., with A.I.A. File No. featuring Heavy Welded Bronze Doors.

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

Truscon Steel Company, Youngstown, Ohio.
Copper Alloy Steel Doors. Catalog 110. Booklet, 48 pp., 8½ x 11 ins. Illustrated.

DOORS, SOUNDPROOF

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

DRAINAGE FITTINGS

Josam Mfg. Co., Michigan City, Ind.
Josam Products. Booklet, 73 pp., 8½ x 11 ins. Illustrated. A valuable line of accessories.
Josam-Marsh Grease, Plaster, Sediment and Hair Interceptors. Brochure. 7 pp., 8½ x 11 ins. Illustrated.
Josam New Saw Tooth-Roof Drain. Folder, 4 pp., 8½ x 11 ins. Illustrated.

DRINKING FOUNTAINS

Halsey W. Taylor Co., Warren, Ohio
Halsey Taylor Drinking Fountains. Architects' Catalog H. 52 pp., 8½ x 11 ins. Illustrated.

DUMBWAITERS

Sedgwick Machine Works, 151 West 15th St., New York, N. Y.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¾ x 8¾ ins., 60 pp. Illustrated.
Catalog and pamphlets, 8½ x 11 ins. Illustrated. Valuable data on dumbwaiters.

ELECTRICAL EQUIPMENT

The Electric Storage Battery Co., Philadelphia.
Emergency Lighting and Emergency Power Data. Booklet. 12 pp., 8½ x 11 ins. Illustrated.

General Electric Co., Merchandise Dept., Bridgeport, Conn.
Wiring System Specification Data for Apartment Houses and Apartment Hotels. Booklet, 20 pp., 8 x 10 ins. Illustrated.
Electrical Specification Data for Architects. Brochure, 36 pp., 8 x 10½ ins. Illustrated. Data regarding G. E. wiring materials and their use.
The House of a Hundred Comforts. Booklet, 40 pp., 8 x 10½ ins. Illustrated. Dwells on importance of adequate wiring.

Harvey Hubbell, Inc., Bridgeport, Conn.
Electrical Specialties. Catalog No. 19. 52 pp., 8½ x 10 ins. Illustrated.

Pick-Barth Company, Inc., Albert, 1200 West 35th St., Chicago, and Cooper Square, New York.
School Cafeterias. Booklet, 6 x 9 ins. Illustrated. The design and equipment of school cafeterias with photographs of installation and plans for standardized outfits.

Prometheus Electric Corporation, 360 West 13th St., New York.
Electric Heating Specialties. Booklet, 24 pages. 8½ x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Electric Power for Buildings. Brochure, 14 pp., 8½ x 11 ins. Illustrated. A publication important to architects and engineers.
Variable-Voltage Central Systems as Applied to Electric Elevators. Booklet, 12 pp., 8½ x 11 ins. Illustrated. Deals with an important detail of elevator mechanism.
Modern Electrical Equipment for Buildings. Booklet, 8½ x 11 ins. Illustrated. Lists many useful appliances.
Electrical Equipment for Heating and Ventilating Systems. Booklet, 24 pp., 8½ x 11 ins. Illustrated. This is "Motor Application Circular 7379."
Westinghouse Panelboards. Catalog 224. Booklet, 64 pp., 8½ x 11 ins. Illustrated.
Beauty; Power; Silence; Westinghouse Fans. (Dealer Catalog 45.) Brochure, 16 pp., 8½ x 11 ins. Illustrated. Valuable information on fans and their uses.
Electric Range Book for Architects (A. I. A. Standard Classification 31 G-4). Booklet, 24 pp., 8½ x 11 ins. Illustrated. Cooking apparatus for buildings of various types.
Westinghouse Commercial Cooking Equipment (Catalog 280). Booklet, 32 pp., 8½ x 11 ins. Illustrated. Equipment for cooking on a large scale.
Electric Appliances (Catalog 44-A). 32 pp., 8½ x 11 ins. Deals with accessories for home use.

ELEVATORS

Otis Elevator Company, 260 Eleventh Ave., New York, N. Y.
Otis Push Button Controlled Elevators. Descriptive leaflets, 8½ x 11 ins. Illustrated. Full details of machines, motors and controllers for these types.
Otis Geared and Gearless Traction. Elevators of All Types. Descriptive leaflets, 8½ x 11 ins. Illustrated. Full details of machines, motors and controllers for these types.
Escalators. Booklet, 8½ x 11 ins., 22 pp. Illustrated. Describes use of escalators in subways, department stores, theaters and industrial buildings. Also includes elevators and dock elevators.

Richards-Wilcox Mfg. Co., Aurora, Ill.
Elevators. Booklet, 8½ x 11 ins., 24 pp. Illustrated. Describes complete line of "Ideal" elevator door hardware and checking devices, also automatic safety devices.

Sedgwick Machine Works, 151 West 15th St., New York, N. Y.
Catalog and descriptive pamphlets, 4¾ x 8¾ ins., 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.
Catalog and pamphlets, 8½ x 11 ins. Illustrated. Important data on different types of elevators.

ESCALATORS

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

FIREPLACE CONSTRUCTION

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

FIREPROOFING

Concrete Engineering Co., Omaha, Neb.
Handbook of Fireproof Construction. Booklet, 54 pp., 8½ x 11 ins. Valuable work on methods of fireproofing.

Concrete Steel Company, 42 Broadway, New York.
Economical Fireproof Floors for Suburban Buildings. Folder. 4 pp., 8½ x 11 ins. Illustrated.

National Fire Proofing Company, Fulton Building, Pittsburgh.
Natco; The Complete Line of Structural Clay Tile. Booklet. 48 pp., 8½ x 11 ins. Illustrated.

North Western Expanded Metal Co., 407 South Dearborn Street, Chicago, Ill.
A. I. A. Sample Book. Bound volume, 8½ x 11 ins. Contains actual samples of several materials and complete data regarding their use.

FLOOR HARDENERS (CHEMICAL)

Master Builders Co., Cleveland, Ohio.
Concrete Floor Treatment. File, 50 pp. Data on securing hardened dustproof concrete.
Concrete Floor Treatments—Specification Manual. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Valuable work on an important subject.

Minwax Company, 11 West 42nd Street, New York, N. Y.
Concrete Floor Treatments. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Toch Brothers, New York, Chicago, Los Angeles.
Handbook of R.I.W. Protective Products. Booklet, 40 pp., 4½ x 7½ ins.

FLOORS—STRUCTURAL

Concrete Steel Company, 42 Broadway, New York.
Structural Economies for Concrete Floors and Roofs. Brochure, 32 pp., 8½ x 11 ins. Illustrated.

Truscon Steel Co., Youngstown, Ohio.
Truscon Floretyle Construction. Booklet, 8½ x 11 ins., 16 pp. Illustrations of actual jobs under construction. Lists of properties and information on proper construction. Proper method of handling and tables of safe loads.

Structural Gypsum Corporation, Linden, N. J.
Gypsteel Pre-cast Fireproof Floors. Booklet, 36 pp., 8½ x 11 ins. Illustrated. Data on flooring.

FLOORING

Armstrong Cork Co. (Linoleum Division), Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog, 8½ x 11 ins., 44 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors. Newly revised, February, 1929.
Armstrong's Linoleum Pattern Book, 1929. Catalog, 9 x 12 ins., 44 pp. Color plates. Reproduction in color of all patterns of linoleum and cork carpet in the Armstrong line.
Linoleum Layer's Handbook. 5 x 7 ins., 36 pp. Instructions for linoleum layers and others interested in learning most satisfactory methods of laying and taking care of linoleum.
Enduring Floors of Good Taste. Booklet, 6 x 9 ins., 48 pp. Illustrated in color. Explains use of linoleum for offices, stores, etc., with reproductions in color of suitable patterns, also specifications and instructions for laying.

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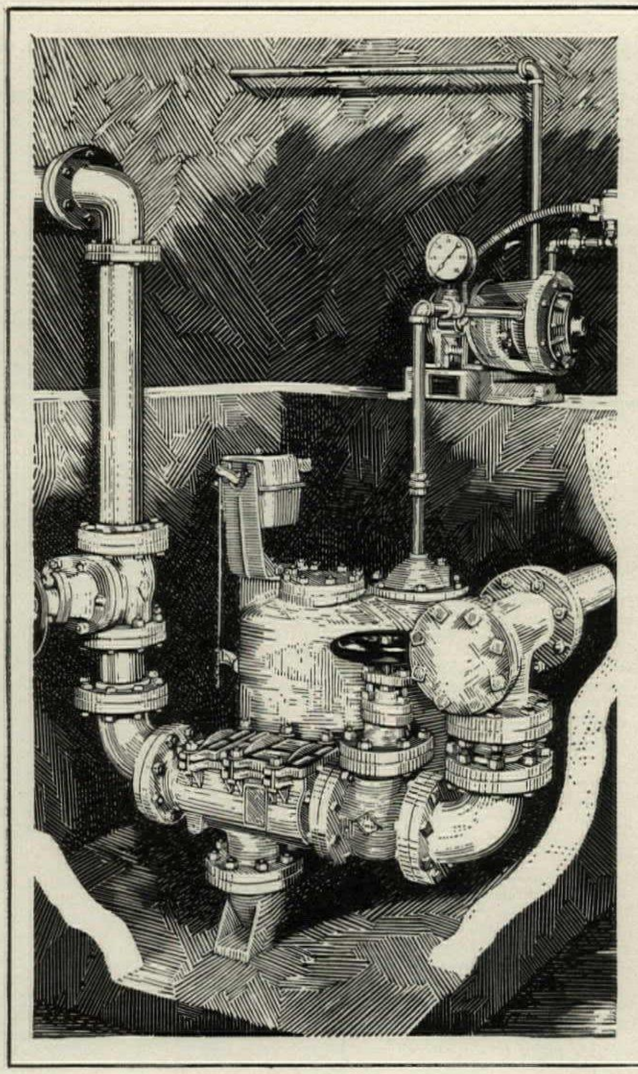

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 170*

FLOORING—Continued

Cellized Oak Flooring, Memphis, Tenn.
Style in Oak Floors. Booklet, 16 pp., 6 x 9 ins. Illustrated.

Congoleum-Nairn, Inc., 195 Belgrove Drive, Kearny, N. J.
Facts you should know about Resilient Floors. A series of booklets on floors for (1) schools, (2) hospitals, (3) offices, (4) stores, (5) libraries, (6) churches, (7) clubs and lodges, (8) apartments and hotels. Illustrated.
Specifications for Resilient Floors. Booklet, 12 pp. A reprint from Sweet's.
A New Kind of Floor Service. Brochure, 8 pp. Data on Bonded Floors.
Sealex Battleship Linoleum. Booklet, 12 pp. Illustrated. Shows typical installations.
Sealex Treadlite Tiles. Two booklets, 8 and 16 pp. Illustrated.
Colonial Planks. Brochure, 8 pp. Illustrated.

National Lumber Manufacturers' Association, Transportation Building, Washington.
Wood Floors. Booklet. 30 pp., 8½ x 11 ins. Illustrated.

C. Pardee Works, 9 East 45th St., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.
Pardee Tiles. Bound Volume, 48 pp., 8½ x 11 ins. Illustrated.

Stedman Products Company, South Braintree, Mass.
Stedman Tile, The Original Reinforced Rubber Floor. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Valuable data on flooring.

Structural Gypsum Corporation, Linden, N. J.
Gypsteel Pre-cast Fireproof Floors. Booklet, 36 pp., 8½ x 11 ins. Illustrated. Data on floorings.

U. S. Gypsum Co., Chicago.
Pyrobar Floor Tile. Folder, 8½ x 11 ins. Illustrated. Data on building floors of hollow tile and tables on floor loading.

U. S. Rubber Co., 1790 Broadway, New York, N. Y.
Period Adaptations for Modern Floors. Brochure, 8 x 11 ins., 60 pp. Richly Illustrated. A valuable work on the use of rubber tile for flooring in interiors of different historic styles.

FURNITURE

American Seating Co., 14 E. Jackson Blvd., Chicago, Ill.
Art Ecclesiastical Booklet, 6 x 9 ins., 48 pp. Illustrations of church fitments in carved wood.
Theatre Chairs. Booklet, 6 x 9 ins., 48 pp. Illustrations of theatre chairs.

Kittinger Co., 1893 Elmwood Ave., Buffalo, N. Y.
Kittinger Club & Hotel Furniture. Booklet, 20 pp., 6¼ x 9¼ ins. Illustrated. Deals with fine line of furniture for hotels, clubs, institutions, schools, etc.
Kittinger Club and Hotel Furniture. Booklet, 20 pp., 6 x 9 ins. Illustrated. Data on furniture for hotels and clubs.
A Catalog of Kittinger Furniture. Booklet, 78 pp., 11 x 14 ins. Illustrated. General Catalog.

GLASS CONSTRUCTION

Adamson Flat Glass Co., Clarksburg, W. Va.
Quality and Dependability. Folder, 2 pp., 8½ x 11 ins. Illustrated. Data in the company's product.

Libbey-Owens Sheet Glass Co., Toledo, Ohio.
Flat Glass. Brochure, 12 pp., 5⅛ x 7⅝ ins. Illustrated. History of manufacture of flat, clear, sheet glass.

GREENHOUSES

King Construction Company, North Tonawanda, N. Y.
King Greenhouses for Home or Estate. Portfolio of half-tone prints, varnishes, 8¾ x 10½ ins.

William H. Lutton Company, 267 Kearney Ave., Jersey City, N. J.
Greenhouses of Quality. Booklet, 50 pp., 8½ x 11 ins. Illustrated. Conservatories making use of Lutton Patented Galvanized Steel V-Bar.

HARDWARE

P. & F. Corbin, New Britain, Conn.
Early English and Colonial Hardware. Brochure, 8½ x 11 ins. An important illustrated work on this type of hardware.
Locks and Builders' Hardware. Bound Volume, 486 pp., 8½ x 11 ins. An exhaustive, splendidly prepared volume.
Colonial and Early English Hardware. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Data on hardware for houses in these styles.

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

Richards-Wilcox Mfg. Co., Aurora, Ill.
Distinctive Garage Door Hardware. Booklet, 8½ x 11 ins., 66 pp. Illustrated. Complete information accompanied by data and illustrations on different kinds of garage door hardware.
Distinctive Elevator Door Hardware. Booklet, 90 pp., 10½ x 16 ins. Illustrated.

HARDWARE—Continued

Russell & Erwin Mfg. Co., New Britain, Conn.
Hardware for the Home. Booklet, 24 pp., 3½ x 6 ins. Deals with residence hardware.
Door Closer Booklet. Brochure, 16 pp., 3½ x 6 ins. Data on a valuable detail.
Garage Hardware. Booklet, 12 pp., 3½ x 6 ins. Hardware intended for garage use.
Famous Homes of New England. Series of folders on old homes and hardware in style of each.

HEATING EQUIPMENT

American Blower Co., 6004 Russell St., Detroit, Mich.
Heating and Ventilating Utilities. A binder containing a large number of valuable publications, each 8½ x 11 ins., on these important subjects.

American Radiator Company, The, 40 West 40th St., N. Y. C.
Ideal Boilers for Oil Burning. Catalog 5⅝ x 8½ ins., 36 pp. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.
Corto—The Radiator Classic. Brochure, 5½ x 8½ ins., 16 pp. Illustrated. A brochure on a space-saving radiator of beauty and high efficiency.
Ideal Arcola Radiator Warmth. Brochure, 6¼ x 9½ ins. Illustrated. Describes a central all-on-one-floor heating plant with radiators for small residences, stores, and offices.
How Shall I Heat My Home? Brochure, 16 pp., 5¾ x 8½ ins. Illustrated. Full data on heating and hot water supply.
New American Radiator Products. Booklet, 44 pp., 5 x 7¾ ins. Illustrated. Complete line of heating products.
A New Heating Problem. Brilliantly Solved. Broadside, 4 pp., 10¾ x 15 ins. Illustrated. Data on the IN-AIRID invisible air valve.
In-Airid, the Invisible Air Valve. Folder, 8 pp., 3½ x 6 ins. Illustrated. Data on a valuable detail of heating.
The 999 ARCO Packless Radiator Valve. Folder, 8 pp., 3½ x 6 ins. Illustrated.

James B. Clow & Sons, 534 S. Franklin St., Chicago, Ill.
Clow Gasteam Vented Heating System. Brochure, 24 pp., 8½ x 11 ins. Illustrated. Deals with a valuable form of heating equipment for using gas.

C. A. Dunham Company, 450 East Ohio St., Chicago, Ill.
Dunham Radiator Trap. Bulletin 101, 8 x 11 ins., 12 pp. Illustrated. Explains working of this detail of heating apparatus.
Dunham Packless Radiator Valves. Bulletin 104, 8 x 11 ins., 8 pp. Illustrated. A valuable brochure on valves.
Dunham Return Heating System. Bulletin 109, 8 x 11 ins. Illustrated. Covers the use of heating apparatus of this kind.
Dunham Vacuum Heating System. Bulletin 110, 8 x 11 ins., 12 pp. Illustrated.
The Dunham Differential Vacuum Heating System. Bulletin 114. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for small buildings.
The Dunham Differential Vacuum Heating System. Bulletin 115. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for large buildings.

The Fulton Sylphon Company, Knoxville, Tenn.
Sylphon Temperature Regulators. Illustrated brochures, 8½ x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments.
Sylphon Heating Specialties. Catalog No. 200, 192 pp., 3½ x 6¾ ins. Important data on heating.

Hoffman Specialty Company, Inc., 25 West 45th St., New York, N. Y.
Heat Controlled With the Touch of a Finger. Booklet, 46 pp., 5¾ x 8¾ ins. Illustrated.
How to Lock Out Air, the Heat Thief. Brochure, 48 pp., 5 x 7¼ ins. Illustrated.

Janette Manufacturing Company, 556 West Monroe Street, Chicago.
More Heat from Any Hot Water System on Less Fuel. Folder. 4 pp., 8½ x 11 ins. Illustrated. Deals with use of the "Hydrolator."

S. T. Johnson Co., Oakland, Calif.
Johnson Oil Burners. Booklet, 9 pp., 8½ x 11 ins. Illustrated.
Bulletin No. 4A. Brochure, 8 pp., 8½ x 11 ins. Illustrated. Data on different kinds of oil-burning apparatus.
Bulletin No. 31. Brochure, 8 pp., 8½ x 11 ins. Illustrated. Deals with Johnson Rotary Burner with Full Automatic Control.

Kewanee Boiler Corporation, Kewanee, Ill.
Kewanee on the Job. Catalog, 8½ x 11 ins., 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators. etc.
Catalog No. 78, 6 x 9 ins. Illustrated. Describes Kewanee Firebox Boilers with specifications and setting plans.
Catalog No. 79, 6 x 9 ins. Illustrated. Describes Kewanee power boilers and smokeless tubular boilers with specifications.

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HEATING EQUIPMENT—Continued

May Oil Burner Corp., Baltimore, Md.
Adventures in Comfort. Booklet, 24 pp., 6 x 9 ins. Illustrated. Non-technical data on oil as fuel.
Taking the Quest Out of the Question. Brochure, 16 pp., 6 x 9 ins. Illustrated. For home owners interested in oil as fuel.

McQuay Radiator Corporation, 35 East Wacker Drive, Chicago, Ill.
McQuay Visible Type Cabinet Heater. Booklet, 4 pp., 8½ x 11 ins. Illustrated. Cabinets and radiators adaptable to decorative schemes.
McQuay Concealed Radiators. Brochure, 4 pp., 8½ x 11 ins. Illustrated.
McQuay Unit Heater. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Gives specifications and radiator capacities.

Modine Mfg. Co., Racine, Wisc.
Modine Copper Radiation. Booklet, 28 pp. 8½ x 11 ins. Illustrated. Deals with industrial, commercial and domestic heating.
A Few Short Years. Folder. 4 pp. 8½ x 11 ins. Illustrated. Heating for garages.
Dairy Plant Heating. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Industrial Heating. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Modine Unit Heater. Folder. 6 pp., 8½ x 11 ins. Illustrated.

Nash Engineering Company, South Norwalk, Conn.
Bulletin 85. Booklet. 12 pp. 10¾ x 7½ ins. Illustrated in color. Describes construction and operation of the Jennings Return Line Vacuum Heating Pump.
Bulletin 87. Brochure. 8 pp. 10¾ x 7½ ins. Illustrated in color. Deals with Sizes T and U Jennings Vacuum Heating Pump for 2500 and 5000 square feet equivalent direct radiation.
Bulletin 63. Booklet. 4 pp. 10¾ x 7½ ins. Illustrated. Describes in detail the Unit Type Motor Driven Jennings Condensation Pump.

National Radiator Corporation, Johnstown, Pa.
Aero Radiators; Beauty and Worth. Catalog 34. Booklet, 6 x 9 ins., 20 pp., describing and illustrating radiators and accessories.
Six Great Companies Unite to Form a Great Corporation. Booklet, 28 pp., 8½ x 10½ ins. Illustrated. Valuable data on heating.

Prometheus Electric Corporation, 360 West 13th St., New York.
Electric Heating Specialties. Booklet, 24 pages. 8½ x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.

Rome Brass Radiator Corporation, 1 East 42nd Street, New York.
Proof of the Pudding. Booklet, 24 pp., 8½ x 10½ ins. Illustrated. Describes Robras, 20-20 concealed-within-the-walls, lightweight, all-brass radiators.
Within the Walls. Brochure, 16 pp., 4 x 9 ins. Illustrated. Gives facts regarding modern, out-of-sight, lightweight, Robras 20-20 radiators.
Engineering Data. Booklet, 16 pp., 8½ x 10½ ins. Illustrated. Full data and tables to facilitate selection and installation of Robras 20-20 concealed radiators for steam, water and vapor heating systems.
Small Bathrooms Made More Spacious, Brochure, 4 pp. Illustrated. Gives descriptions, sizes and prices of Robras lightweight cabinet radiators to be installed under wash basins.

Sarco Company, Inc., 183 Madison Ave., New York City, N. Y.
Steam Heating Specialties. Booklet, 6 pp., 6 x 9 ins. Illustrated. Data on Sarco Packless Supply Valves and Radiator Traps for vacuum and vapor heating systems.
Equipment Steam Traps and Temperature Regulations. Booklet, 6 pp., 6 x 9 ins. Illustrated. Deals with Sarco Steam Traps for hospital, laundry and kitchen fixtures and the Sarco Self-contained Temperature Regulation for hot water service tanks.

Spencer Heater Co., Williamsport, Pa.
Catalog. Booklet, 20 pp., 6⅛ x 9 ins. Illustrated. Complete line of magazine feed cast iron sectional and steel tubular heaters.
The Fire that Burns Uphill. Brochure, 24 pp., 6⅝ x 9¼ ins. Illustrated in color. Magazine feed heaters for steam, vapor and hot water heating.

B. F. Sturtevant Company, Hyde Park, Boston, Mass.
Tempervane Heating Units. Catalog 363. Booklet, 44 pp., 8½ x 11 ins. Illustrated. Data on "Heating Every Corner with Maximum Economy."

Trane Co., The, La Crosse, Wis.
Bulletin 14, 16 pp., 8½ x 10⅝ ins. Covers the complete line of Trane Heating Specialties, including Trane Bellows Traps, and Trane Bellows Packless Valves.
Bulletin 20. 24 pp., 8½ x 10⅝ ins. Explains in detail the operation and construction of Trane Condensation. Vacuum, Booster, Circulating, and similar pumps.
How to Cut Heating Costs. Booklet, 18 pp., 8½ x 11 ins. Illustrated.

HOISTS, TELESCOPIC

Gillis & Geoghegan, Inc. 535 West Broadway, New York.
G & G Telescopic Hoist. Booklet. 24 pp. 8½ x 11 ins. Illustrated complete data on hoists.
Ash Removal. Folder. 8½ x 11 ins. Illustrated. Hoists for removing ashes from basements.

HOSPITAL EQUIPMENT

The Frink Co., Inc., 369 Lexington Ave., New York City.
Catalog 426. 7 x 10 ins., 16 pp. A booklet illustrated with photographs and drawings, showing the types of light for use in hospitals, as operating table reflectors, linolite and multilite concentrators, ward reflectors, bed lights and microscopic reflectors, giving sizes and dimensions, explaining their particular fitness for special uses.

Holophane Company, 342 Madison Avenue, New York.
Lighting Specific for Hospitals. Booklet, 30 pp., 8½ x 11 ins. Illustrated.

The International Nickel Company, 67 Wall St., New York, N. Y.
Hospital Applications of Monel Metal. Booklet, 8½ x 11½ ins., 16 pp. Illustrated. Gives types of equipment in which Monel Metal is used, reasons for its adoption, with sources of such equipment.

Pick-Barth Company, Inc., Albert, 1200 West 35th St., Chicago, and Cooper Square, New York.
Some Thoughts About Hospital Food Service Equipment. Booklet, 22 pp., 7½ x 9¼ ins. Valuable data on an important subject.

Prometheus Electric Corporation, 360 West 13th St., New York.
Electric Heating Specialties. Booklet, 24 pages. 8½ x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.

HOTEL EQUIPMENT

Pick-Barth Company, Inc., Albert, 1200 West 35th St., Chicago, and Cooper Square, New York.
Some Thoughts on Furnishing a Hotel. Booklet, 7½ x 9 ins. Data on complete outfitting of hotels.

INCINERATORS

Home Incinerator Co., Milwaukee, Wis.
The Decent Way. Burn it with Gas. Brochure, 30 pp., 5¼ x 7¼ ins., inside. Illustrated. Incinerator sanitation equipment for residence use.
A. I. A. File, 12 pp., 8¾ x 10¾ ins., inside. Suggestions for architect on incineration, showing installation and equipment.
Specialized Home Comforts Service Plan Book. 40 pp., 8½ x 11 ins., inside. Illustrated. A complete outline of the many advantages of incineration.
Blue Star Standards in Home Building. 16 pp., 5½ x 8½ ins., inside. Illustrated. Explaining fully the Blue Star principles, covering heat, incineration, refrigeration, etc.

Josam Mfg. Co., Michigan City, Ind.
Josam-Graver Incinerators. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Kerner Incinerator Company, 715 E. Water St., Milwaukee, Wis.
Incinerators (Chimney-fed). Catalog No. 15 (Architect and Builders' Edition). Size 8½ x 11 ins., 16 pp. Illustrated. Describes principles and design of Kernerator Chimney-fed Incinerators for residences, apartments, hospitals, schools, apartment hotels, clubs and other buildings. Shows all standard models and gives general information and working data.
Sanitary Elimination of Household Waste. Booklet, 4 x 9 ins. 16 pp. Illustrated. Gives complete information on the Kernerator for residences.
Garbage and Waste Disposal for Apartment Buildings. Folder, 8½ x 11 ins., 16 pp. Illustrated. Describes principle and design of Kernerator Chimney-fed Incinerator for apartments and gives list of buildings where it has been installed.
Sanitary Disposal of Waste in Hospitals. Booklet, 4 x 9 ins., 12 pp. Illustrated. Shows how this necessary part of hospital service is taken care of with the Kernerator. Gives list of hospitals where installed.
The Kernerator (Chimney-fed) Booklet. Catalog No. 17, 20 pp., 8½ x 11 ins. Illustrated. Data on a valuable detail of equipment.

INSULATION

Armstrong Cork & Insulation Co., Pittsburgh, Pa.
The Insulation of Roofs with Armstrong's Corkboard. Booklet. Illustrated. 7½ x 10½ ins., 32 pp. Discusses means of insulating roofs of manufacturing or commercial structures.
Insulation of Roofs to Prevent Condensation. Illustrated booklet, 7½ x 10½ ins., 36 pp. Gives full data on valuable line of roof insulation.
Filing Folder for Pipe Covering Data. Made in accordance with A. I. A. rules.
The Cork-lined House Makes a Comfortable Home. 5 x 7 ins. 32 pp. Illustrated.
Armstrong's Corkboard. Insulation for Walls and Roofs of Buildings. Booklet, 66 pp., 9½ x 11¾ ins. Illustrates and describes use of insulation for structural purposes.

National Lumber Manufacturers' Association, Transportation Building, Washington.
The Cost of Comfort. Booklet. 80 pp., 8½ x 11 ins. Illustrated. A handbook on the economies of dwelling insulation.

Structural Gypsum Corporation, Linden, N. J.
Heat Insulation Value of Gypsteel. Folder, 4 pp., 8½ x 11 ins. Brochure, by Charles L. Norton, of M. I. T.

JOISTS

Bates Expanded Steel Truss Co., East Chicago, Ind.
Catalog No. 4. Booklet, 32 pp., 8½ x 11 ins. Illustrated. Gives details of truss construction with loading tables and specifications.

REQUEST FOR CATALOGS

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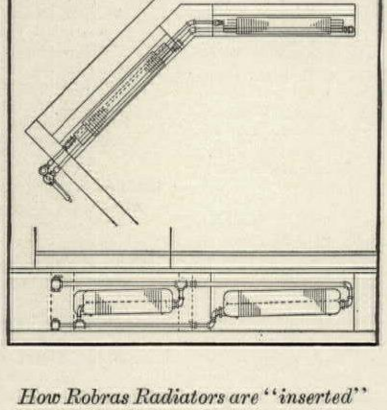
The bay window is a bay window again, *with* ROBRAS 20-20 Radiators *in the walls*

How to reconcile the architectural niceties of some charming period of the past with the hard utilitarian facts of modern heating is no longer the problem it used to be.

With Robras 20-20 Radiators all the facts of heating are hidden *in the wall—out of sight—out of the way.*

Architectural considerations once more rule untrammeled in rooms unmarred by bulky, cast-iron radiators. Compromises with good taste, make-shift concealments that half-reveal what they half-conceal: even these are not now necessary.

The Robras 20-20 Radiator is simply assigned to its usual position in the wall between the studding under the windows, (It can, however, be installed wherever there is a waste space 4″ deep!)—in sills under French doors, in corner cupboards, inside of tiling, and so on.



How Robras Radiators are "inserted" in wall, directly under bay windows, out of sight, out of the way.

Upon this fact has been built a whole new technique of radiation. Some of the finest apartments, country homes, yachts and small houses in America have taken advantage of it.

May we tell you more of this astonishingly flexible radiator, of its almost instantaneous heating, of its sturdy, electrically welded construction? One of our offices or Sweet's Catalog (or your A. I. A. file) are at your disposal.

ROME BRASS RADIATOR CORPORATION, 1 East 42nd Street, New York City

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 174*

JOISTS—Continued

Concrete Steel Company, 42 Broadway, New York, N. Y.
Structural Economies for Concrete Floors and Roofs. Booklet, 32 pp., 8½ x 11 ins. Illustrated.
Modern Concrete Reinforcement. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Construction Details for Installing Havemeyer Trusses. Data sheets, 8½ x 11 ins. Illustrated.
Standard Practice for Placing Havemeyer Reinforcement in Columns, Beams and Slabs. Data sheets, 8½ x 11 ins. Illustrated.

KITCHEN EQUIPMENT

The International Nickel Company, 67 Wall St., New York, N. Y.
Hotels, Restaurants and Cafeteria Applications of Monel Metal. Booklet, 8½ x 11 ins., 32 pp. Illustrated. Gives types of equipment in which Monel Metal is used, with service data and sources of equipment.

Prometheus Electric Corporation, 360 West 13th St., New York.
Electric Heating Specialties. Booklet, 24 pages. 8½ x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.

John Van Range Co., Cincinnati.
Practical Planning for Church Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.
Practical Planning for School Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

LABORATORY EQUIPMENT

Alberene Stone Co., 153 West 23rd Street, New York City.
Booklet, 8¾ x 11¼ ins., 26 pp. Stone for laboratory equipment, shower partitions, stair treads, etc.

Duriron Company, Dayton, Ohio.
Duriron Acid, Alkali and Rust-proof Drain Pipe and Fittings. Booklet, 8½ x 11 ins., 20 pp. Full details regarding a valuable form of piping.

LANTERNS

Todhunter, Arthur, 119 E. 57th St., New York, N. Y.
Hand-wrought Lanterns. Booklet, 5¼ x 6¾ ins., 20 pp. Illustrated in black and white. With price list. Lanterns appropriate for exterior and interior use, designed from old models and meeting the requirements of modern lighting.

LATH, METAL AND REINFORCING

Milwaukee Corrugating Co., Milwaukee
The Milcor Manual. Booklet, 96 pp., 8½ x 11 ins. Illustrated. Data on metal lath and similar materials.
Milcor Metal Ceiling Catalog. Booklet, 288 pp., 8½ x 11 ins. Illustrated. Data on metal ceiling and wall construction.

National Steel Fabric Co., Pittsburgh, Pa.
Better Walls for Better Homes. Brochure, 16 pp., 7¾ x 11¾ ins. Illustrated. Metal lath, particularly for residences.
Steeltex for Floors. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Combined reinforcing and form for concrete or gypsum floors and roofs.
Steeltex Data Sheet No. 1. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for floors on steel joists with round top chords.
Steeltex Data Sheet No. 2. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for floors on steel joists with flat top flanges.
Steeltex Data Sheet No. 3. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for folders on wood joists.

North Western Expanded Metal Co., 1234 Old Colony Building, Chicago, Ill.
North Western Expanded Metal Products. Booklet, 8½ x 10¾ ins., 20 pp. Fully illustrated, and describes different products of this company, such as Kno-burn metal lath, 20th Century Corrugated. Plasta-saver and longspan lath channels, etc.
Longspan ¾-inch Rib Lath. Folder, 4 pp., 8½ x 11 ins. Illustrated. Deals with a new type of V-Rib expanded metal.
A. I. A. Sample Book. Bound volume, 8½ x 11 ins. Contains actual samples of several materials and complete data regarding their use.
Norwest Metal Lath. Folder, 8½ x 11 ins. Illustrated. Data on Flat Rib Lath.

Truscon Steel Company, Youngstown, Ohio.
Truscon ¾-inch Hy-Rib for Roofs, Floors and Walls. Booklet, 8½ x 11 ins., illustrating Truscon ¾-inch Hy-Rib as used in industrial buildings. Plates of typical construction. Progressive steps of construction. Specification and load tables.

LAUNDRY MACHINERY

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

LAUNDRY MACHINERY—Continued

Troy Laundry Machinery Co., Inc., 9 Park Place, New York City.
Laundry Machinery for Large Institutions. Loose-Leaf booklet, 50 pp., 8½ x 11 ins. Illustrated.
Laundry Machinery for Small Institutions. Loose-leaf brochure, 50 pp., 8½ x 11 ins. Illustrated.
Accessory Equipment for Institutional Laundries. Leather bound book, 50 pp., 8½ x 11 ins. Illustrated.
Dry Cleaning Equipment for Institutional Purposes. Brochure, 50 pp., 8½ x 11 ins. Illustrated.

LIGHTING EQUIPMENT

The Frink Co., Inc., 369 Lexington Ave., New York, N. Y.
Catalog 415, 8½ x 11 ins., 46 pp. Photographs and scaled cross-sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Holophane Company, Inc., 342 Madison Ave., New York, N. Y.
The Lighting of Schools; A Guide to Good Practice. Booklet. 24 pp., 8½ x 11 ins. Illustrated.
Lighting Specifications for Hospitals. Brochure, 30 pp., 8½ x 11 ins. Illustrated.
Industrial Lighting. Bulletin 448A. Booklet, 24 pp., 8½ x 11 ins. Illustrated.
Holophane Catalog. Booklet, 48 pp., 8½ x 11 ins. Combination catalog and engineering data book.
The Lighting of Schools. A Guide to Good Practice. Booklet, 24 pp., 8½ x 11 ins. Illustrated.

Smyser-Royer Co., 1700 Walnut Street, Philadelphia, Pa.
Catalog "J" on Exterior Lighting Fixtures. Brochure, illustrated, giving data on over 300 designs of standards, lanterns and brackets of bronze or cast iron.

Todhunter, 119 East 57th St., New York, N. Y.
Lighting Fixtures, Lamps and Candlesticks. 24 pp., 8½ x 11 ins. Illustrated. Fine assortment of lighting accessories.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
Industrial Lighting Equipment. Booklet, 32 pp., 8½ x 11 ins. Illustrated.
Commercial Lighting. Brochure, 24 pp., 8½ x 11 ins. Illustrated.
Airport and Floodlighting Equipment. Booklet, 20 pp., 8½ x 11 ins. Illustrated.

LUMBER

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

MAIL CHUTES

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

MANTELS

Henry Klein & Co., Inc. 40-46 West 23rd Street, New York.
Driwood Mantels. Booklet. 12 pp. 8½ x 11 ins. Illustrated. Fine line of eighteenth century English and American mantels.

Arthur Todhunter, 119 E. 57th St., New York, N. Y.
Georgian Mantels. New booklet, 24 pp., 5¾ x 6¾ ins. A fully illustrated brochure on eighteenth century mantels. Folders give prices of mantels and illustrations and prices of fireplace equipment.

MARBLE

The Georgia Marble Company, Tate, Ga.; New York Office, 1328 Broadway.
Why Georgia Marble Is Better. Booklet, 3⅝ x 6 ins. Gives analysis, physical qualities, comparison of absorption with granite, opinions of authorities, etc.
Convincing proof. 3⅝ x 6 ins., 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.
Hurt Building, Atlanta; Senior High School and Junior College, Muskegon, Mich. Folders, 4 pp., 8½ x 11 ins. Details.

METALS

Aluminum Company of America, Pittsburgh.
Architectural Aluminum. Brochure, 30 pp., 8½ x 11 ins. Illustrated. An excellent booklet on the subject.

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

The International Nickel Company, 67 Wall St., New York N. Y.
Monel Metal Primer. 8 folders, 4 pp., 8½ x 11 ins. Illustrated. Valuable data on use of monel in kitchens, laundries, etc.

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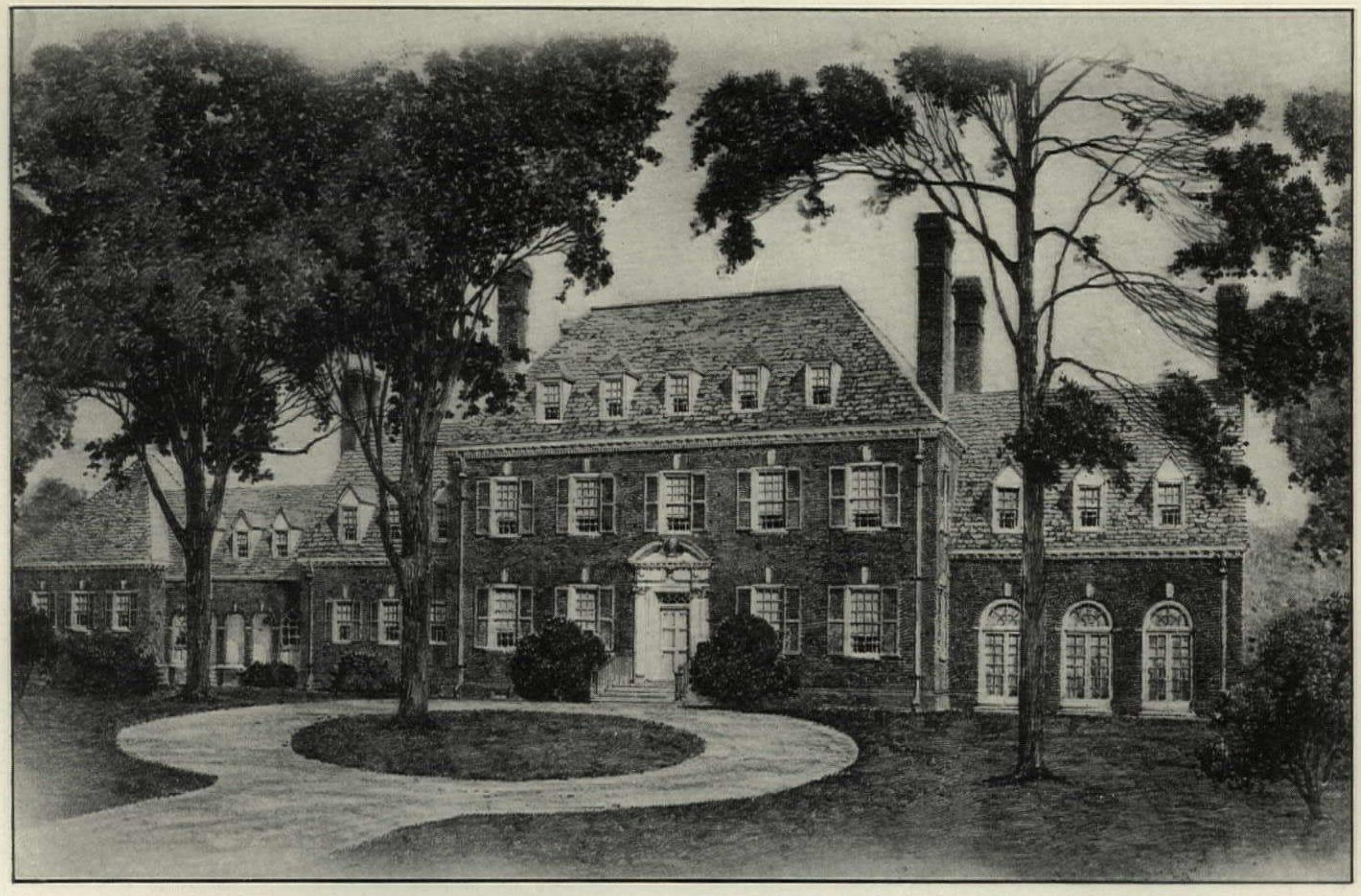

The home of Mr. H. W. Ellerson, Richmond, Virginia, insulated with Armstrong's Corkboard. W. Duncan Lee, the architect, says after the first winter, "Insulation has been thoroughly satisfactory . . . will pay for itself many times."

"ENOUGH" *means* Armstrong's Corkboard

ONE-HALF-INCH is not enough insulation for your houses—adequate protection requires three times that thickness, even with corkboard.

"But," says your client, "what about the cost?"

That's like asking whether a two-story house costs more than a bungalow. You can buy many materials that cover more area per dollar than corkboard, if it is covering surface in which you are interested. But if you are buying insulation, you'll measure their resistance to heat, and you'll come to this conclusion: It costs less to get adequate insulation with Armstrong's Corkboard than with any other material.

By *adequate* insulation, we mean that amount of insulation which gives the greatest saving in heat, and the most comfortable home, *in proportion to the cost of insulation.*

Armstrong's Corkboard comes in thicknesses that do give adequate insulation. It is made for architects whose plans presuppose worthy building materials. To the homes these men create, Armstrong's Corkboard brings comfort and economy in the largest measure for each dollar of insulation cost.

Detailed information and filing folders will be gladly sent upon request. Write to the Armstrong Cork & Insulation Company, 900 Concord St., Lancaster, Pa.

Armstrong's Corkboard Insulation

for the Walls and Roofs of Comfortable Homes

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 176*

MILL WORK—See also Wood

Curtis Companies Service Bureau, Clinton, Iowa.
Architectural Interior and Exterior Woodwork. Standardized Book, 9 x 11¼ ins., 240 pp. Illustrated. This is an Architects' Edition of the complete catalog of Curtis Woodwork, as designed by Trowbridge & Ackerman. Contains many color plates.
Better Built Homes. Vols. XV-XVIII, incl. Booklet, 9 x 12 ins., 40 pp. Illustrated. Designs for houses of five to eight rooms, respectively, in several authentic types, by Trowbridge & Ackerman, architects for the Curtis Companies.
Curtis Details. Booklet, 19½ x 23½ ins., 20 pp. Illustrated. Complete details of all items of Curtis woodwork, for the use of architects.
Curtis Cabinet and Stair Work. Booklet, 48 pp., 7¾ x 10½ ins. Illustrated.
Curtis Windows. Brochure, 7¾ x 10½ ins. Illustrated.
Curtis Interior Doors. Booklet, 7¾ x 10½ ins. Illustrated.
Curtis Entrances and Exterior Doors. Brochure, 7¾ x 10½ ins. Illustrated.

Hartmann-Sanders Company, 2155 Elston Ave., Chicago, Ill.
Column Catalog, 7½ x 10 ins., 48 pp. Illustrated. Contains prices on columns 6 to 36 ins. diameter, various designs and illustrations of columns and installations.
The Pergola Catalog. 7½ x 10 ins., 64 pp. Illustrated. Contains illustrations of pergola lattices, garden furniture in wood and cement, garden accessories.

Klein & Co., Inc., Henry, 11 East 37th St., New York, N. Y.
Two Driwood Interiors. Folder, 4 pp., 6¼ x 9 ins. Illustrated. Use of moulding for paneling walls.
A New Style in Interior Decoration. Folder, 4 pp., 6¼ x 9 ins. Illustrated. Deals with interior woodwork.
Driwood Period Mouldings in Ornamented Wood. Booklet, 28 pp., 8½ x 11 ins. Illustrated.
How Driwood Period Mouldings in Ornamented Wood Set a New Style in Decoration. Folder.

Roddis Lumber and Veneer Co., Marshfield, Wis.
Roddis Doors. Brochure, 24 pp., 5¼ x 8½ ins. Illustrated price list of doors for various types of buildings.
Roddis Doors, Catalog G. Booklet, 184 pp., 8½ x 11 ins. Completely covers the subject of doors for interior use.
Roddis Doors for Hospitals. Brochure, 16 pp., 8½ x 11 ins. Illustrated work on hospital doors.
Roddis Doors for Hotels. Brochure, 16 pp., 8½ x 11 ins. Illustrated work on doors for hotel and apartment buildings.

MORTAR AND CEMENT COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Folder, 8½ x 11 ins., 4 pp. Illustrated in colors, gives full information concerning Clinton Mortar Colors with specific instructions for using them.
Color Card. 3¼ x 6½ ins. Illustrates in color the ten shades in which Clinton Mortar Colors are manufactured.
Something New in Stucco. Folder, 3½ x 6 ins. An interesting folder on the use of coloring matter for stucco coated walls.

ORNAMENTAL PLASTER

Jacobson & Co., 241 East 44th St., New York, N. Y.
A Book of Old English Designs. Brochure, 47 plates, 12 x 9 ins. Deals with a fine line of decorative plaster work.
Architectural and Decorative Ornaments. Cloth bound volume, 184 pp., 9 x 12 ins. 18 plates. Price, $3.00. A general catalog of fine plaster ornaments.
Geometrical ceilings. Booklet, 23 plates, 7 x 9 ins. An important work on decorative plaster ceilings.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Minwax Company, Inc., 11 West 42nd St., New York.
Color Card and Specifications for Minwax Brick and Cement Coating. Folder, 4 pp., 8½ x 11 ins. Illustrated.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book, 5½ x 3¼ ins., 100 pp. Gives directions and formulæ for painting various surfaces of wood, plaster, metals, etc., both interior and exterior.
Red Lead in Paste Form. Booklet. 6¼ x 3½ ins., 16 pp. Illustrated. Directions and formulæ for painting metals.
Came Lead. Booklet, 6 x 8¾ ins., 12 pp. Illustrated. Describes various styles of lead cames.

Sherwin-Williams Company, 601 Canal Rd., Cleveland, Ohio.
Complete Architectural Specifications for painting, varnishing and lacquering, reprinted from the Sherwin-Williams Architectural Catalogue as it appears in Sweet's Architectural Catalogue. Form Number B 303. 8½ x 11, bound in paper, thirty pages of specifications and color chips; carries A. I. A. file number.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES—Continued

Toch Brothers, New York, Chicago, Los Angeles.
Architects' Specification Data. Sheets in loose leaf binder, 8½ x 11 ins., dealing with an important line of materials.

U. S. Gutta Percha Paint Co., Providence, R. I.
Barreled Sunlight. Booklet, 8½ x 11 ins. Data on "Barreled Sunlight" with specifications for its use.

PARCEL DELIVERY DEVICES

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

PARTITIONS

Circle A. Products Corporation, New Castle, Ind.
Circle A. Partitions Sectional and Movable. Brochure. Illustrated. 8½ x 11¼ ins., 32 pp. Full data regarding an important line of partitions, along with Erection Instructions for partitions of three different types.

Irving Hamlin, Evanston, Ill.
Hamlinized Folding Partitions Made from Hamlin's Evanston Soundproof Doors, Sectional and Movable. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Hauserman Company, E. F., Cleveland, Ohio.
Hollow Steel Standard Partitions. Various folders, 8½ x 11 ins. Illustrated. Give full data on different types of steel partitions, together with details, elevations and specifications.

Henry Klein & Co., 25 Grand Street, Elmhurst, L. I., N. Y.
Telesco Partition. Catalog, 8¾ x 11 ins., 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.
Detailed Instructions for Erecting Telesco Partitions. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

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

Richards-Wilcox Mfg. Co., Aurora, Ill.
Partitions. Booklet, 7 x 10 ins., 32 pp. Illustrated. Describes complete line of track and hangers for all styles of sliding parallel, accordion and flush-door partitions.

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

U. S. Gypsum Co., Chicago, Ill.
Pyrobar Partition and Furring Tile. Booklet, 8¾ x 11 ins., 24 pp. Illustrated. Describes use and advantages of hollow tile for inner partitions.

PIPE

American Brass Company, Waterbury, Conn.
Bulletin B-1. Brass Pipe for Water Service. 8¾ x 11 ins., 28 pp. Illustrated. Gives schedule of weights and sizes (I.P.S.) of seamless brass and copper pipe, shows typical installations of brass pipe, and gives general discussion of the corrosive effect of water on iron, steel and brass pipe.

American Rolling Mill Company, Middletown, Ohio.
How ARMCO Dredging Products Cut Costs. Booklet, 16 pp., 6 x 9 ins. Data on dredging pipe.

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill.
Catalog A. 4 x 16½ ins., 700 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

Duriron Company, Dayton, Ohio.
Duriron Acid, Alkali, Rust-proof Drain Pipe and Fittings. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Important data on a valuable line of pipe.

National Tube Co., Frick Building, Pittsburgh, Pa.
"National" Bulletin No. 2. Corrosion of Hot Water Pipe, 8½ x 11 ins., 24 pp. Illustrated. In this bulletin is summed up the most important research dealing with hot water systems. The text matter consists of seven investigations by authorities on this subject.
"National" Bulletin No. 3. The Protection of Pipe Against Internal Corrosion, 8¾ x 11 ins., 20 pp. Illustrated. Discusses various causes of corrosion, and details are given of the deactivating and deareating systems for eliminating or retarding corrosion in hot water supply lines.
"National" Bulletin No. 25. "National" Pipe in Large Buildings. 8½ x 11 ins., 88 pp. This bulletin contains 254 illustrations of prominent buildings of all types, containing "National" Pipe, and considerable engineering data of value to architects, engineers, etc.
Modern Welded Pipe. Book of 88 pp., 8½ x 11 ins., profusely illustrated with halftone and line engravings of the important operations in the manufacture of pipe.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 178*

PLASTER

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

PLUMBING EQUIPMENT

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

Crane Company, 836 S. Michigan Ave., Chicago, Ill.
Plumbing Suggestions for Home Builders. Catalog, 3 x 6 ins., 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog, 4 x 6½ ins., 34 pp. Illustrated.
Planning the Small Bathroom. Booklet, 5 x 8 ins. Discusses planning bathrooms of small dimensions.

John Douglas Co., Cincinnati, Ohio.
Douglas Plumbing Fixtures. Bound volume, 200 pp., 8½ x 11 ins. Illustrated. General catalog.
Another Douglas Achievement. Folder, 4 pp., 8½ x 11 ins. Illustrated. Data on new type of stall.
Hospital. Brochure, 60 pp., 8½ x 11 ins. Illustrated. Deals with fixtures for hospitals.

Duriron Company, Dayton, Ohio.
Duriron Acid, Alkali and Rust-Proof Drain Pipe and Fittings. Booklet, 8½ x 11 ins., 20 pp. Full details regarding a valuable form of piping.

Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
Watrous Patent Flush Valves, Duojet Water Closets, Liquid Soap Fixtures, etc. 8½ x 11 ins., 136 pp., loose-leaf catalog, showing roughing-in measurements, etc.

Maddock's Sons Company, Thomas, Trenton, N. J.
Catalog K. Booklet, 150 pp., 8½ x 10⅞ ins. Illustrated. Data on vitreous china plumbing fixtures with brief history of Sanitary Pottery.

Speakman Company, Wilmington, Del.
Catalog K. Booklet, 150 pp., 8½ x 10⅞ ins. Illustrated. Data on showers and equipment details.

Trenton Potteries Company, Trenton, N. J.
The Blue Book of Plumbing. Bound volume, 182 pp., 8½ x 10½ ins. Illustrated.

PNEUMATIC TUBE SYSTEMS

G & G Atlas Systems, Inc., 544 West Broadway, New York.
12 pp., 8½ x 11. Illustrated booklet of tube systems for retail stores and other buildings.
4 pp., 8½ x 11. Data Sheet showing schematic diagrams for hotel, bank, factory and wholesale buildings, table of sizes, space requirements and preliminary layout steps. A. I. A. 35h21.

PUMPS

Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill.
Bulletin E. 7¾ x 10¾ ins., 32 pp. Illustrated. Catalog. Complete descriptions, with all necessary data, on Standard Service Pumps, Indian Brand Pneumatic Tanks, and Complete Water Systems, as installed by Kewanee Private Utilities Co.

Nash Engineering Company, South Norwalk, Conn.
Bulletin 52. Brochure. 6 pp., 10½ x 7¾ ins. Illustrated in color. Devoted to Jennings Standard Centrifugal Pumps for house service, boosting city water pressure to supply top stories, for circulating warm water, etc.
Bulletin 97. Booklet. 16 pp., 10½ x 7¾ ins. Illustrated in color. Describes the design, construction and operation of the Jennings Suction Sump Pump.
Bulletin 11. Brochure. 8 pp., 10½ x 7¾ ins. Illustrated in color. Deals with Nash Hytor Vacuum Pumps for air and gases.

The Trane Co., La Crosse, Wis.
Trane Small Centrifugal Pumps. Booklet, 3¾ x 8 ins., 16 pp. Complete data on an important type of pump.

RAMPS

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

REFRIGERATION

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

North Western Expanded Metal Company, Chicago, Ill.
Designing Data. Book, 6 x 9 ins., 96 pp. Illustrated. Covers the use of Econo Expanded Metal for various types of reinforced concrete construction.

REINFORCED CONCRETE—See also Construction, Concrete

North Western Expanded Metal Company, Chicago, Ill.
Longspan ¾-inch Rib Lath. Folder, 4 pp., 8½ x 11 ins. Illustrated. Deals with a new type of V-Rib expanded metal.

Truscon Steel Company, Youngstown, Ohio.
Shearing Stresses in Reinforced Concrete Beams. Booklet, 8½ x 11 ins., 12 pp.

RESTAURANT EQUIPMENT

John Van Range Company, Cincinnati.
Planning Restaurants That Make Money. Booklet, 78 pp., 8½ x 11 ins. Illustrated. Excellent work on equipment.

ROOFING

The Barrett Company, 40 Rector St., New York City.
Architects' and Engineers' Built-up Roofing Reference Series; Volume IV Roof Drainage System. Brochure, 64 pp., 8½ x 11¾ ins. Gives complete data and specifications for many details of roofing.

Federal Cement Tile Co., 608 S. Dearborn Street, Chicago.
Catalog and Roof Standards. Booklet, 36 pp. 8½ x 11 ins. Illustrated. Describes Featherweight Concrete Insulating Roof Slabs, including complete data, weights and dimensions, specifications and detail drawings. Also includes complete information on Featherweight Nailing Concrete Roof Slabs for use with ornamental slate or copper covering. The catalog is profusely illustrated and contains also a partial list of users.
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Federal Interlocking Tile and Glass Tile. 4 pp., 8½ x 11 ins. Illustrates and describes complete roof or precast concrete slabs requiring no composition covering.

Heinz Roofing Tile Co., 1925 West Third Avenue, Denver, Colo.
Plymouth-Shingle Tile with Sprocket Hips. Leaflet, 8½ x 11 ins. Illustrated. Shows use of English shingle tile with special hips.
Italian Promenade Floor Tile. Folder, 2 pp., 8½ x 11 ins. Illustrated. Floor tiling adapted from that of Davanzati Palace.
Mission Tile. Leaflet, 8½ x 11 ins. Illustrated. Tile such as are used in Italy and Southern California.
Georgian Tile. Leaflet, 8½ x 11 ins. Illustrated. Tiling as used in old English and French farmhouses.

Johns-Manville Corporation, New York.
The New Book of Roofs. Brochure, 24 pp., 8½ x 11 ins. Illustrated. Roofing from the Architect's point of view.

Ludowici-Celadon Company, 104 So. Michigan Ave., Chicago, Ill.
"Ancient" Tapered Mission Tiles. Leaflet, 8½ x 11 ins., 4 pp. Illustrated. For architects who desire something out of the ordinary this leaflet has been prepared. Describes briefly the "Ancient" Tapered Mission Tiles, hand-made with full corners and designed to be applied with irregular exposures.

Milwaukee Corrugating Co., Milwaukee.
Milcor Architectural Sheet Metal Guide. Booklet. 72 pp., 8½ x 11 ins. Illustrated. Metal tile roofing, skylights, ventilators, etc.
Milcor Sheet Metal Handbook. Brochure. 128 pp., 8½ x 11 ins. Illustrated. Deals with rain-carrying equipment, etc.

Structural Gypsum Corporation, Linden, N. J.
Relative Effectiveness of Various Types of Roofing Construction in Preventing Condensation of the Under Surface. Folder, 4 pp., 8¾ x 11 ins. Important data on the subject.
Gypsteel Pre-cast Fireproof Roofs. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Information regarding a valuable type of roofing.

U. S. Gypsum Co., Chicago, Ill.
Pyrobar Roof Construction. Booklet, 8 x 11 ins., 48 pp. Illustrated. Gives valuable data on the use of tile in roof construction.
Sheetrock Pyrofill Roof Construction. Folder, 8½ x 11 ins. Illustrated. Covers use of roof surfacing which is poured in place.

SCHOOL EQUIPMENT

John Van Range Co., Cincinnati.
Practical Planning for School Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

SEWAGE DISPOSAL

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

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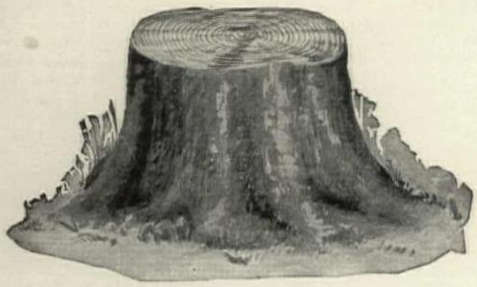
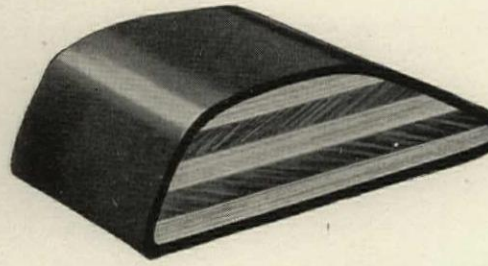


LAYERS OF WOOD in Whale-Bone-Ite



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Sydney, Australia Adelaide, Australia Milwaukee Havana Buenos Aires Johannesburg, South Africa

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 180*

SEWAGE DISPOSAL—Continued

Nash Engineering Company, South Norwalk, Conn.
Bulletin 67. Booklet. 16 pp. 10¾ x 7½ ins. Illustrated in color. Describes Type A Jennings Sewage Ejector for handling Unscreened sewage and raising it from basements below sewer level.
Bulletin 103. Brochure. 16 pp. 10¾ x 7½ ins. Illustrated in color. Deals with small size Type B Jennings Sewage Ejector.

SCREENS

American Brass Co., The, Waterbury, Conn.
Facts for Architects About Screening. Illustrated folder, 9½ x 11¾ ins., giving actual samples of metal screen cloth and data on fly screens and screen doors.

Athey Company, 6015 West 65th St., Chicago, Ill.
The Athey Perennial Window Shade. An accordion pleated window shade, made from translucent Herringbone woven Coutil cloth, which raises from the bottom and lowers from the top. It eliminates awnings, affords ventilation, can be dry-cleaned and will wear indefinitely.

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

SHELVING-STEEL

David Lupton's Sons Company, Philadelphia, Pa.
Lupton Steel Shelving. Catalog E. Illustrated brochure, 40 pp., 8⅝ x 11 ins. Deals with steel cabinets, shelving, racks, doors, partitions, etc.

STEEL PRODUCTS FOR BUILDING

Bethlehem Steel Company, Bethlehem, Pa.
Steel Joists and Stanchions. Booklet, 72 pp., 4 x 6¾ ins. Data for steel for dwellings, apartment houses, etc.

Steel Frame House Company, Pittsburgh, Pa. (Subsidiary of McClintic-Marshall Corp.)
Steel Framing for Dwellings. Booklet, 16 pp., 8½ x 11 ins. Illustrated.
Steel Framing for Gasoline Service Stations. Brochure, 8 pp., 8½ x 11 ins. Illustrated.
Steel Frame Standard Gasoline Service Stations. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Three standard designs of stations.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
The Arc Welding of Structural Steel. Brochure, 32 pp., 8½ x 11 ins. Illustrated. Deals with an important structural process.

STONE, BUILDING

Indiana Limestone Company, Bedford, Ind.
Volume 3, Series A-3. Standard Specifications for Cut Indiana Limestone work, 8½ x 11 ins., 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.
Volume 1. Series B. Indiana Limestone Library, 6 x 9 ins., 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Volume 4. Series B. Booklet. New Edition, 8½ x 11 ins., 64 pp. Illustrated. Indiana Limestone as used in Banks.
Volume 5. Series B. Indiana Limestone Library. Portfolio, 11⅛ x 8¾ ins. Illustrated. Describes and illustrates the use of stone for small houses with floor plans of each.
Volume 6. Series B. Indiana Limestone School and College Buildings. 8½ x 11 ins., 80 pp. Illustrated.
Volume 12. Series B. Distinctive Homes of Indiana Limestone. 8½ x 11 ins., 48 pp. Illustrated.
Old Gothic Random Ashlar. 8½ x 11 ins., 16 pp. Illustrated.

STORE FRONTS

Brasco Manufacturing Co., 5025-35 South Wabash Ave., Chicago, Ill.
Catalog No. 33. Series 500. All-Metal Construction. Brochure, 20 pp., 8½ x 11 ins. Illustrated. Deals with store fronts of a high class.
Catalog No. 34. Series 202. Standard construction. Booklet, 16 pp. 8½ x 11 ins. Illustrated, complete data on an important type of building.
Detail Sheets. Set of seven sheets, 8½ x 11 ins., printed on tracing paper, giving full-sized details and suggestions for store front designs.
Davis Solid Architectural Bronze Sash. Set of six sheets, 8½ x 11 ins., printed on tracing paper. Full-sized details and suggestions for designs of special bronze store front construction.

The Kawneer Company, Niles, Mich.
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STORE FRONTS—Continued

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Zouri Safety Key-Set Store Front Construction. Catalog, 8¼ x 10½ ins., 60 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.
International Store Front Construction. Catalog, 8½ x 10 ins., 70 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.
Store Fronts by Zouri. Booklet, 30 pp., 9 x 12 ins. Illustrated.

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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., 8½ x 11 inches. Illustrated.
Planning for Telephones in Buildings. Brochure, 74 pp., 8½ x 11 inches. Illustrated.

TERRA COTTA

National Terra Cotta Society, 19 West 44th St., New York, N. Y.
Standard Specifications for the Manufacture, Furnishing and Setting of Terra Cotta. Brochure, 8½ x 11 ins., 12 pp. Complete Specification, Glossary of Terms Relating to Terra Cotta and Short Form Specification for incorporating in Architects' Specification.
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National Fire-Proofing Co., 250 Federal Street, Pittsburgh, Pa.
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Natco Double Shell Load Bearing Tile Bulletin. 8½ x 11 ins., 6 pp. Illustrated.
Natco Header Backer Tile Bulletin. 8½ x 11 ins., 4 pp. Illustrated.
Natco Face Tile for the Up-to-Date. Farm Bulletin. 8½ x 11 ins.
Natco Unibacker Tile Bulletin. 8½ x 11 ins., 4 pp. Illustrated.
Natcoflor Bulletin. 8½ x 11 ins., 6 pp. Illustrated.

TILES

Hanley Company, Bradford, Pa.
Hanley Quarry Tile. Folder. 4 pp., 5 x 8 ins. Illustrated.

C. Pardee Works, 9 East 45th St., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.
Pardee Tiles. Bound volume, 48 pp., 8½ 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.
Office Buildings Yesterday and Today. Folder, 8½ x 11 ins. Illustrated. Valves for use in office buildings.

VENETIAN BLINDS

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

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VENETIAN BLINDS—Continued

Columbia Mills, Inc., 225 Fifth Ave., New York.
Columbia Venetian Blinds. Booklet, 6 pp., 8½ x 11 ins. Illustrated. Complete data and specifications.

VENTILATION

American Blower Co., Detroit, Mich.
American H. S. Fans. Brochure, 28 pp., 8½ x 11 ins. Data on an important line of blowers.

Duriron Company, Dayton, Ohio.
Acid-proof Exhaust Fans. Folder, 8 x 10½ ins., 8 pp. Data regarding fans for ventilation of laboratory fume hoods.
Specification Form for Acid-proof Exhaust Fans. Folder, 8 x 10½ ins.

WATERPROOFING

Master Builders Company, Cleveland, Ohio.
Waterproofing and Dampproofing and Allied Products. Sheets in loose index file, 9 x 12 ins. Valuable data on different types of materials for protection against dampness.
Waterproofing and Dampproofing File. 36 pp. Complete descriptions and detailed specifications for materials used in building with concrete.

Minwax Company, Inc., 11 West 42nd St., New York.
Waterproofing Stadia. Folder, 4 pp., 8½ x 11 ins. Illustrated.
Transparent Waterproofings for All Masonry Walls and Surfaces. Folder, 4 pp., 8½ x 11 ins. Illustrated.
Data Sheet on Membrane Waterproofing. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Sommers & Co., Ltd., 342 Madison Ave., New York, N. Y.
"Permantile Liquid Waterproofing" for making concrete and cement mortar permanently impervious to water. Also circulars on floor treatments and cement colors. Complete data and specifications. Sent upon request to architects using business stationery. Circular size, 8⅜ x 11 ins.

Toch Brothers, New York, Chicago, Los Angeles.
Architects' Specification Data. Sheets in loose leaf binder, 8½ x 11 ins., dealing with an important line of materials.

WEATHER STRIPS

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

WINDOWS

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Blue Book. Brochure, 75 pp., 8½ x 11 ins. Illustrated. Data on steel windows.

The Kawneer Company, Niles, Mich.
Circular, 8½ x 11 with A.I.A. File No. featuring full size details and specifications of Heavy Type Sealair Independent Balanced Sash Window.
Circular, 8½ x 11 with A.I.A. File No. featuring full size details and specifications of Light Independent Balanced Sash Sealair Windows.
Circular, 8½ x 11 with A.I.A. File No. featuring full size details and specifications of In-swinging Sash Sealair Windows. The above to be furnished in non-ferrous metal and steel.

David Lupton's Sons Company, Philadelphia, Pa.
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Lupton Commercial Projected Windows. Brochure. 24 pp., 8½ x 11 ins. Illustrated. Details and specifications.

WINDOWS, CASEMENT

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Casements. Booklet, 14 pp., 8½ x 11 ins. Illustrated. Discusses casements, particularly for residences.
Fenestra Screen Casements. Brochure, 16 pp., 8½ x 11 ins. Illustrated.
Decorating With Casements. Booklet, 18 pp., with inserts in color 6 x 8½ ins. Deals with use of decorations, particularly draperies, with casement windows.

Hope & Sons, Henry, 103 Park Ave., New York, N. Y.
Catalog, 12¾ x 18½ ins., 30 pp. Illustrated. Full-size details of outward and inward opening casements.

David Lupton's Sons Company, Philadelphia, Pa.
Lupton Casement of Copper Steel. Catalog C-217. Booklet, 24 pp., 8⅜ x 11 ins. Illustrated brochure on casements, particularly for residences.

WINDOWS, CASEMENT—Continued

Lupton Creates a Complete Casement. Folder, 8½ x 11 ins. Illustrated data on a casement providing for screens, shades and draperies.
Lupton Heavy Casements. Detail Sheet No. 101, 4 pp., 8½ x 11 ins. Details and specifications only.

Richards-Wilcox Mfg. Co., Aurora, Ill.
Casement Window Hardware. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Shows typical installations, detail drawings, construction details, blue-prints if desired. Describes AIR-way Multifold Window Hardware.
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List of Parts for Assembly. Booklet, 8½ x 11 ins., 16 pp. Full lists of parts for different units.

WINDOW SCREENS

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Screen Casements. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

WINDOW SHADES AND ROLLERS

Columbia Mills, Inc., 225 Fifth Avenue, New York, N. Y.
Window Shade Data Book. Folder, 28 pp., 8½ x 11 ins. Illustrated.
Window Shade Rollers. Brochure, 24 pp., 8 x 11 ins. Illustrated. Rollers and accessories.

WINDOWS, STEEL AND BRONZE

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Truscon Solid Steel Double-Hung Windows. 24 pp. Booklet, 8½ x 11 ins. Containing illustrations of buildings using this type of window. Designs and drawings of mechanical details.
Continuous Steel Windows and Mechanical Operators. Catalog 126. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

WOOD—See also Millwork

American Walnut Mfrs. Association, 618 So. Michigan Boulevard, Chicago, Ill.
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American Walnut for Interior Woodwork and Paneling. 7 x 9 ins. Illustrated. Discusses interior woodwork, giving costs, specifications of a specimen room, the different figures in Walnut wood, Walnut floors, finishes, comparative tests of physical properties and the advantages of American Walnut for woodwork.

Curtis Companies Service Bureau, Clinton, Iowa.
Curtis Cabinet and Stair Work. Booklet, 47 pp., 7¾ x 10½ ins. Illustrated.
Curtis Windows. Brochure, 7¾ x 10½ ins. Illustrated.
Curtis Interior Doors. Booklet, 7¾ x 10½ ins. Illustrated.
Curtis Entrances and Exterior Doors. Brochure, 7¾ x 10½ ins. Illustrated.

National Lumber Mfrs. Assn., Washington, D. C.
Airplane Hangar Construction. Booklet, 24 pp., 8½ x 11 ins. Use of lumber for hangars.
Modern Home Interiors. Booklet, 8½ x 11 ins. Illustrated. Deals with interior uses of wood.

WOOD FINISH

Minwax Company, Inc., 11 West 42nd St., New York.
Color card and specification for Minwax Flat Finish. Folder, 4 pp., 8½ x 11 ins. Illustrated. Deals with a penetrative, preservative stain finish giving stain and soft wax effect.

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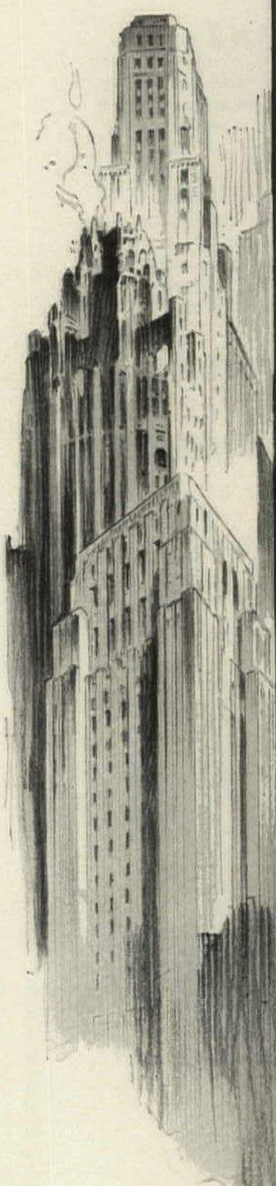

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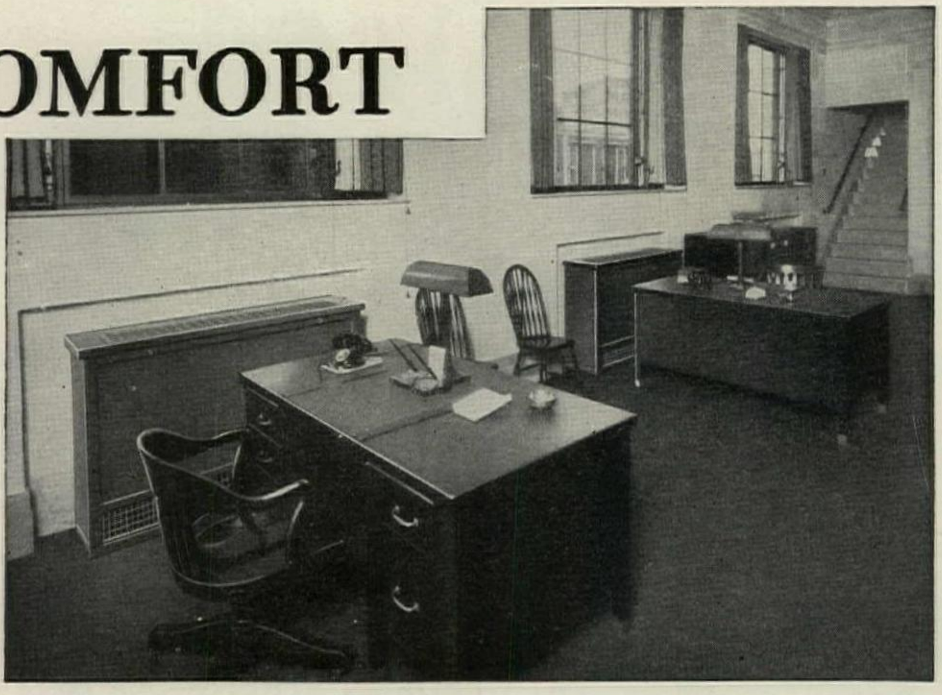

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Architect: James E. Allan, Lawrence.
Heating & Ventilating Contractors: Bride, Grimes Co., Lawrence.

...without conspicuous steam connections

Unit Heater-Ventilators fitted in well with the requirements of the Broadway Savings Bank at Lawrence, Mass.

The Units were specially finished to match mahogany-woodwork...and all steam connections were enclosed within the cabinets. They present a particularly pleasing appearance — thoroughly in keeping with the dignity of the institution.

Sturtevant Unit Heater-Ventilators are designed to draw in—from out-of-doors—controlled quantities of air; filter it clean, warm it to desired temperature and admit it to a room, noiselessly, safely,—without the hint of a draft. The temperature controlling mechanism is simple and trustworthy...it may be entirely automatic or each unit may be manually operated if desired.

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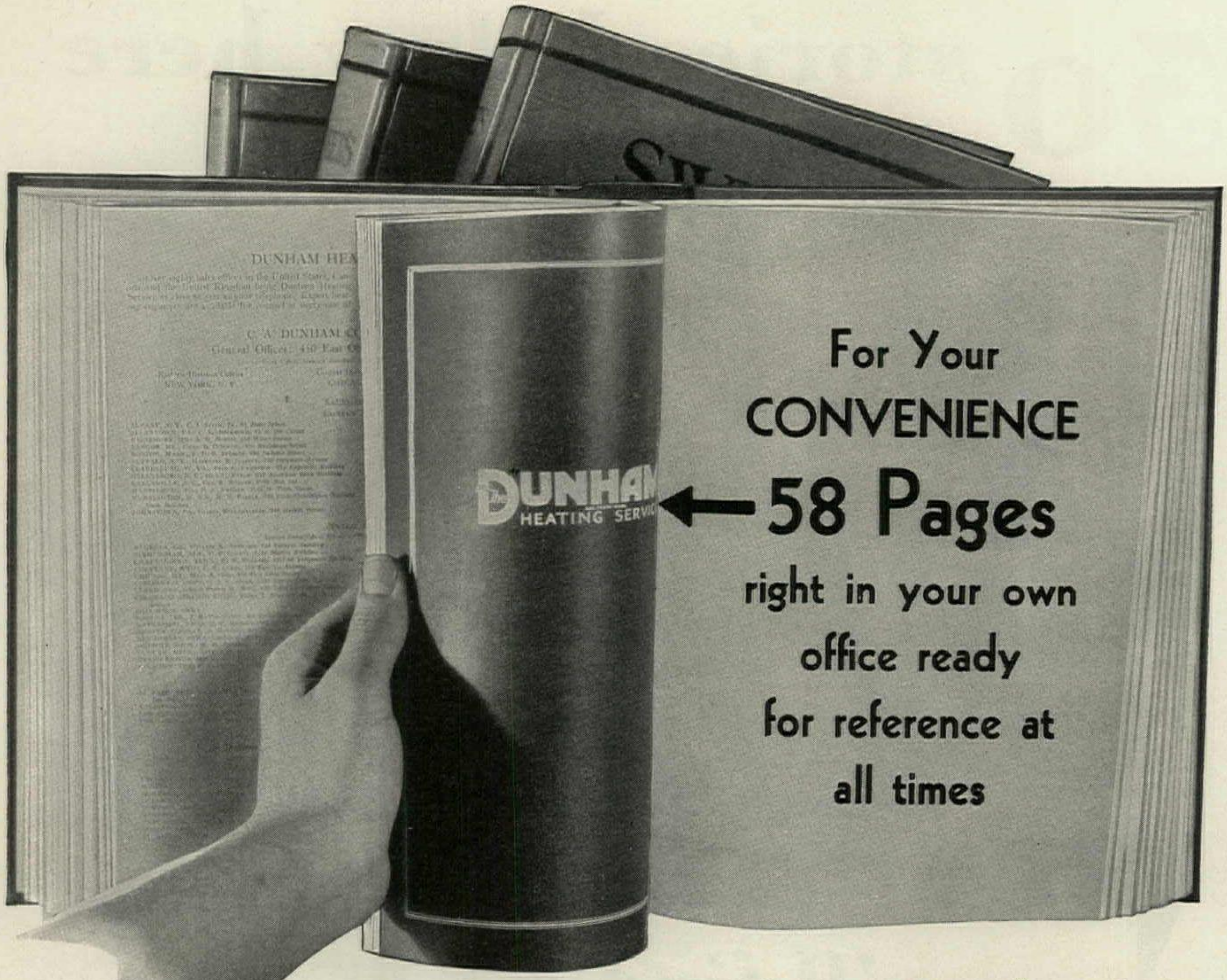
SUPPLIES OUTDOOR AIR — FILTERED CLEAN — AND TEMPERED



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C. A. DUNHAM CO.

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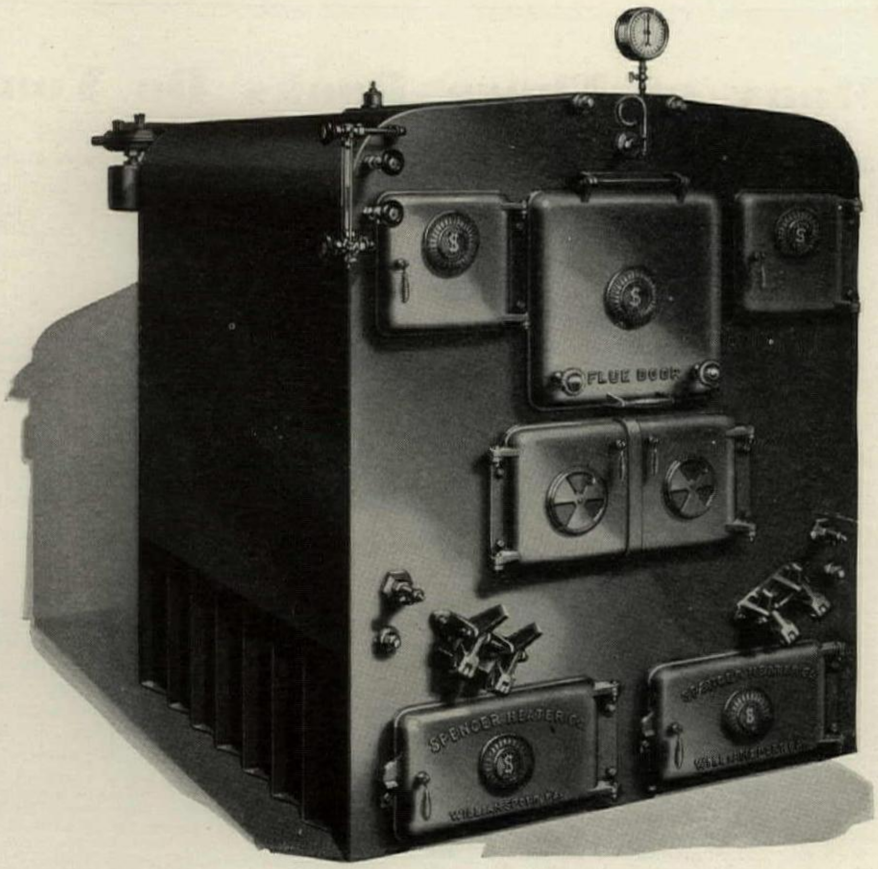
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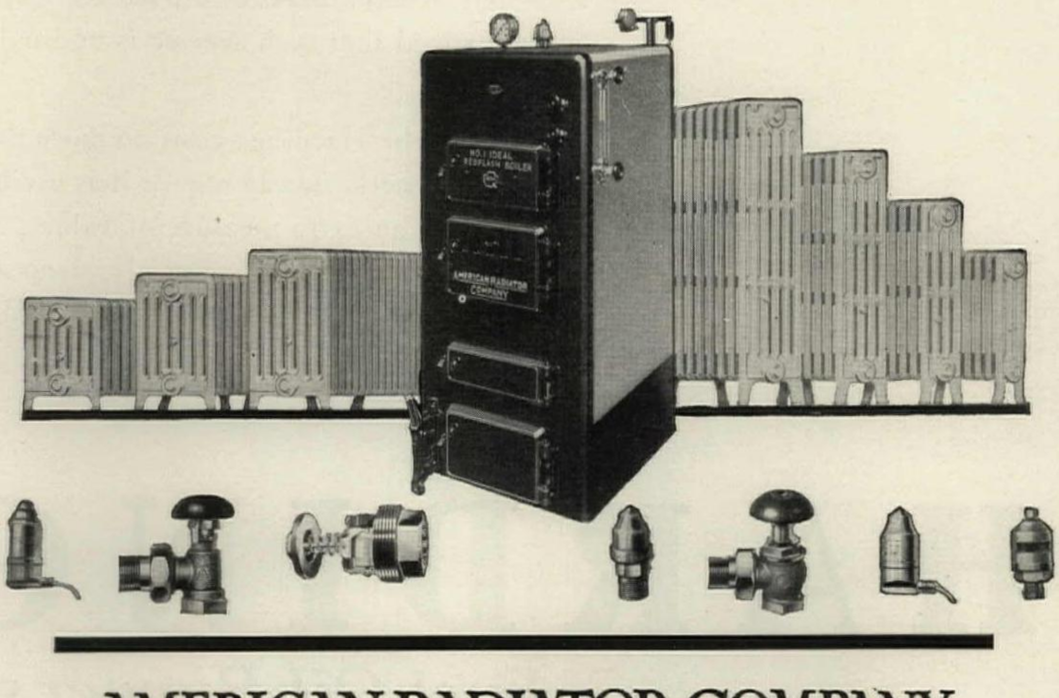

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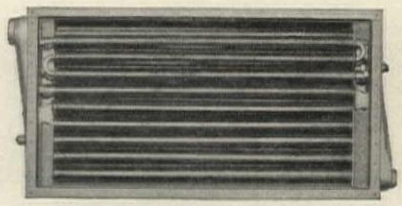

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REVIEWS OF MANUFACTURERS' PUBLICATIONS

AEROFIN CORPORATION, New York. "Aerofin Light Weight Fan System Heat Surface." A treatise on its use.

It can readily be understood that securing proper radiation of heat depends in a large measure on selecting first of all a metal which gives the utmost of radiation, and then giving the metal a form or shape which provides the utmost of such surface, the form or shape to be so made that the radiation shall also give all the diffusion or distribution of heat to be had. This is quite possible provided adequate study is given to the problem, and this brochure describes and illustrates a highly ingenious type of radiation by which the coils within a radiator are made up not of ordinary cast iron pipes but of pipes made of a metal which gives all the radiation possible, the pipes being so made that their outer edges are "crimped" on what might perhaps be called the "fan" system. "Aerofin is the original scientifically and specifically designed light-weight, noncorrosive, non-ferrous heat surface, first introduced to the general market in 1923. Since that time Aerofin has revolutionized the whole practice of fan engineering and has become the most widely used of all heat surfaces. These remarkable results have been achieved because Aerofin,—the first improvement in fan system heat surface in a quarter-century,—was designed by fan engineers of long experience to meet the specific requirements of the age; to relieve the architect, the engineer and the contractor of those limitations and difficulties imposed by old fashioned, ponderous, illy-adapted surface, usually miscalled 'radiation'; and to provide them with a heat surface free not only of those inadequacies, but possessing to the greatest possible extent those characteristics which render a fan system heat surface useful, flexibly adaptable in both old and new applications, dependable, durable, and modern. Aerofin, now flattered by widespread imitation, pioneered in its field, led at the beginning, leads now and will always lead, because the accumulated experience of many years and men, gained while blazing the trail others now are following, constitutes an inalienable advantage which has been, is being, and will be utilized fully as the years go on, so that Aerofin may continue in the vanguard,—leading, by an ever-widening margin, those that follow. This we pledge, in recognition of the confidence and coöperation we have enjoyed as pioneers,—the confidence and coöperation, on the part of America's most brilliant architects, engineers and contractors, who have accorded us the place and the obligations of leadership. Aerofin immediately compelled recognition because it departed from tradition and embodied the principles and materials of a new and advanced engineering. Its designers, unrestricted by either method or production equipment, sought—and found—a better type of heat surface and better materials of which to make it. They developed, carefully and painstakingly, the important principles of extended surface and utilized non-corrosive, light weight, ductile metals having coefficients of heat conductivity many times that of the brittle cast iron previously used. They perfected unit design, eliminating all the difficulties of assembly in the field. And finally, being men of long experience in fan engineering and realizing the pressing need for it, they made the first encased unit heat surface, forever banishing the troubles, delays and losses arising from casing-on-the-job, theretofore considered a necessary evil. Something about the revolutionary advantages of Aerofin's light weight and compactness is said later herein. Suffice it here to mention, in passing, that these two factors alone, were Aerofin not possessed of its many other advantages, would have contributed more to the general advancement of fan engineering, especially in the constantly broadening field of the unit heater, than any other single invention which has come since that of the fan itself."

THE DRIWOOD CORPORATION, 11 East 37th Street, New York. "Period Mouldings in Ornamented Wood."

These pages of THE ARCHITECTURAL FORUM, devoted as they are to reviewing briefly the catalogs of manufacturers, have more than once directed the attention of architects and interior decorators to the excellent assortment of wood mouldings made and marketed by this firm. This booklet does full justice to an admirable stock of mouldings of all the architectural and decorative types likely to be used by decorators or architects. In choosing from the vast assortment of designs which have been accumulated during many centuries, there is of course opportunity for the exercise of considerable taste and discrimination, and the illustrations in the brochure prove that, whoever has been responsible for the choice, there has been the exercise of excellent judgment. The mouldings, since they are of different dimensions, are suited for use in many ways,—as cornices next to the ceilings of rooms; as outlines for wall panels; as fireplace surrounds or for incorporation in overmantels; as members of architraves and entablatures for doors and important windows; as parts of chair rails, baseboards, plate racks, etc. Although the booklet does not suggest it, the mouldings would seem to be admirably suited for use as cornices from which window draperies are frequently hung. The arrangement of the pages is such that alongside an illustration of a moulding there is given a reproduction of a detailed drawing showing the profile of a moulding, giving measurements of its height and showing the extent to which different members project from the supporting wall.

THE IDEAL ELECTRIC & MFG. CO., Mansfield, O. *The Ideal Rotator*, Volume 1, Number 3.

The present-day theater, already so alluring in many ways, is made even more attractive when to its other advantages there is added the treatment of its air so that during even the warmest days of summer its atmosphere is cool and inviting. Of course this treatment of air and temperature can be had, and in fact it has been had so often that it is no longer a novelty of the first order. It is probable, however, that there are many architects who are not familiar with the mechanism for air treatment, and this gives particular interest to anything published on the subject. *The Ideal Rotator* is a publication "issued occasionally" by the Ideal Electric & Mfg., Co. in the interests of its cooling equipment. This particular number deals with the matter in most helpful fashion, giving illustrations of the exteriors and interiors of theaters where the equipment is now in use.

GENERAL ELECTRIC COMPANY, Merchandise Dep't, Bridgeport, Conn. "G-E Fiberduct for Underfloor Wiring."

Owners of many office buildings or structures of other kinds are frequently perplexed by the demands of tenants for new electrical outlets or connections. Where wires are run up through walls, this is likely to mean the tearing away of plaster and sometimes of lathing to reach the wires. Even more troublesome is an instance where wires are installed beneath concrete floors, for it generally means the chiseling away of concrete to reach the ducts in which the wires are strung. What these owners should have is a system by which wires may be run in such raceways or conduits that new outlets may be installed at any time. Here it is: "G-E Fiberduct is a non-corrosive raceway for underfloor wiring in concrete floors. It is so designed that neat appearing outlets may be installed safely and economically at any point and at any time during the life of the building. The prime requisite of any underfloor wiring installation is that the raceways shall be permanently accessible for the installation of additional outlets. This is assured by the use of 'G-E Fiberduct.' It is composed of impregnated fiber which successfully resists every known type of corrosion encountered in actual service. Conclusive evidence of its resistance to corrosion is furnished by the millions of feet of fiber underground conduit which have been installed by public utilities in all sections of the country during the last quarter of a century. The second element of this new system is the cast iron, rust-resisting junction box equipped with an adjustable brass cover. Covers can be furnished for wood, concrete or linoleum floor surfaces. The system is completed by a line of brass surface fittings which permit outlets to be established exactly when and where they are required in a neat, safe and economical manner." This brochure illustrates and describes the "G-E Fiberduct" system and shows by various plans, diagrams, and other drawings the exact method of its use. The introduction of such a system means that ingenuity has made possible one more step toward efficiency in modern building.

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Now you can give every room, in every building you plan, a supremely comfortable heating system and a free floor span.

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You know how gladly the owner of every fine home, apartment building or office building will welcome the opportunity to get rid of visible, space wasting radiators entirely. When you specify Trane Concealed Heat you give the owner a free floor span in every room, the first requirement of perfect interior decoration and economical use of space. Because Trane Concealed Heating gives the owner warmth where he wants it, and only when he wants it, his fuel bills show a considerable saving. Installed with Trane traps and valves and other specialties, Trane Concealed Heating is a complete vapor system which will give your clients years of money-saving, trouble-free service. For a file copy of the new booklet, "Modern Style in Room Heating", write The Trane Co., Dept. 1, 220 Cameron Ave., La Crosse, Wis.

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REVIEWS AND ANNOUNCEMENTS

JUDELSON DRYER CORPORATION, Moundsville, W.Va. "Judelson Dryers, Catalog No. 29."

Study and experiment, which have brought about improvement in so many departments of the building and equipment of homes, have been the cause of considerable improvement in the designing and manufacturing of clothes dryers. Dryers are today more widely used than ever before. Even where drying in the open air is possible it is not always desirable, while in small houses and apartments and other more or less crowded living quarters it is likely to be quite impossible. This brochure is issued by a firm long known for the excellence of its drying equipment. "Judelson Dryers embody the specialized experience of more than 35 years in manufacturing efficient clothes-drying equipment. The highest engineering skill and approved scientific principles, together with many exclusive, patented features of construction and design, give Judelson Dryers an outstanding place in the dryer field. Judelson Dryers are made in two styles and several sizes to meet the exact requirements of homes, apartment houses and institutions, large, medium and small. Each style and size is equipped with the highly efficient Judelson System of Heating, Ventilation, Air Circulation and Evaporation. The proper degree and application of heat, combined with a positive method of ventilation, and circulation and dry, fresh air, insure garments being dried with the natural freshness of outdoor drying under ideal weather conditions. *Enclosed Indirect Heating System.* The entire heating element is completely enclosed, and it is impossible for gas fumes or products of combustion to get into the drying chamber. Only dry, fresh air, heated to the proper degree, is circulated through the clothes in the drying compartment. *Body Construction.* The body construction is exceedingly strong and rigid. Sturdy legs raise the housing 3 inches from the floor. All sheet metal parts are smooth, accurately formed and fit snugly. *Insulated Panels.* All sheet metal parts are formed of heavy gauge COP-R-LOY rust-resisting steel. Wall panels are double casing with ¾-inch air insulation space between inner and outer casings, conserving heat.

Charles W. Frank announces his removal to 8 South Adolph Avenue, Akron, Ohio.

Albert R. Martin announces his removal from 664 to 540 North Michigan Avenue, Chicago.

Arthur E. Harvey announces the removal of his offices to the Wilshire Professional Building, 3875 Wilshire Boulevard, Los Angeles.

Newhouse & Bernham, who have lately opened new offices at 8 South Michigan Avenue, Chicago, desire the catalogs and other publications issued by manufacturers.

THE CRANE COMPANY, Chicago. "Pumping Equipment for Schools and Other Educational Institutions."

So important is the sanitation of educational buildings that many cities and states regulate by code the plumbing fixtures which must be installed in schools, colleges, and other buildings of an educational character. The extremely hard wear which plumbing equipment is certain to receive in such buildings has been well considered by the manufacturers of plumbing fixtures, and the result is a line of fittings well designed and carefully made with particular reference to this specific use. This splendidly produced booklet presents in its 60 pages the fine line of plumbing fixtures produced by the Crane concern for use in schools,—fittings of every type and character likely to be required. The brochure deals with every detail of data which an architect, engineer, builder or contractor could desire, and presents views of many educational buildings erected more or less recently all over the country. One extremely helpful detail is the inclusion of many plans, prepared in "blue print" fashion, showing well designed toilet rooms, lavatories, shower rooms, swimming pools, rest rooms, janitors' closets, etc., all these being places in which plumbing fixtures are necessary for successful use.

NATIONAL STEEL FABRIC COMPANY, Union Trust Building, Pittsburgh. "Better Walls for Better Homes."

Architects and decorators have always realized that the character of an interior is largely determined by the treatment given its walls,—not difficult to understand, since at least 80 per cent of an interior's background is made up of walls. If the walls,—at least those of the principal rooms,—are treated in a manner in keeping with the architectural style in which a building is designed, the result is dignity and consistency. During the past few years much has been made of wall treatments of many kinds, and manufacturers of plastering materials as well as makers of paints, lacquers, varnishes, etc., have exerted considerable skill and ingenuity in providing materials to aid architects and decorators in obtaining just the effect they desire, and yet the benefit of all this may be easily lost unless the actual structure of a wall is what it should be,—resistant to the passage of heat, cold and sound, and equally resistant to the development of cracks, which of course will mar if not ruin wall decorations of any sort, the cracks being due generally to the uneven settling of the foundation into the ground; this settling passes the resulting strain on to the building's structural framework, the framework passing the strain to the lathing which holds the plaster, and the plaster, being dry, brittle and fragile, cracks, with the result that walls are marred or ruined. This brochure deals with use of "Steeltex" for lathing, the material being such that it resists,—or perhaps absorbs,—movement without passing it on to the plaster. The principle of course is not particularly new, but rarely has it been explained and illustrated as well as has been done in this booklet. The use of "Steeltex" is dealt with in regard to its properties for resisting passage of heat, cold and sound as well as for resisting the development of cracks in plaster, and countless illustrations aid in making use of the material easily grasped. There are also shown a great number of illustrations, largely views of buildings of a residence character in which "Steeltex" has been used, and the names of the architects are also given.

NATIONAL LUMBER MANUFACTURERS' ASSOCIATION, Transportation Bldg., Washington. "Wood Floors."

This very interesting booklet, issued by the National Lumber Manufacturers' Association, is one of a series published by this firm. It points out to the architect, interior decorator and prospective home builder the importance of the appearance as well as the durability of floors. Being the base upon which beauty of interior decoration is established, floors should have the proper attention as to materials and design. This booklet describes the vast number of advantages of wood for flooring,—its beauty, warmth and dryness, adaptability, smoothness, durability, etc. "A concise presentation is given of the various factors which make wood a successful flooring medium. This is followed by a brief description of wood floor construction, touching on the essential details, with a section on the different available woods for floors. Tables are included to show the commercial grades and sizes of flooring lumber in several popular woods. Short sections follow on laying and finishing the wood floor." The booklet is beautifully illustrated with a number of illustrations of well known rooms, such as the Blue Room in the White House in Washington. A number of other illustrations show many designs and effects possible.

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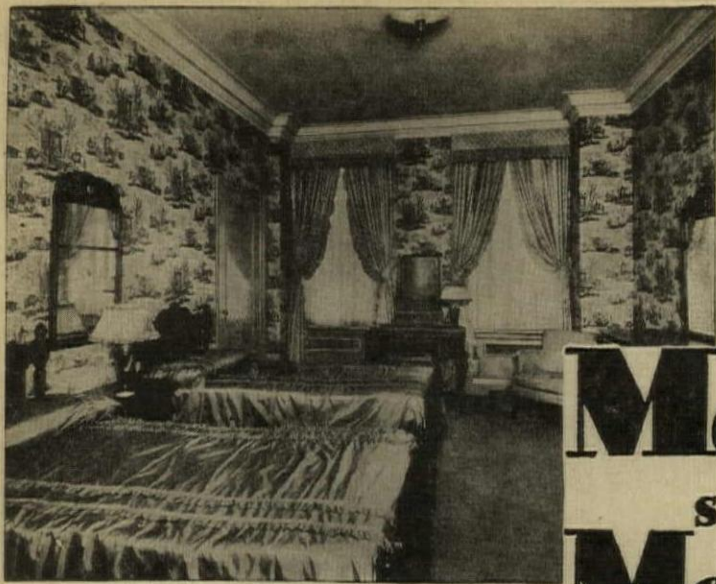

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