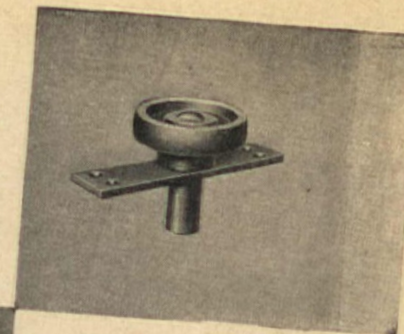
THE ARCHITECTURAL FORUM

ARCHITECTURAL ENGINEERING & BUSINESS

IN TWO PARTS PART TWO

AUGUST 1930

Hangar doors slide smoothly and easily



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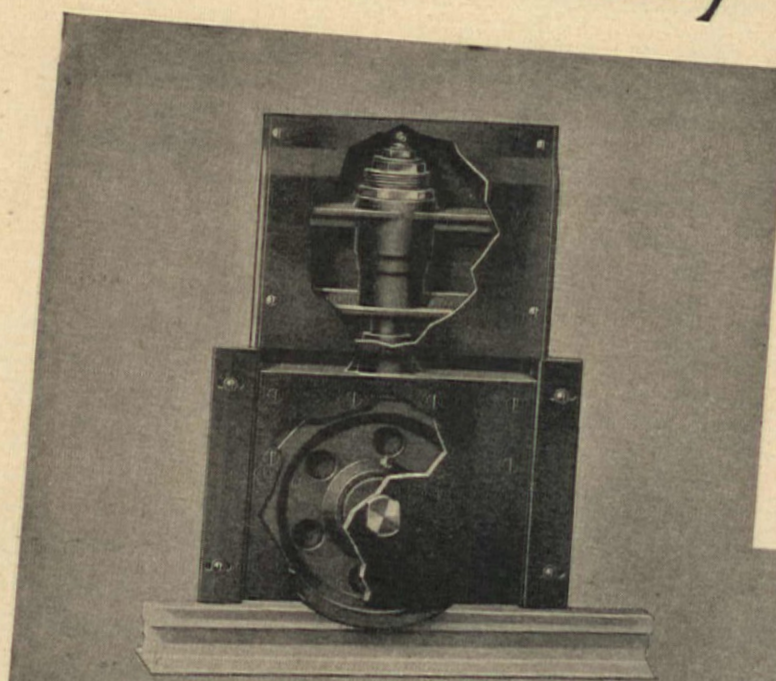
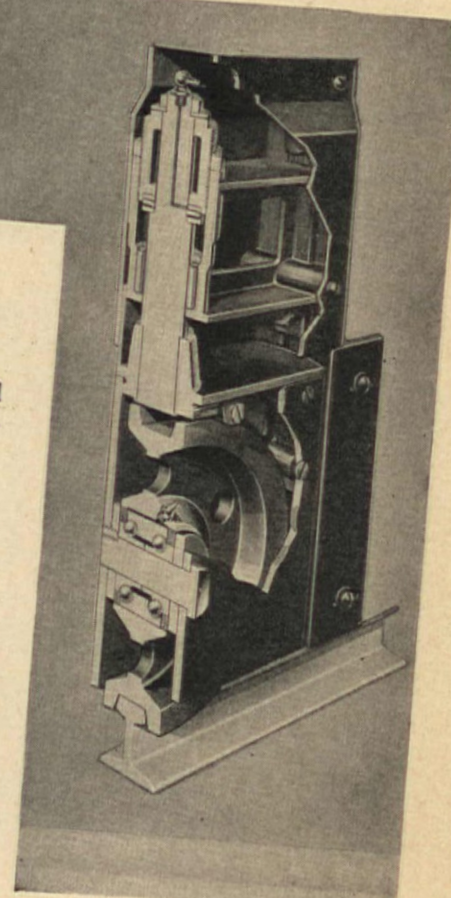
R-W bottom rollers fit standard (12" x 20") slots on steel and wood doors. R-W bottom roller No. 574 for "round-the-corner" hangar doors is shown. Side plates are integral units with no springs or other intricate parts to break or get out of order.





on R-W hardware-

Correct engineering is just as essential for ground equipment as for flying equipment. Profits in aviation depend on both.

R-W hardware insures continued smooth, easy, trouble-free performance of hangar doors, because R-W hardware is specially engineered to do that particular job.

R-W rollers are ball bearing, Alemite-equipped and weather-stripped. They are designed for corner tubular, structural steel, and heavy wood doors weighing up to 3000 lbs. each. Specify R-W equipment for "round-the-corner" doors and for straight sliding doors. Have an R-W engineer cooperate with your door manufacturer. Use freely the experience and knowledge of the R-W engineering staff, comprised of recognized doorway specialists. Write for folder F-62 featuring R-W hangar door hardware.

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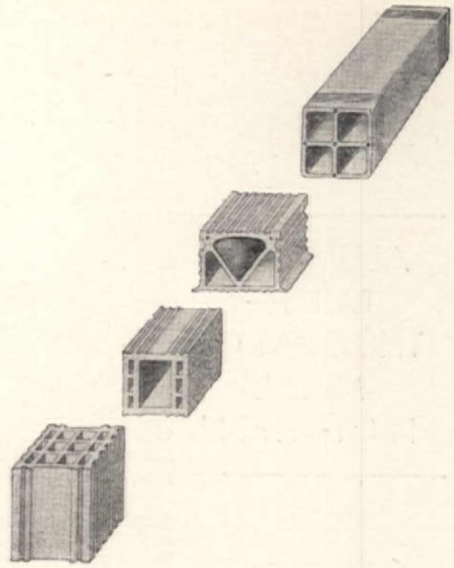

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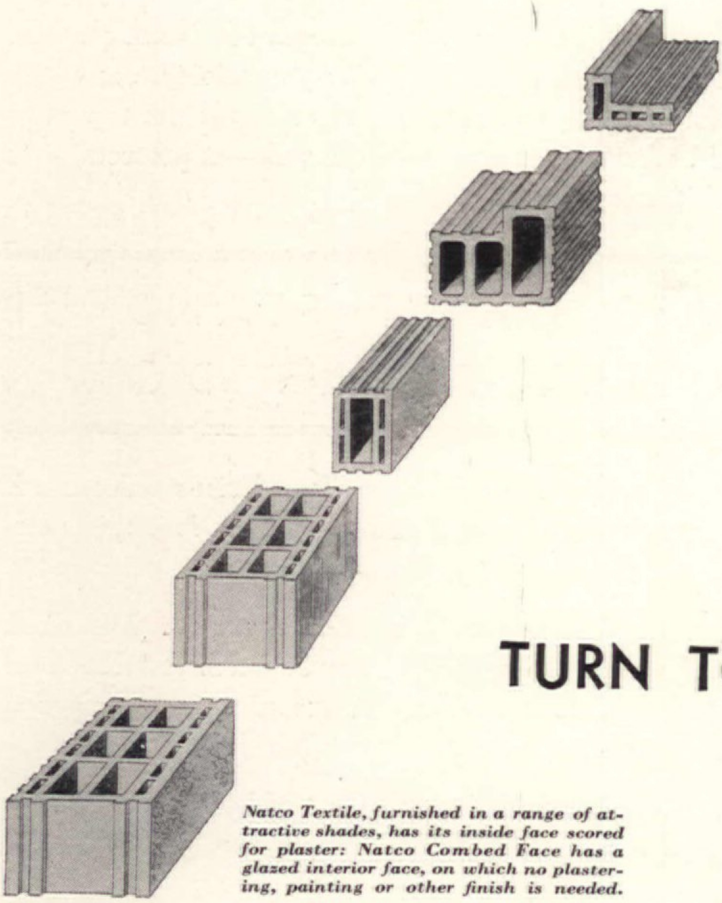

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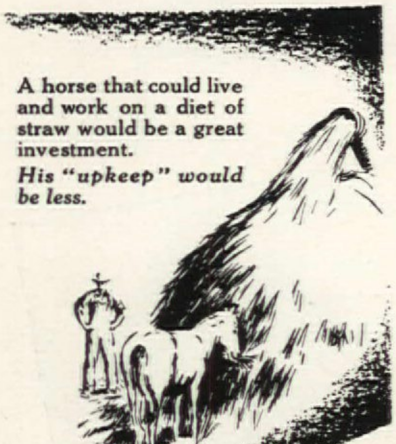

A horse that could live and work on a diet of straw would be a great investment.
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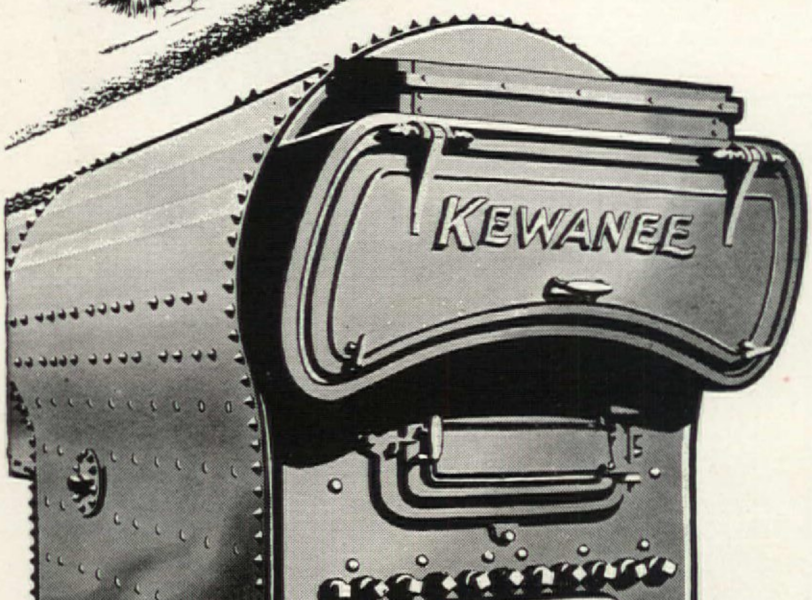

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«Let's Build a Boiler like an Automobile Radiator»

. . . Said H. M. Jerome

The late H. M. Jerome, Automotive Engineer, scientist, and inventor.

WHY should a man noted for his successes in the field of automotive engineering concern himself with boilers for home heating? When a really scientific problem presents itself, a true inventor, once interested, cannot rest until it is solved. And Inventor Jerome was determined. He would perfect *an automatic heat machine that would deliver heat at low cost.*

The cooling system of an automobile engine and a house heating plant are much alike . . . both transfer heat. In an automobile motor the tremendous heat developed in the combustion chamber must be carried away. Water around the chamber absorbs the heat . . . passes it through the great number of small passageways in the radiator, which is exposed to the cool air, . . . and the heat from the water is radiated into the open air.

«Why not build a boiler like an automobile radiator,» reasoned Mr. Jerome. But, instead of exposing the «radiator» to the air and allowing it to throw off heat . . . expose it to the hot gases of combustion (from fuel oil or gas) and make it *absorb* the heat and pass it on into the heating system.

The high velocity flow, through the very irregular water and air passages of an automobile radiator, produces a turbulence that washes off the film of air, which by adhering to the metal reduces conductivity. The result is a greatly increased heat transfer. In the Gar-Wood, the combustion chamber is placed at the *top* of the boiler and well over one-half the fuel's radiant heat is absorbed by the water immediately surrounding the chamber. The remaining hot gases pass down into the narrow openings between a series of flat water tubes, which are baffled in such a way as to cause a scrubbing action of the hot gases against the steel walls of the tubes.★ The result is an almost complete transfer of the remaining heat into the water sections. Stack temperatures are held just high enough to prevent condensation.

★ The short, wide flues of the old type boiler are not built to absorb the intense heat produced by an oil burner.

Complete details of this most efficient and more economical balanced heating unit are to be found in our new book. The coupon brings it.

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Gentlemen: Send me . . . *without cost or obligation* . . . a copy of "A New Principle of Generating Heat at Low Cost."

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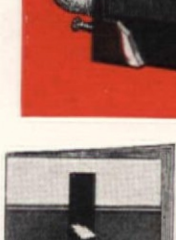

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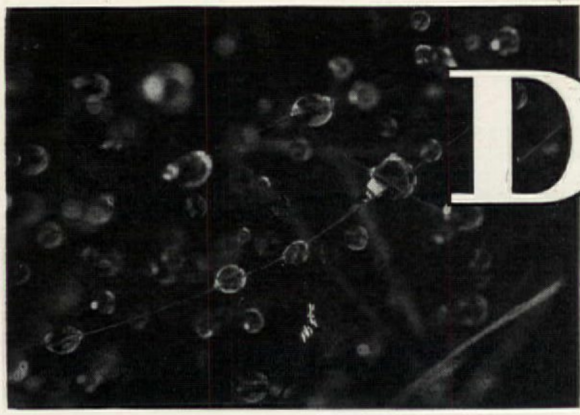
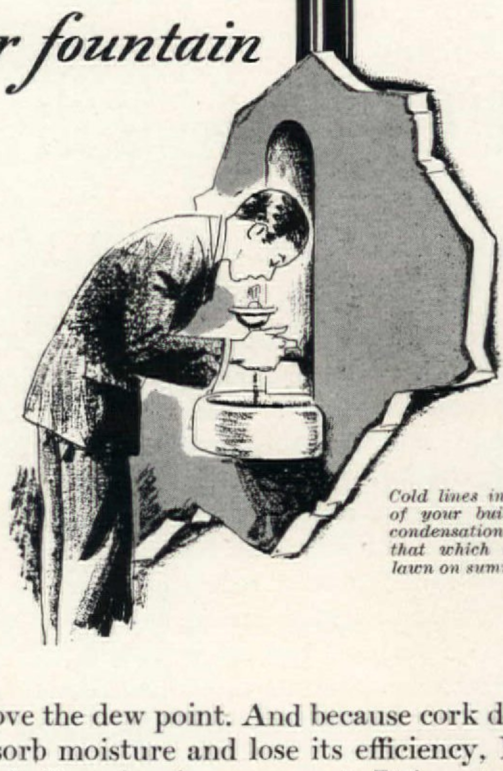
Gar-Wood


Bail with a bucket?
no such thing!
BECAUSE



DEW *attacks* *the* PIPE COVERING

behind every drinking water fountain



Cold lines in the walls of your building face condensation as real as that which wets your lawn on summer nights.

When DEW wins the fight, the pipe covering is ruined. Pipe chases must be opened and wet insulation replaced. Just some of the damages Novoid Cork Covering prevents.

WHEREVER warm air strikes a cool surface, it deposits moisture. Architects call it condensation. Gardeners call it dew. To grass and flowers it is a blessing. To the insulation on cold lines it is a constant menace.

Novoid Cork Covering insulates cold lines without fear of dew damage. Its close-structured cork body has no voids in which moisture can collect. It has none of the capillary attraction so common in fibrous materials. Outside and inside, both covering and fitting jackets are coated with pure mineral rubber. Novoid Cork Covering is impervious to moisture.

The high insulating value of the cork keeps the outside of Novoid Cork Covering above the dew point. And because cork does not absorb moisture and lose its efficiency, Novoid Cork Covering is permanent. It is not subject to progressive deterioration, which causes increasing line losses and gradual overloading of the refrigerating machines.

Novoid Cork Covering and Novoid Corkboard are built like a stone wall. Small granules are fitted between large granules, leaving a minimum of voids between. Novoid means more cork per cubic inch.

Novoid Cork Covering is made for all sizes of pipes and fittings and in thicknesses suitable for refrigerated drinking water, brine and ammonia lines. For further information write to Cork Import Corporation, 345 West 40th Street, New York, N. Y.

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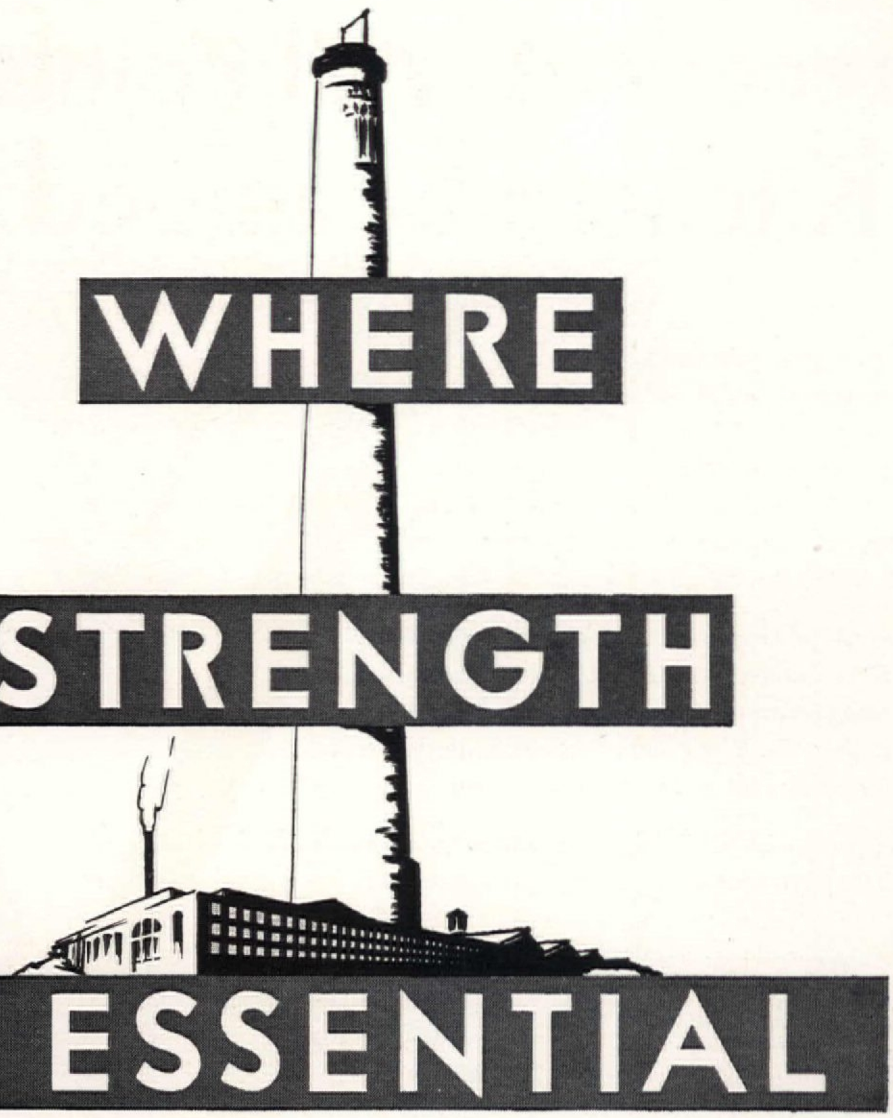
FOR COLD LINES, COOLERS AND TANKS



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And since Brixment is more plastic, is ground finer and hardens more slowly, it insures a better bond and more thorough bedding of the brick.

Ideal for foundation, load-bearing or parapet walls and even for tall, free-standing stacks. Louisville Cement Company, Incorporated, Louisville, Kentucky.

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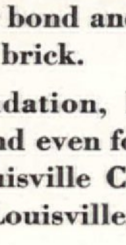

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If you set new precedents of your own, or invite the friendly counsel of the past, you will be led inevitably to Van Equipment. First of all, it is *good* equipment, as fine as can be built. Second, it is serviced by men who are familiar with the engineering problems that you meet. And third, it is lower in cost than its quality suggests.

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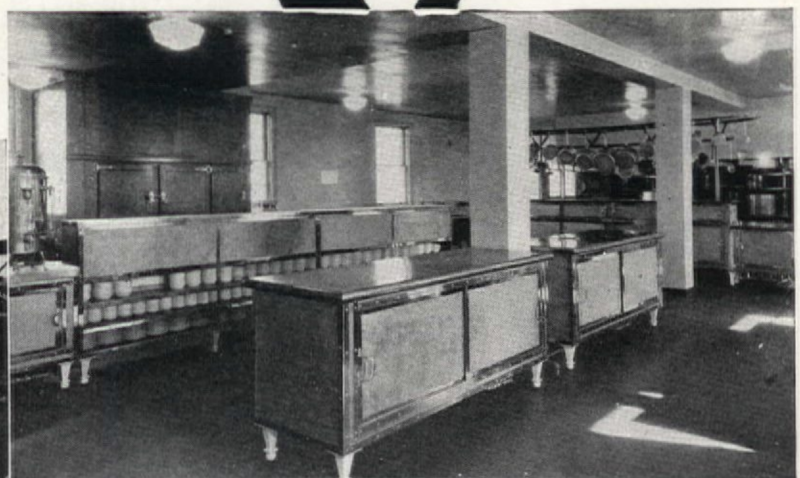
Right, a general view of the Van Kitchen in the famous Onwentsia Club, Lake Forest, Illinois.

Below, view of the range and broiler division of the splendid kitchen of the Onwentsia Club.
H. T. Lindeberg, *Architect*



See our listing in Sweets—pages C3798 to 3801

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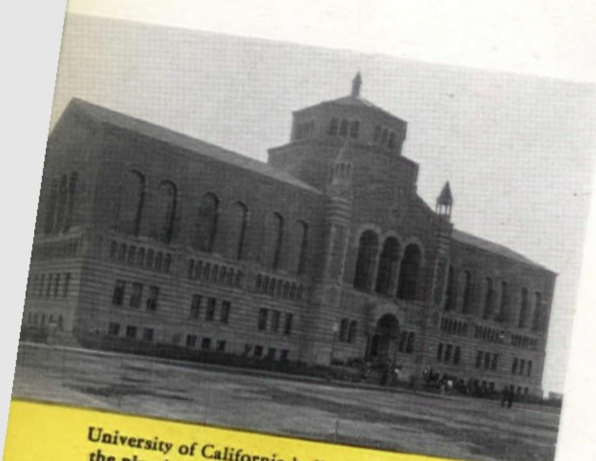

University of California buildings in which the plumbing lines are Toncan Iron Pipe.
George W. Kelham, Architect.
Hunter & Hudson, Engineers
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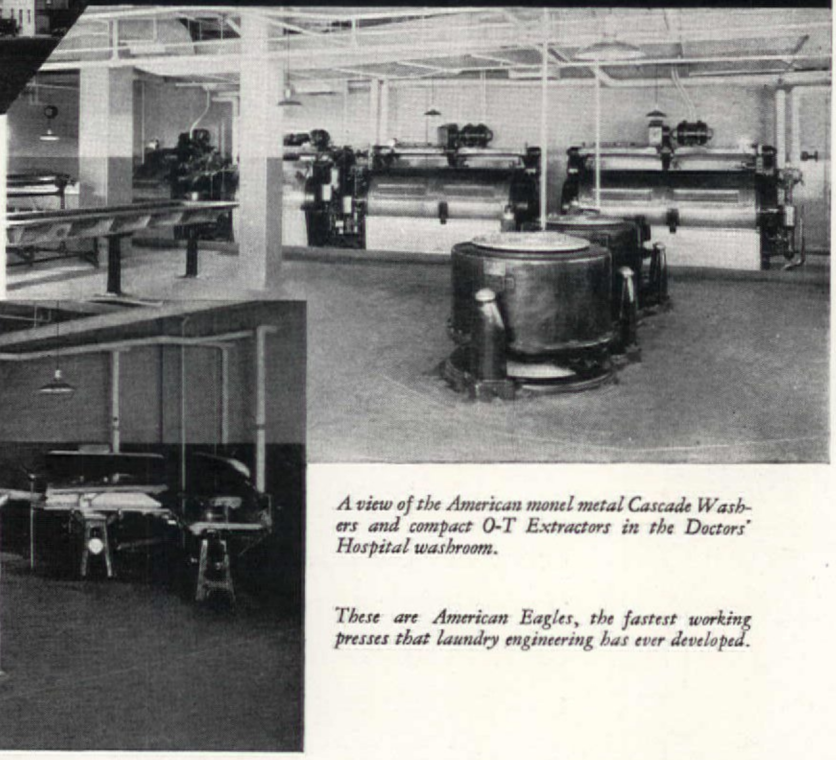
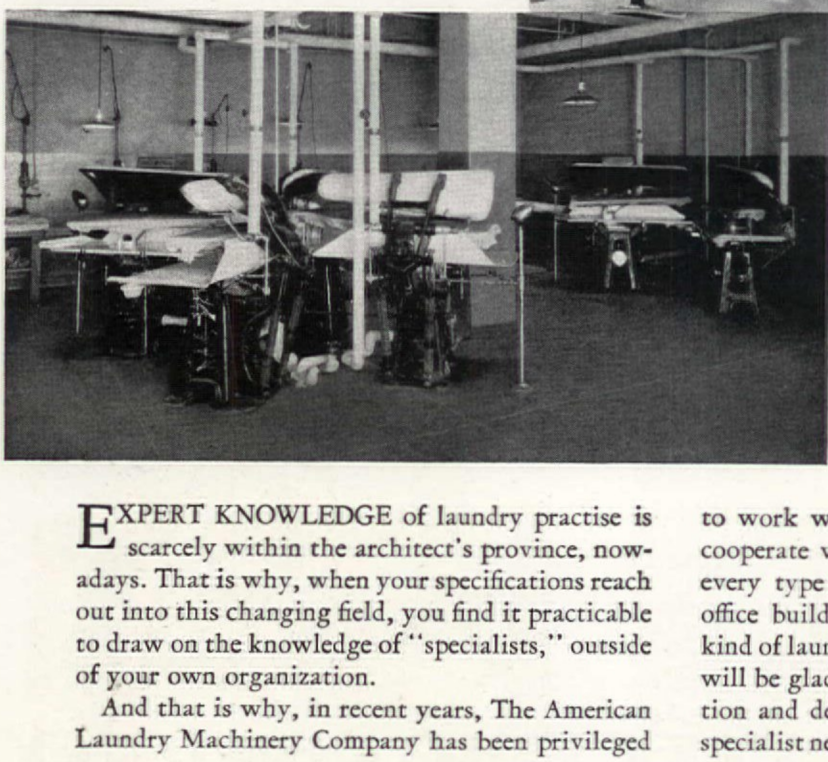
ARCHITECTS: Crow, Lewis & Wick.



A view of the American monel metal Cascade Washers and compact O-T Extractors in the Doctors' Hospital washroom.



These are American Eagles, the fastest working presses that laundry engineering has ever developed.

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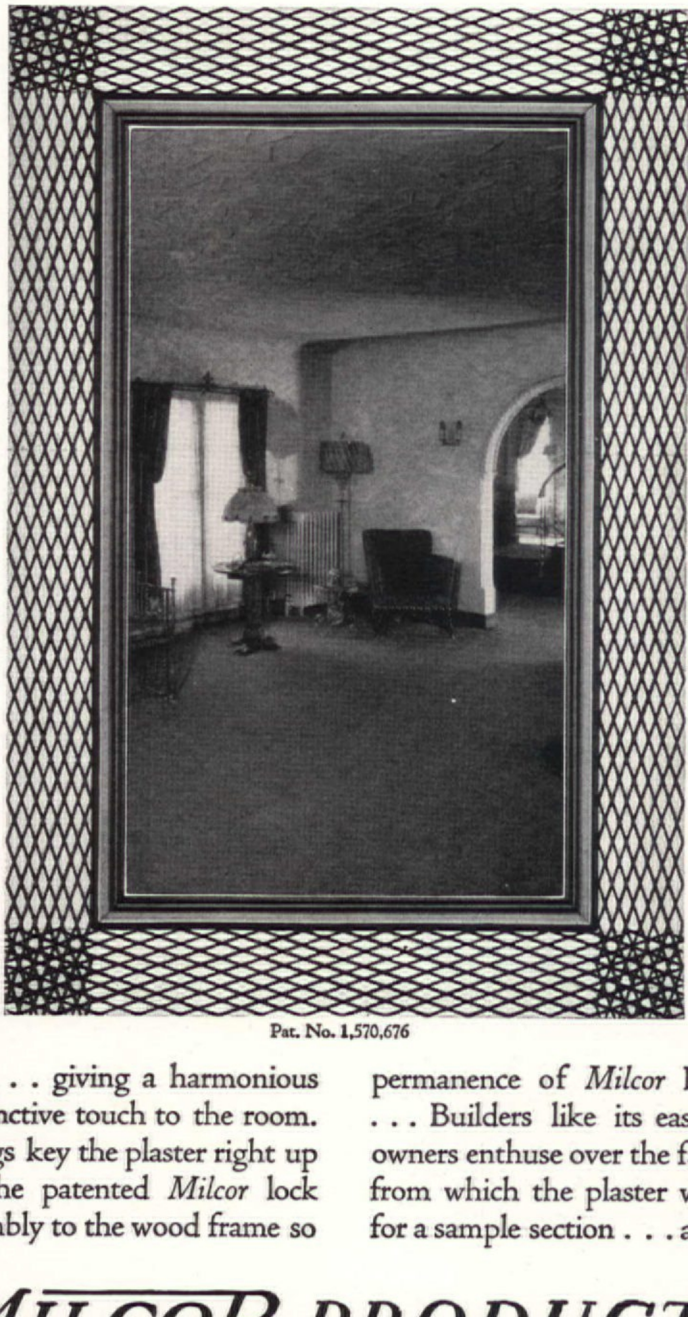

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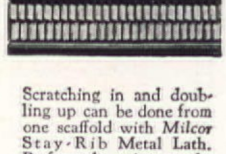

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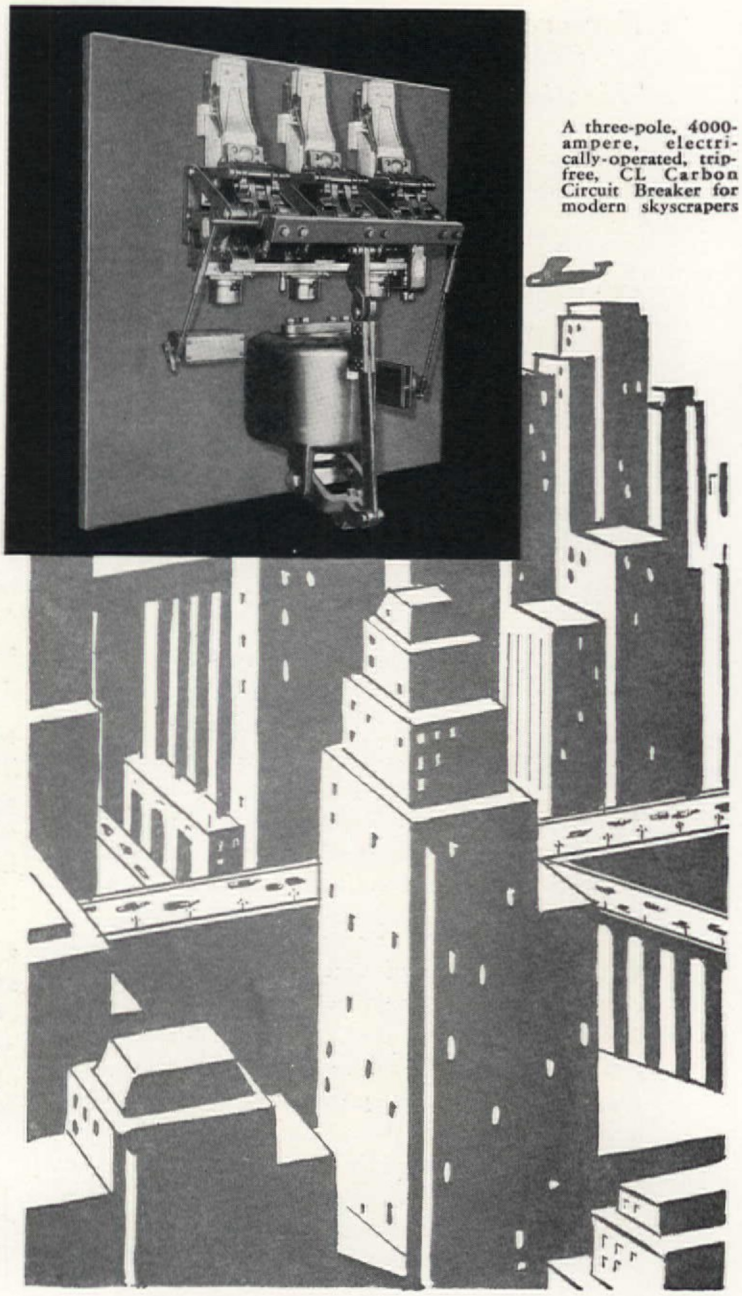

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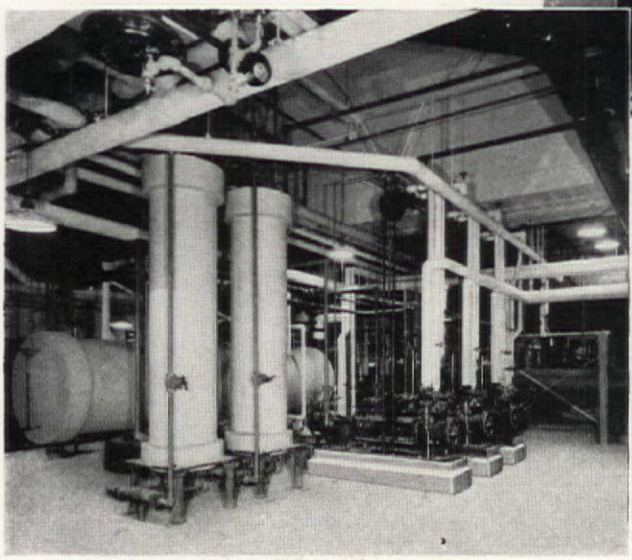

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Small wonder that Carbondale Refrigeration was chosen for this important service. In The Stevens and the St. George, the world's two largest hotels, in theatres, markets and public buildings throughout the country, Carbondale has proven its reputation for trustworthy performance.

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BOOK DEPARTMENT

AN INTRODUCTION TO THE HISTORY OF ARCHITECTURE

A REVIEW BY

CLIFFORD WAYNE SPENCER

THE history of mankind is closely bound up with the history of architecture. Every great civilization has developed its own distinctive types of building, and it is by studying these remnants of examples of these styles that we may learn something of the true nature of the people by whom and for whom they were built. The written chronicles of history may recount more or less accurately the important events that took place and even something of the social, economic and political developments of a given era or nation, but it is very seldom, if ever, that they record an unbiased conception of the everyday life and nature of the masses which formed the basis of all civilizations and states.

For an indication of the social, religious and political fabric of the nations of the past, and even of the present, the buildings in which the people lived, worshiped and carried on the affairs of state are the best historical documents. Thus we can learn from the sheer massiveness of Egyptian temples that they were built by a nation of slaves oppressed by their rulers and compelled by their superstitions to spend their lives in endless toil that they might erect by primitive means great palaces for the Pharaohs and temples to their gods. In like manner the observers of the future may learn from a study of English domestic architecture that the backbone of the British Empire consisted of peaceful, home-loving yeomen, content with their status in life and willing to live in their humble picturesque cottages and serve the considerable body of landed aristocracy and nobility. The rise and fall of the Roman Empire may be traced from the severe simplicity of the early republic to the lavish indulgence that brought about the downfall of the empire, by means of a study of the buildings of the various periods. So it is that the more carefully one investigates the character and structural features of architecture the greater becomes one's understanding of the forces underlying historical development.

Unfortunately, volumes which aim to cover the history of architecture in detail are likely to become so massive as to discourage anything like a careful perusal by even the professional reader. How many of us have resolutely determined to read carefully through the pages of Sir Banister Fletcher's "History of Architecture on the Comparative Method," only to be overcome in the early stages by a realization of the immensity of the task? In fact, if one should have the diligence to carefully study all the material in some such complete and authoritative work, there is danger that he might become lost in the maze of detail and lose sight of the general picture of architectural history. It is as an introduction and supplement to these more complete treatises that the little volume which is the subject of the present review will probably be found most useful. The architect who has long passed his student days and would like to refresh his memory as to some of the major features of architectural history, will find it a valuable short cut in doing so, as will those who wish to make a rapid review of the subject in preparation for an examination.

As is the case with many books on the subject, emphasis has been placed strongly on British architecture. In fact, it might almost be called an introduction to the history of English architecture. The earlier styles of architecture are well covered, however, and the author follows the usual procedure of tracing the stages of development in chronological order, starting with the Egyptian and following with a chapter on the architecture of Greece, Rome, the early Christian and Byzantine, Saracenic, early British and Saxon, Norman, French, Gothic and Renaissance. The rest of the volume treats of the various types of English architecture under the headings of Early English, Decorated, Perpendicular, English Houses, Parish Churches and Monasteries.

It can be seen that as a guide to the general history of architecture many important contemporary styles have been overlooked. The authors no doubt intended it as a guide to the study of English architecture, and as such it is very successful. As a matter of fact, the list of important buildings contained in the appendix might well serve as a guide as to what the architectural student should see while traveling in Great Britain. In presenting their material, the authors have based their selection on the sound fundamental principle that good architecture implies all builders' work that is nobly conceived and faithfully carried out. This at once shuts out a vast number of buildings which pretend to be what they are not, or which grudgingly supply our bare material needs but offer nothing to the mind and spirit. As defined by the authors, "nobly conceived" does not necessarily mean the grand and the magnificent, for modesty and simplicity stand high among noble qualities, and there is many a quiet little building that deserves to be included in the realm of architecture and many a pretentious pile which does not. Any building which does its proper work well and with grace and dignity may be said to be "nobly conceived."

Since architecture springs from good building, it follows that an understanding of architecture depends to a great extent on a knowledge of the simple forms of building and the proper use to which materials are put in all countries and at all periods. "The too-commonly accepted approach on the æsthetic side usually directs attention to the superficial ornamentation of a building, but fails to arouse any real interest in its finer qualities, and, indeed, only too often the decorative beauty of a noble style is ignored, while the student is allowed to concentrate upon a few of the more obvious details." It is not surprising, therefore, that we find in the pages of this work much space and many illustrations devoted to highly important structural and utilitarian features of building. The documents are well chosen and clearly presented, although they are not as numerous as in the case of some of the more complete architectural histories. The appendix gives, in addition to the list of names and locations of important examples of English architecture, a valuable and interesting "Glossary of Terms Used in Architecture."

AN INTRODUCTION TO THE HISTORY OF ARCHITECTURE. By H. Barrett Carpenter and Joseph Knight. 292 pp., 5 x 7½ ins. Price, $2.50. Longmans, Green & Co., 55 Fifth Avenue, New York.

METALS are attracting attention because their uses are becoming more numerous and unusual. Forward-looking architects are giving increasing attention and study to the characteristics of metals and their possible uses that are within the scope of architectural practice. We are all accustomed to the use of cast iron, wrought iron and steel and bronze in connection with buildings, and the use of metals in furniture manufacturing in Europe is bound to have its effect on furniture designing and production in America. Other applications of metal to building construction are being studied seriously, and the metal-clad building of real architectural merit is passing out of the visionary class into reality. Under these conditions it is but natural that architects are seeking knowledge pertaining to all metals that promise a fruitful field for exploration and adaptation to uses within their province. Among these metals is aluminum, the architectural use of which is still embryonic.

The work under discussion is divided into two volumes,—the first, "Aluminum and Its Production," and the second, "Aluminum Products and Their Fabrication." Together, they form a complete treatise on aluminum. The second volume will perhaps attract the more immediate attention of architects because in it are found the data pertaining to the physical characteristics and properties of the various alloys and forms of aluminum. Obviously, no one can design for the use of any material without such data. There are apparently innumerable aluminum alloys providing physical characteristics and properties for almost every purpose. A recent development is a structural aluminum which is similar to steel in that its resistance to tension and compression is equal. This alloy is rolled in structural shapes, and on account of the great ratio of its strength to weight it has interesting and somewhat revolutionary possibilities. A wide range of finishing and coloring has been developed, and the choice is really selective.

The element of cost must be considered. For some uses the cost per unit of weight may appear as excessive, but with the unusual ratio of strength to weight its use will effect real economies. Aluminum has its limitations; there is no material suitable for universal use. The limitations,—or better, the possibilities of aluminum,—are more fully understood after a reading of certain portions of this work. Real knowledge concerning aluminum, which is essential for its safe use, is attained by the same processes that such knowledge is attained about any other material. This work supplies the knowledge which is essential to the use of the material in connection with building construction and furniture manufacturing. We may hazard the opinion that notwithstanding the vast amount of research that has been made by the producers, architects will lead aluminum into unanticipated fields and with success.

THE ALUMINUM INDUSTRY. By Junius David Edwards, Francis C. Frary and Zay Jeffries, and Experts from the Staff of the Aluminum Company of America. 2 vols., 358 and 870 pages, 6 x 9 ins., cloth, illustrated. Price, $12. McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York.

PROFESSOR MUJICA, an eminent South and Central American architect, has produced a monumental history of the skyscraper. The collection of historical data is complete and well arranged. The skyscraper is considered in its structural and æsthetic development from the '80s up to the present time, and in fact some of the buildings illustrated are now in the process of completion. The opposition to the skyscraper, even in its early days, by some of the leading architects of the time is shown by their writings and also by the opposition of some leading contemporary architects. The transitions in design in the evolution of this type of building are all recorded in chronological sequence.

The effect of the skyscraper on the requirements for adequate sunlight, circulation of air, safety from storm and fire, durability, street congestion and public welfare, is all recorded by quotations from various writers. Some of these expressions are extremely interesting in the light of present-day knowledge and experience. It is a dispassionate and unbiased exposition of every feature of skyscrapers arranged progressively up to this time. A very comprehensive illustration of the development of the skyscraper is given in the 134 plates and is in fact an authentic pictorial history.

The author introduces his work by advancing a theory as to the ultimate American style of architecture. He shows that from the sixteenth to the twentieth century the forms of indigenous architecture found in Central and South America were entirely disregarded,—in fact unknown to us,—in the growth of American architecture. He conceives the idea that a Neo-American style can and will be developed, based on these native forms. Very interesting illustrations are given of details and restorations of ancient buildings made by Professor Mujica. The question arises as to why a Neo-American style should develop from these ancient Central American styles, rather than an American style entirely germinated by the conditions that are particular to our own times. As a history of the most distinctive feature of American architecture, confined to its æsthetic design, this work is complete and well presented.

HISTORY OF THE SKYSCRAPER, by Francisco Mujica. 53 pages of text, 134 plates, 13 x 17½, leather. Price $35. William Helburn, Inc., 15 East 55th Street, New York.

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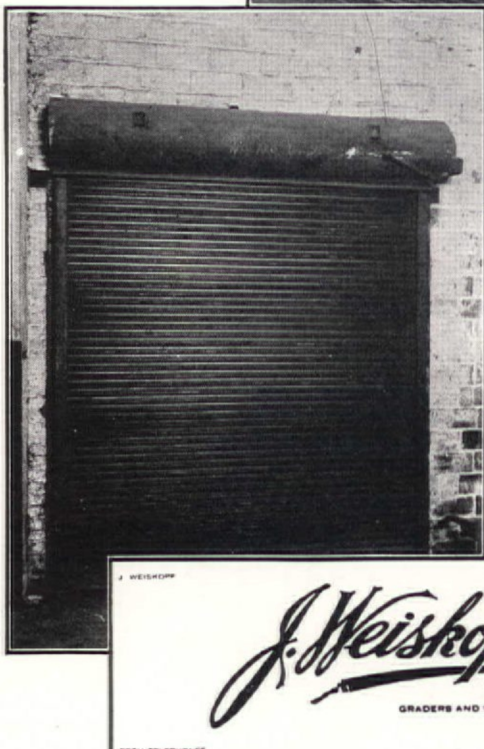

Unretouched photographs, taken April 8th, 1930, of the Kinnear Automatic Rolling Doors installed in the Weiskopf Building in 1912, as they appear after eighteen years of continuous service and fire protection duty.

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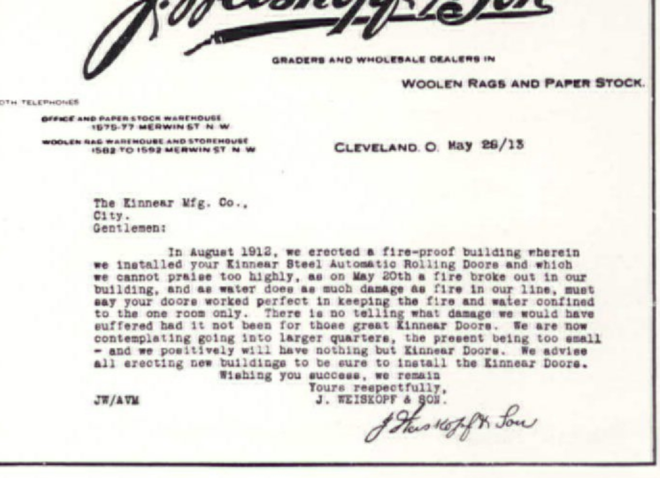

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THE ARCHITECTURAL FORUM

VOL. LIII, No. 2

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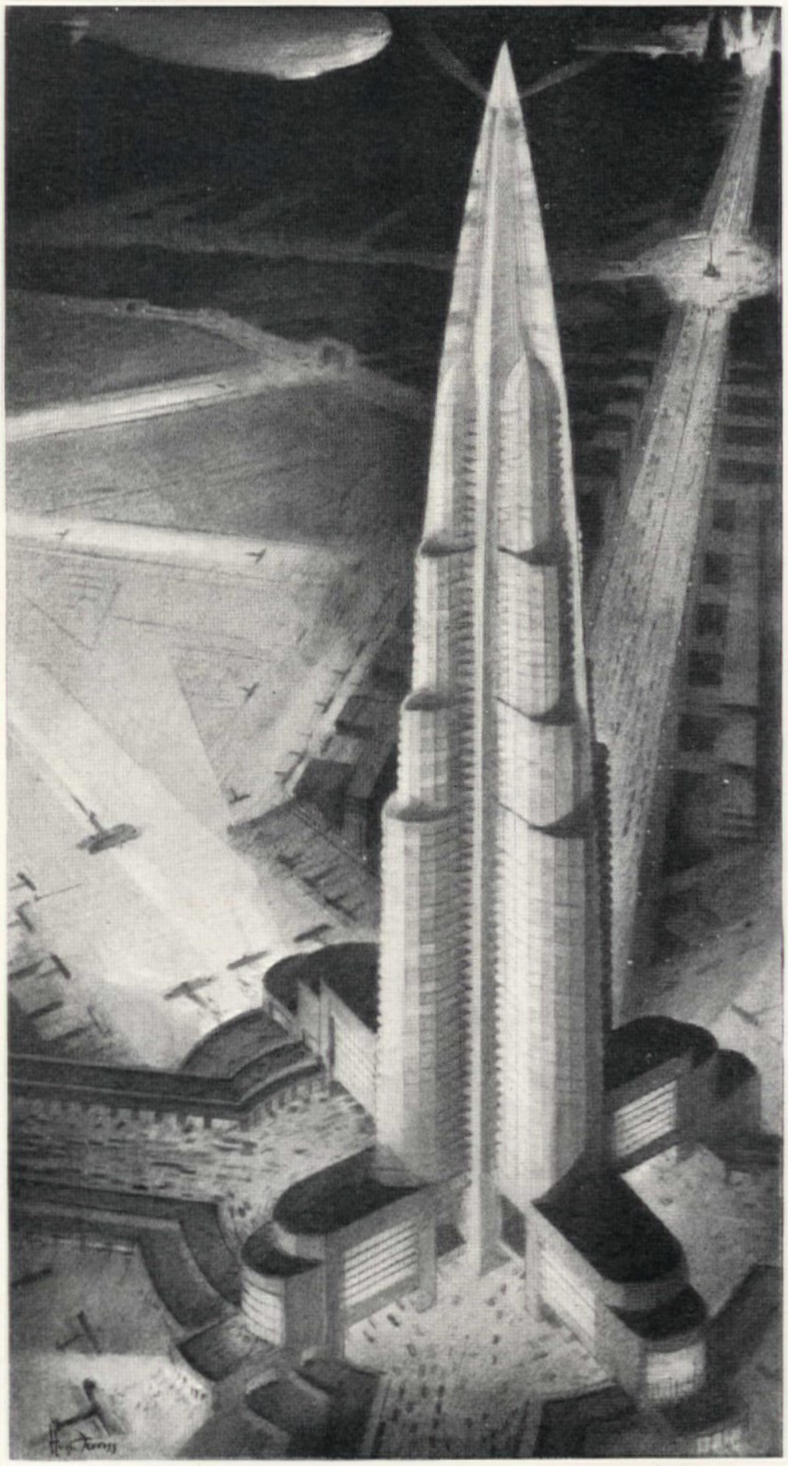

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THE EDITORS.

SKY-WORKERS

FROM A DRAWING BY PAUL BISSELL, JR.

THE
ARCHITECTURAL
FORUM

VOLUME LIII NUMBER TWO

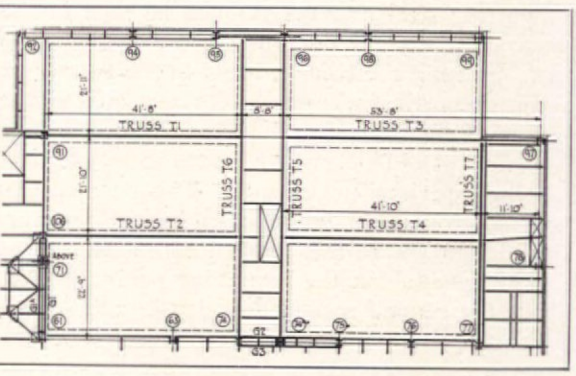
AUGUST 1930

STRUCTURAL FEATURES OF THE WEST SIDE Y. M. C. A.

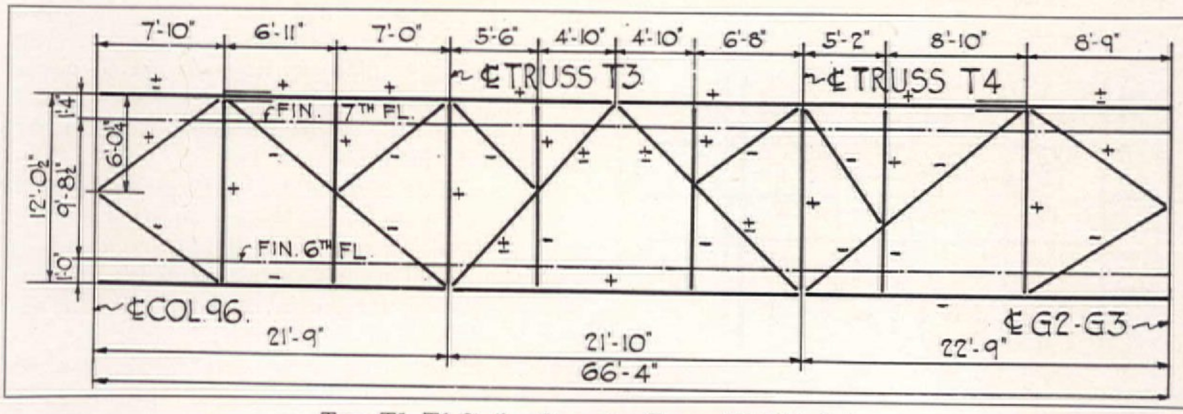
BY
A. T. NORTH

THE inclusion in a building of extremely large rooms, in juxtaposition and used for different purposes, presents some interesting structural problems that require judgment and skill in their solution. The new West Side Y.M.C.A. Building, New York, is such a structure. Above the swimming pools, extending through the second and third floors, are three gymnasiums extending through the fourth and fifth floors, and above the larger gymnasium are six handball courts extending through the sixth and seventh floors. The floor area occupied by the gymnasiums and their separating corridors is about 11,500 square feet, and the construction above is supported on four interior columns.

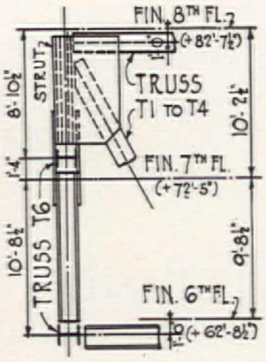
The unobstructed floors of the gymnasiums are obtained by using seven steel trusses which extend through and between the two-story handball courts. The longer transverse trusses are 12′ 0½″ high on center lines of chords. The four longitudinal trusses are 19′ 11″ high on center lines of chords. All of these trusses are level on the bottom and the longitudinal trusses extend 7′ 10½″ above the transverse trusses. They are supported at the ends of the top chords by struts supported on the top chords of the trusses below. This scheme made it possible to use a rather unique form for the longitudinal trusses T1 to T4 inclusive. It will be seen that they practically consist of two trusses in one, and the reasons therefor are obvious. A large number of irregularly spaced concentrated loads are supported on the upper chords and compression web members are placed under each of these load points. These loads are distributed through subsidiary trusses that are about 6′ 8″ high, the reactions of which are carried into the deeper principal truss, which is 19′ 11″ high. The ceiling of the gymnasium and floor of the handball courts are supported by the lower chords of these trusses.

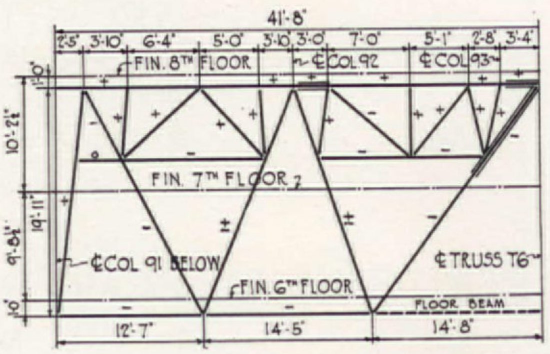


Framing Plan of Trusses

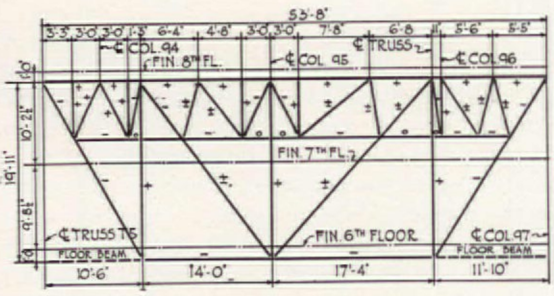


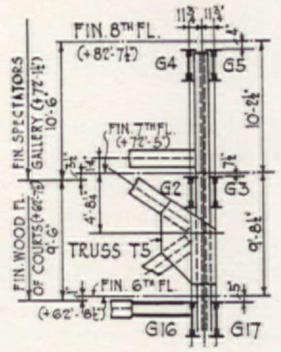
Truss T5, T6 Similar, Supporting Trusses T1-T4 inclusive





(Left) Struts on Trusses T5-T6 Supporting Trusses T1-T4 inclusive. (Right) Truss T1 Offsetting Col. 91 at left 2'-5"





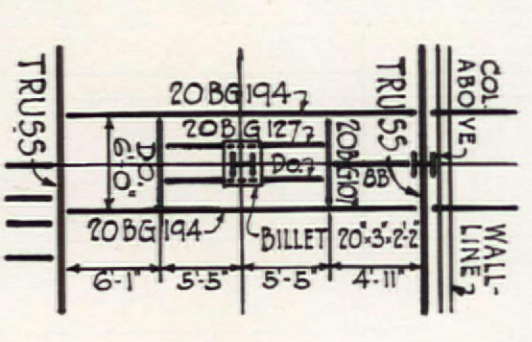
(Left) Truss T3 Showing Unusual Loading on Upper Chord. (Right) Strut on Girders to Support Truss T5

Above the handball courts, eight columns supporting the upper floors are supported between the longitudinal trusses on baskets or huddles of beams. It was necessary to limit the depth of the supporting steel to 20". As will be seen in the illustration, 20 BG floor beams are arranged so as to transmit the column loads to the trusses or other supporting members. On top and in the center of this basket or huddle is placed a 20 x 3" x 2' 2" steel billet, which serves as a base plate for the superimposed column. This construction was not economical, but it was a logical construction design within the height limitations.

The floors about the swimming pools are 5' 0" above the general second floor level, with spectators' galleries at the third floor level. The bottoms of the pools at their greatest depth are below the second floor level. The pools are lined with ⅜" steel plates welded to a structural steel cradle. The cradle floors are composed of longitudinal I beams supported by and coped into transverse I beam girders. The side walls of the pools are made of vertical I beam struts supported on the transverse girders, and between the vertical struts horizontal I and channel beams are placed. All of the members are designed to support the dead loads and the hydrostatic pressures.

Before the inner walls and floor of the pools were finished with gunite and tile, the pools were filled with water to test their tightness and were kept filled for some time to permit the welded steel tank to adjust itself to the loads. It is reported that in the case of a pool that was finished without adjusting the welded steel tank to the water loads, the tile lining cracked some time after the pool was filled with water. It is but reasonable to expect that some distortion, if you please, will take place in the tank lining under load, and obviously it is good practice to adjust the lining to load before installing the inelastic gunite and tile finish.

This building is an example of the inclusion of complicated structural steel within certain fixed and unusual architectural limitations, and is evidence of the versatility of engineers and the adaptability of structural steel to unusual demands. Weiskopf & Pickworth, Consulting Engineers, designed the steel work, which was detailed by Steinmetz & Rice and fabricated and erected by the Harris Structural Steel Company.



Steel Huddle for Column Base

HEATING AND VENTILATING THE Y. M. C. A.

BY
ALBERT L. BAUM
OF JAROS & BAUM, CONSULTING ENGINEERS

THE West Side Y. M. C. A. was designed to have among its facilities a very large physical department, including two swimming pools, three large gymnasiums, six handball courts, and a number of other facilities. In addition, there are sleeping accommodations for 600 people and a large cafeteria. All of these various forms of service combined make a heavy hot water demand.

One of the first considerations in the design of the mechanical equipment was the selection of the type of boiler and generating plant, if any. A careful analysis was made by studying actual data from other Y. M. C. A. buildings. From this information, graphs were prepared indicating the daily fluctuation of hot water demand, electrical demand, and the various steam demands. These graphs indicated that the amount of low-pressure steam available from a private electrical generating plant would take care of the heating of the building in winter and the supplying of the hot water service throughout the year with a comparatively small waste of exhaust steam in summer, even allowing ample interest and depreciation charges on all the necessary equipment. It was found that the saving to the Y. M. C. A. of the private electrical generating plant was great enough to pay off the first cost of the generating plant within the first four years.

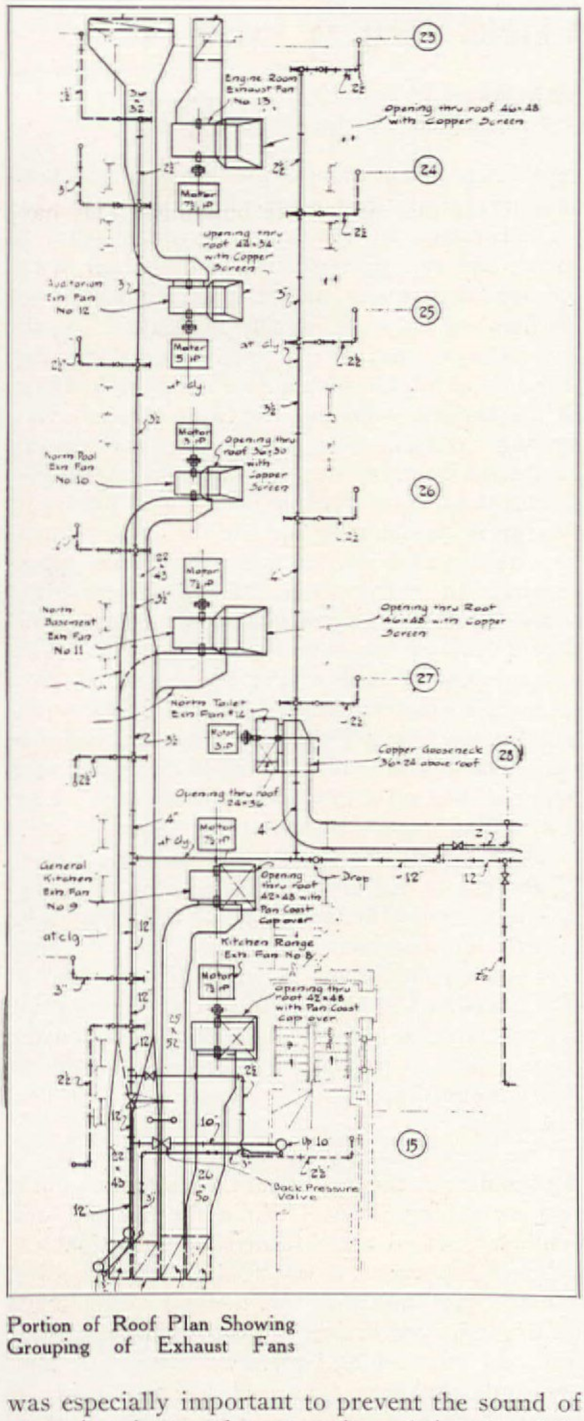
Consequently, an electrical generating plant was installed. The high-pressure boiler plant to provide all the necessary steam for the various services was made a water-tube boiler installation, stoker-fired, burning a mixture of 50 per cent anthracite dust, and 50 per cent bituminous coal. This combination was selected for the highest over-all efficiency. To further facilitate the coal handling problem, conveyors were installed to take the coal directly from the coal storage bins, and deliver it into the stoker hoppers.

With the atmospheric relief riser from the engines running to the roof of the building, it was determined to make the low-pressure steam heating system a down-feed system with the distributing low-pressure main located at the top of the building, and starting right next to the back-pressure valve. This low-pressure distributing steam main is illustrated on the roof plan herewith. To further facilitate the maintenance of plant economy, the steam heating system was made a vacuum return line installation, thus effecting a minimum back pressure on the engines. It is of interest to note that the heating system is arranged so that heat can be maintained in the physical department even though the heating system is shut off for the rest of the building. This has the advantage of removing the slight chill in spring and fall when such heat is desired in the physical department, whereas the remainder of the building does not need to be heated. As the owners were particularly interested in the distribution of steam demand through the building, all the various steam services were metered, thus making it possible to properly charge each department with its steam, water, and electrical demand.

The location of the physical department part way up in the building introduced some exacting structural conditions due to the large open spaces required in such places as the gymnasiums, coupled with the fact that above the gymnasiums the dormitory sections were located. This arrangement created a very interesting problem of carrying the structure above the gymnasiums, and for this purpose the steel engineers designed some heavy steel girders. These girders in turn required the offsetting of a number of steam distributing risers for the heating system in order to clear the mass of steel and concrete caused by the use of the girders. The sixth floor plan illustrated herewith shows one of the many cases of this kind encountered. This type of offset was also a contributing factor in the selection of the down-feed, low-pressure steam distributing system, since the down-feed method eliminated the problems of dripping long steam riser offsets, which would have been the case with an up-feed system.

One of the interesting ventilating features in the building is the use of unit ventilators for the two swimming pools. While the use of unit ventilators was dictated primarily by the tightness of space conditions, it was found during the first winter's operation that this method of combined heating and ventilating for the swimming pools was very effective and efficient. Automatic temperature regulation was used so as to hold the temperature in each of these rooms at about 80 to 85° Fahr. The rate of air change caused by the units kept the atmosphere in these poolrooms fresh and pleasant.

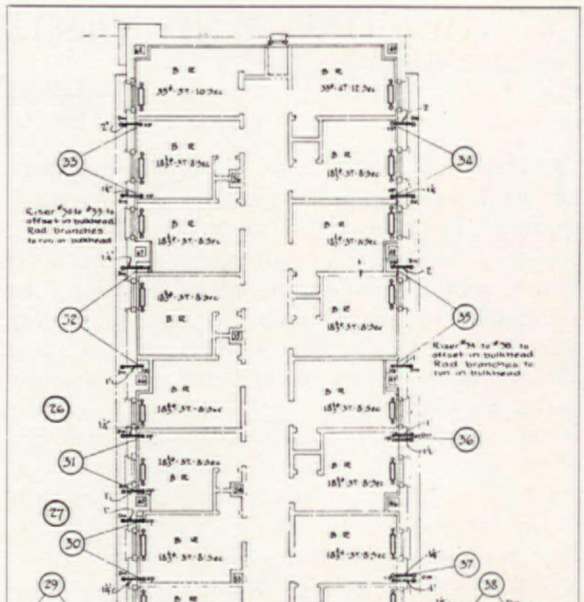
Another interesting feature in the ventilation is illustrated on the roof plan herewith showing the grouping of the exhaust fans in the attic spaces at the top of the building. The north fan room especially lent itself to an arrangement of fans, motors, and ducts whereby easy access to all bearings for oiling purposes was obtainable. This fan room being located over bedrooms, it



Portion of Roof Plan Showing Grouping of Exhaust Fans

was especially important to prevent the sound of operating fans and motors from being heard in the bedrooms below. The small detail of the fan base indicates the method which was successfully used to prevent these fan noises from traveling into the building structure. Essentially, the fan foundations consisted of a sheet lead pan in which the timber frame and natural cork for the fan bases were set, thus avoiding any direct contact between the fans and the structure.

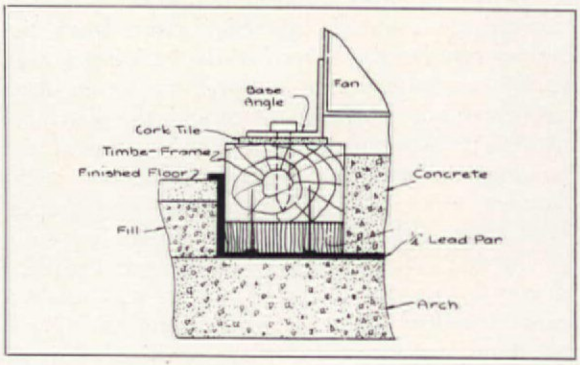
The customary division of the kitchen exhaust ventilation was used wherein a separate fan for



Portion of 6th Floor Plan Showing Branches in Bulkheads on Roof

the range hood exhaust was installed independently of the general kitchen exhaust. In addition to the exhaust, the kitchen was given mechanical air supply.

The cafeteria alongside the kitchen received an excellent architectural treatment, requiring as high a ceiling as possible. For the proper ventilation of this area, therefore, it was determined to use unit ventilators for the air supply and to confine the entire exhaust ductwork over the serving counter. Thus, while the rest of the basement ceiling is quite thoroughly filled up with ducts, pipes, and electrical conduits, the cafeteria, in spite of its location in the basement of the building, possesses excellent headroom.



Detail of Fan Bases to Eliminate Noise

THE Y. M. C. A. SWIMMING POOL EQUIPMENT

BY
A. E. HANSEN
CONSULTING ENGINEER

AMONG the chief attractions of the Y.M.C.A. are the two swimming pools, the large pool for men with 85,000 gallons' capacity, and the small pool for boys with a capacity of 54,000 gallons. The large pool is 25 feet wide by 75 feet long with an 8-foot maximum and a 3-foot minimum water depth; the boys' pool is 20 feet wide by 60 feet long with the same maximum and minimum water depths. Both pools are of steel, lined with concrete, mortar and tile.

POOL EQUIPMENT

The mechanical equipment of the large pool consists of a single-stage, double-suction, centrifugal pump, operating against a net head of 53 feet, driven by a 1720-r.p.m. motor; two pressure filters, built of open-hearth steel, fitted with single-control five-way operating valves with lever and brass dial and with feeding pots for sulphate of aluminum and soda ash. The maximum filter rate is four gallons per square foot; the filter bed consists of three grades of quartz, properly graded and suitable for pressure filter service, the filter sand containing 98 per cent silica A.S.M.E. standard. Filters used in connection with New York water require the use of soda ash to raise the alkalinity of the water in order to make the aluminum sulphate effective; otherwise, the alum will go through the filter without reaction. A pressure gauge is provided on the inlet and outlet ends of each filter unit. When the pressure drop through the filters rises to 15 pounds, the operator knows that the time has arrived for filter washing; the normal pressure drop through the filters when clean is not over 5 pounds.

The large pool is also equipped with a heater of sufficient capacity to maintain the temperature of the pool at 72° Fahr. A liquid chlorinating machine of the solution feed type sterilizes the water. The chlorine solution is purchased from the manufacturers in demijohns, which are kept on hand; a full demijohn is merely placed in position when the demijohn in use is nearly exhausted. The chlorine solution is fed into the pipe supplying the pool inlets after the entire water filtration and heating processes are completed. A lint and hair catcher is inserted on the suction side of the recirculating pump. The large pool has three inlets at the shallow end and six recirculating outlets at its deepest point. These recirculating outlets are also used for draining purposes. Their multiplicity is due to the requirement of the New York Plumbing Code which limits the size of each outlet.

RECIRCULATING EQUIPMENT

With the recirculating equipment installed, the entire contents of the pool are turned over in about 9½ hours. Provision is made to replenish the water lost by evaporation and splashing through the addition of fresh water which may be fed either directly without filtration and heating or by passing it through the filters and heater. The make-up water is, however, sterilized by the chlorinator.

This is the process of recirculation: The recirculating pump takes its water from the six

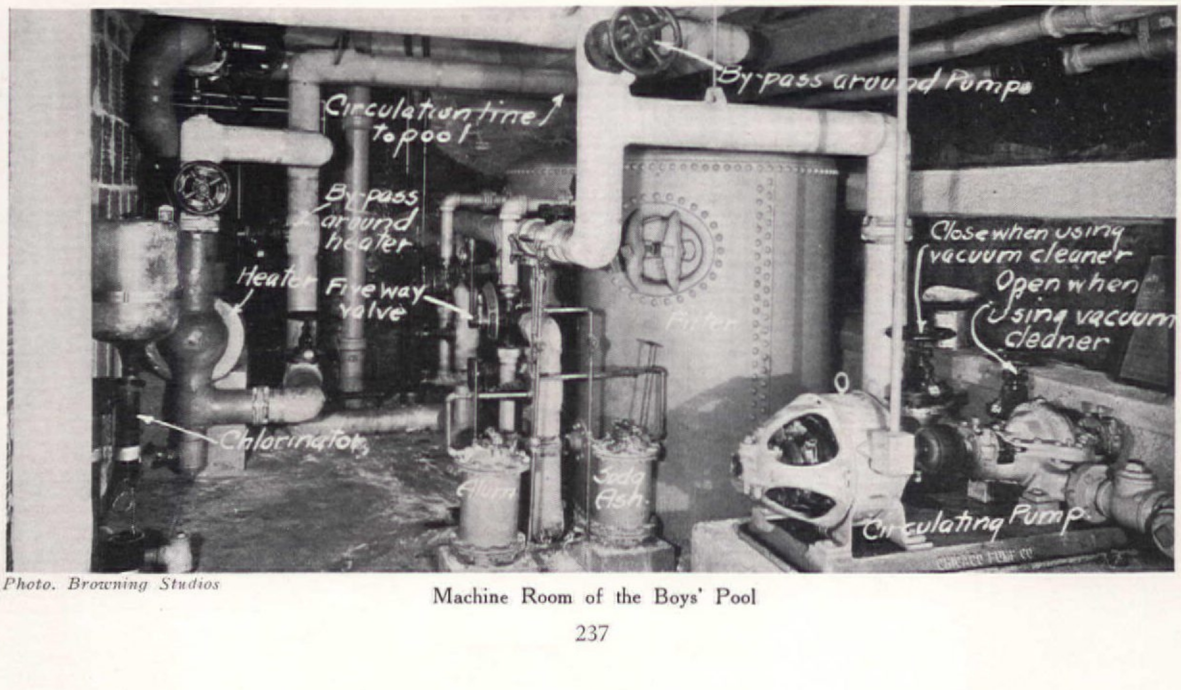
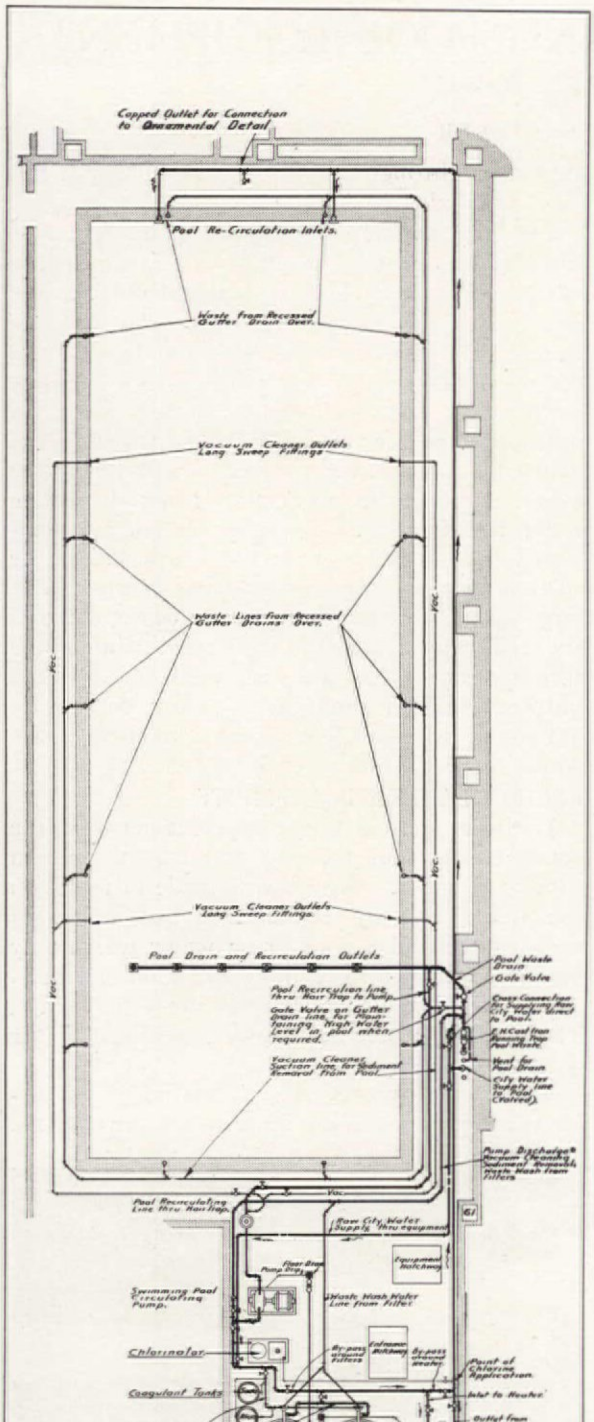


Photo. Browning Studios

Machine Room of the Boys' Pool



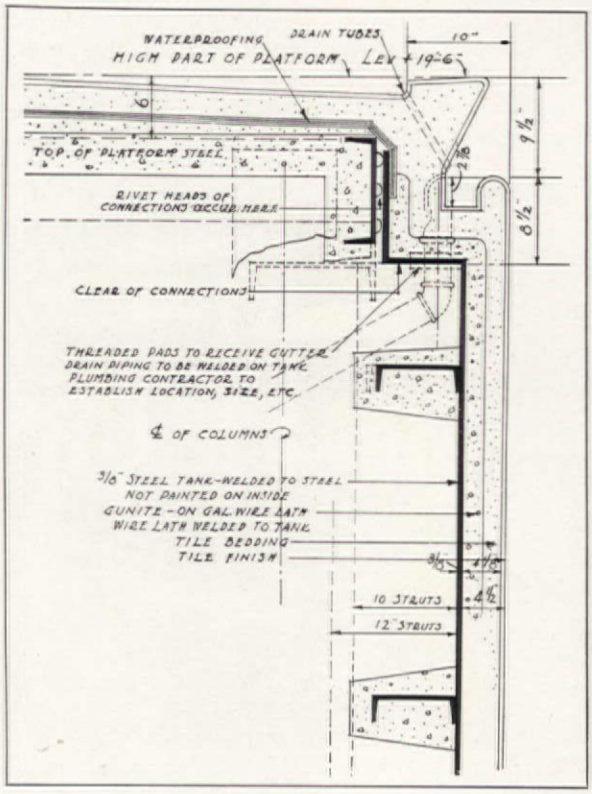
Plan Showing Equipment and Connections of the Large Pool

recirculating outlets at the deepest point of the pool through the lint and hair catcher. It discharges to the filters, taking on its way, first, the required amount of soda ash and then the required amount of alum, depositing the alum floc on top of the filter bed. The water then passes through the two filter units to the heater. From the heater it goes to the pool feed line where it is sterilized by the addition of the liquid chlorine, and is then discharged through the three inlets at the shallow end of the pool.

POOL CLEANING

For cleaning purposes, the pool is provided with four suction outlets located two in each side of the pool below the water line. These outlets are capped when the pool is not being cleaned. These suction outlets are piped along the sides of the pool and connected at the deep end of the pool, entering the pump suction on the pool side of the lint and hair catcher. When the pool is being cleaned the recirculating pump has a valved by-pass to discharge the used pool water through the pool drain to the sewer. The vacuum cleaning equipment, which is attached to the four cleaning outlets, was furnished by the owners and was not included in the plumbing contract. The pool is provided with a scum gutter having 14 outlets located at various intermediate points along the gutter; they drain to the pool drain. To refill the pool when empty with fresh water takes about 5½ hours.

The equipment for the small pool with the



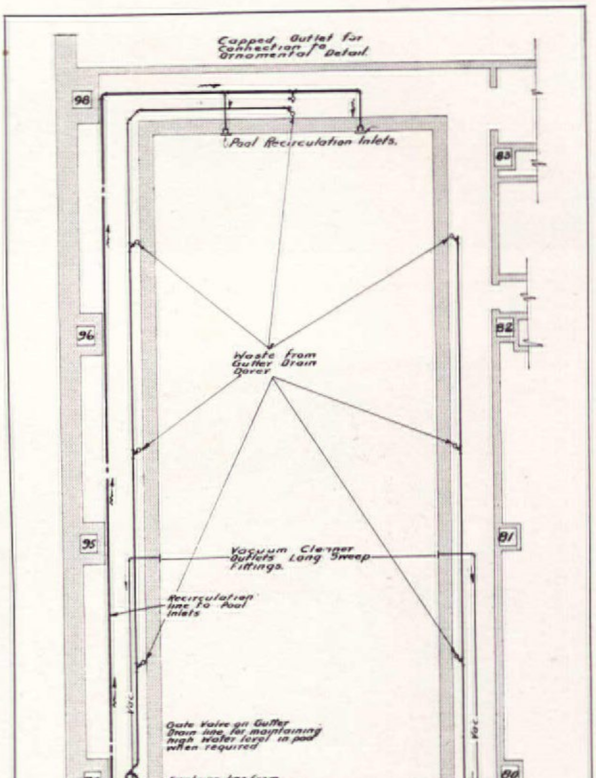
Section of the Large Pool Showing Details of Construction operation of the recirculating apparatus is similar to that of the large pool except that the small pool has five recirculating outlets instead of six, only two vacuum cleaning outlets instead of four, and has only ten instead of 14 scum gutter outlets. The plans and specifications provided for two recirculating pumps for each pool; one of each of these was omitted for economy.

SHOWER ROOMS

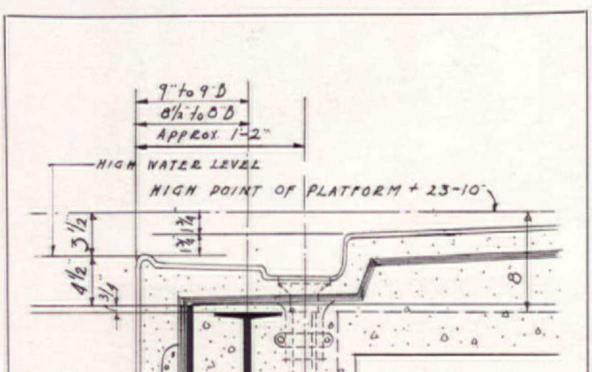
Separate shower rooms are provided in connection with both pools. There are four men's shower rooms containing two small rooms in which are 11 shower heads each and two large rooms in which are 16 shower heads each, making a total of 54. The illustration shows the large shower room for men. The boys have a similar shower room with 16 shower heads. The shower rooms are so located that neither men nor boys can enter the pools without passing through their respective shower rooms. It is compulsory that both men and boys take showers before entering their pools; in the case of the boys, this rule is enforced by an attendant. As will be noted, the shower heads project from the wall at about a 45° angle; each battery of showers is controlled by a thermostatic anti-scalding valve, set at 110° Fahr. Each shower head has its own hot and cold control valves so that the shower may be regulated, but the bather cannot scald himself, due to the thermostatic mixing valve control. It is interesting to note that the hot water supply for all showers in the dormitory portion on the upper floors of the building is controlled by similar thermostatic anti-scalding valves, also set at 110°.

UNIQUE FEATURES

The Y. M. C. A. boasts of its own efficient barber shop. One of the unique features of the plumbing installation in the Y.M.C.A. building is that it contains plumbing fixtures for so many various purposes, such as wall-hung water closets and lavatories; specially designed urinals; drinking fountains; hospital, dentist and chiropodist fixtures; special cafeteria and kitchen equipment; chemical laboratory with its acid-proof waste



Plan Showing Equipment and Connections of the Smaller Pool



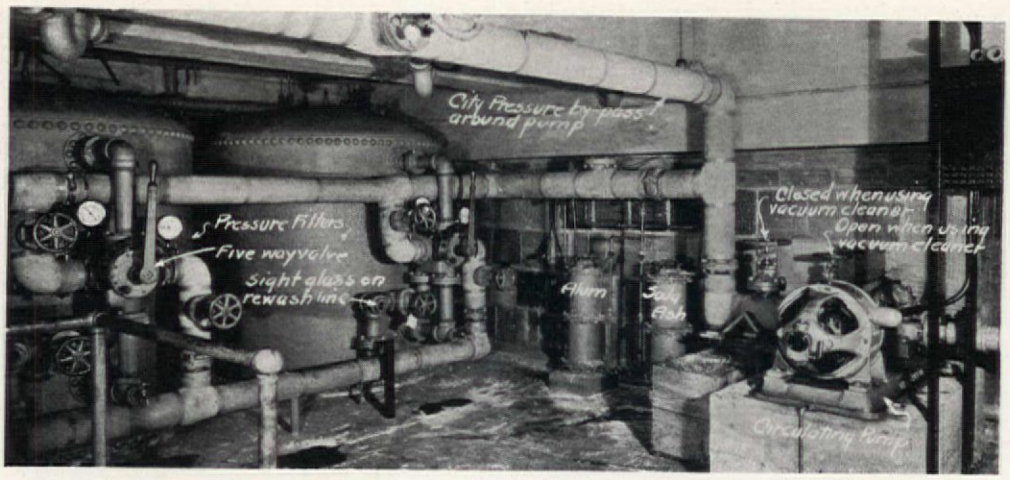
Section of the Smaller Pool Showing Flat-type Gutter

Men's Shower Room Showing Drain Gutter at Wall; Valves at Right of Shower Heads

lines that empty into neutralizing lime boxes before entering the sewer; special cuspidors which are flushed by the waste of adjacent drinking fountains in each gymnasium and in the hand-ball courts; a liquid soap dispensing system for each battery of lavatories; special mop sinks that can accommodate mop trucks, used for washing the floors throughout the building; and an ice water system piped to the various drinking fountains; also, an adequate fire protection system.

MECHANICAL EQUIPMENT

The mechanical equipment for the plumbing in the building, in addition to that described for the swimming pools, consists of two house pumps with their suction tank, three hot water heaters, two hot water circulating pumps, and a central vacuum cleaning machine as illustrated herewith, except that the hot water circulating pumps are located on the right side and not within the camera field. In addition, there is a two-compartment, combination house and fire tank located in the tower, and a refrigerating plant, located in the tower below the house tank.



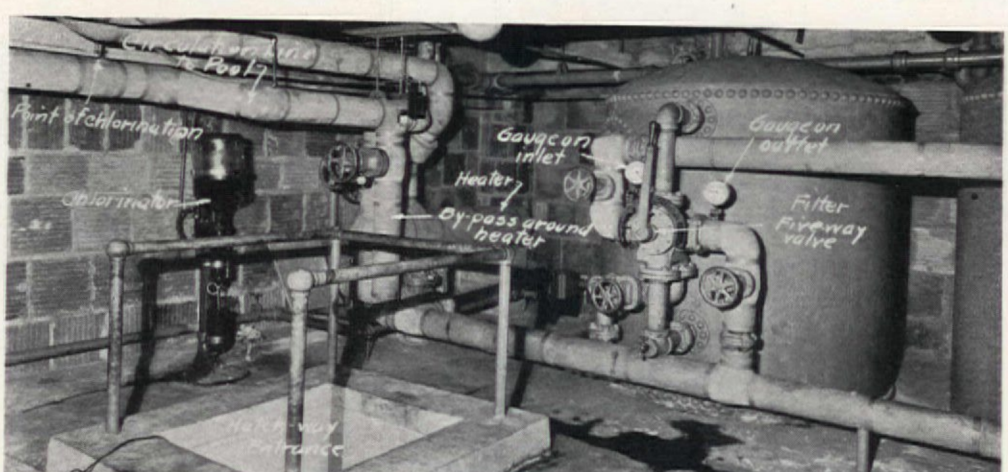


Photo. Browning Studios

Two Views of the Machine Room of the Large Pool

KNICKERBOCKER

Setting First Basement Columns, April 7, 1930

THE EMPIRE STATE BUILDING

III. THE STRUCTURAL FRAME

BY
J. L. EDWARDS*

THE outstanding structural feature of the Empire State Building is its height, which gives it first place among the world's tall structures. The highest point of the building proper, exclusive of the mooring mast, is 1,092 feet above Fifth Avenue. A comparison of the height and outline of the Empire State and other noted tall buildings is given in Fig. 1, showing, to the same scale, the Metropolitan Life, Woolworth, Chrysler, and Empire State towers. Figures, such as 58,000 tons representing the total weight of structural steel in the building, and 303,000 tons representing the total weight of the completed, occupied building, are impressive, but perhaps other ways of expressing these quantities may give a clearer comparative idea of its size.

If it had been necessary to move all of the steel from the shops to the site, at one time, it would have required a train of heavily loaded cars 11 miles long, and to transport all of the materials used in the building, the train would have been 57 miles long. The structural steel could have been rolled into railroad rails and used to lay a double-track railroad from New York to Washington. Many people have expressed the fear that such tremendous loads of building materials, concentrated in a small area, create a dangerous condition which might result in widespread settlement or shifting of the underlying strata. The absurdity of this is best appreciated by comparing the total weight of rock originally on the site with the weight of the building. If the Empire State site had been originally solid rock, level with the present streets, then the weight of rock removed in excavating for the previous buildings and for the basements of the present structure would be equal to three-

* Mr. Edwards was Engineer in Charge of Design for this building for H. G. Balcom, Consulting Engineer, 10 East 47th Street, New York.

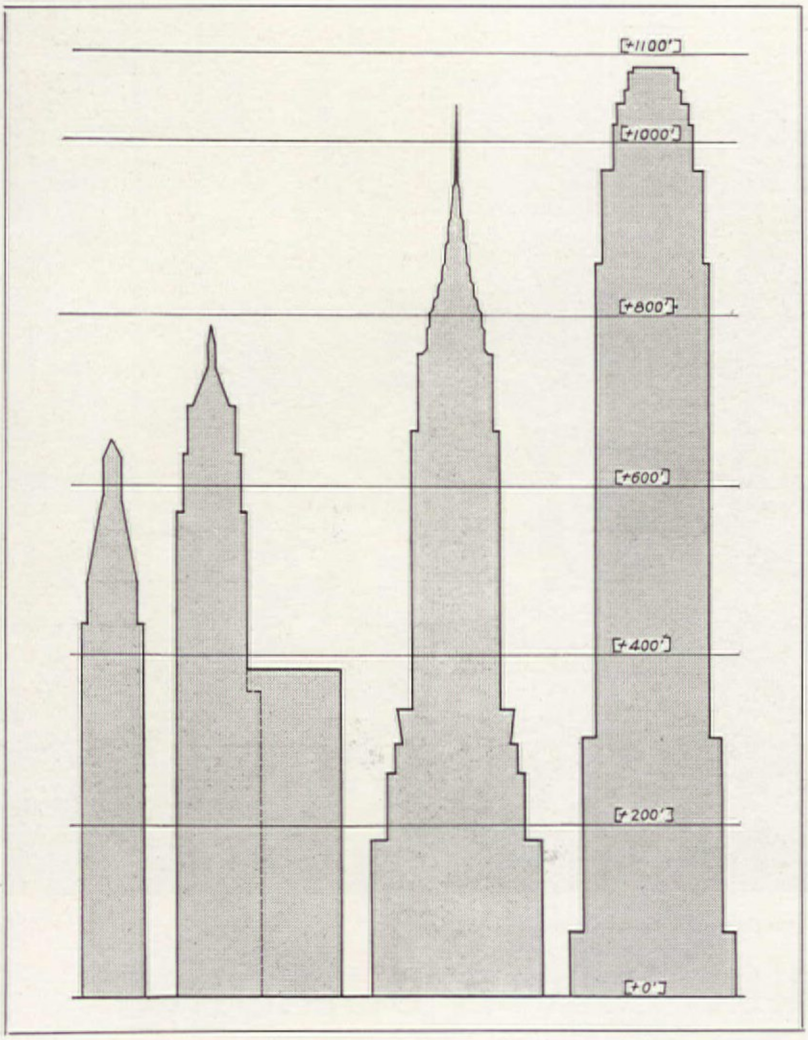


Figure 1. The Comparative Heights and Outlines of the Metropolitan, Woolworth, Chrysler and Empire State Buildings (Left to Right)

quarters of the total weight of the building. A hill of rock 45 feet high over the entire site occupied would be equivalent in weight to the entire building.

The floor framing presents few unusual features. The floor arches are the ordinary 4-inch cinder concrete slabs used so extensively in New York on spans up to 8 feet, and consequently the floor beams are spaced to accommodate this type of construction. Provision was made in the framing to allow for a maximum of four temporary passenger elevators and eight hod hoists to be used during construction. The former hotel building had vaults under the sidewalks which could be utilized for storage and subcontractors' supply rooms during construction, thus releasing space in the interior of the building. To make the space available, the sidewalk was temporarily supported on timber shoring when the old building was demolished. The ground floor framing was designed with double beams extending beyond the columns, which were located 4 feet

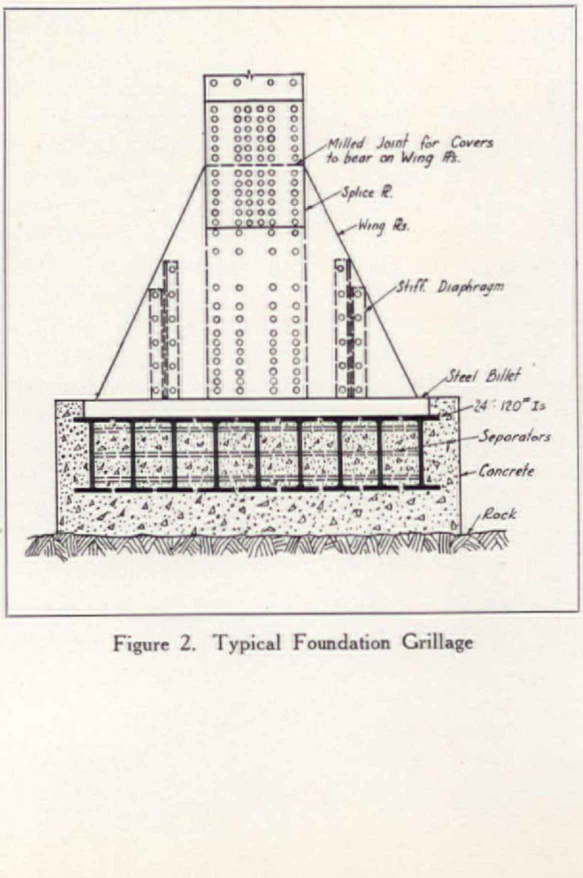
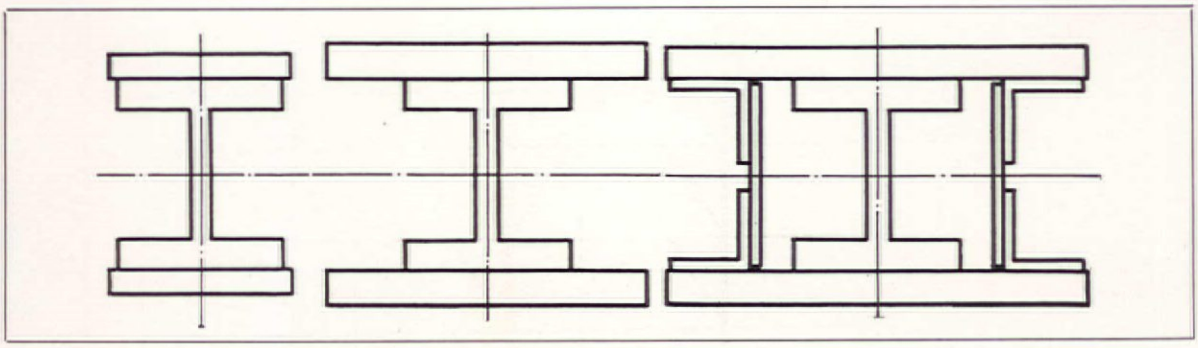


Figure 2. Typical Foundation Grillage



Type 1 Type 2 Type 3
Figure 3. Types of Built-up Column Sections

back of the building line. This arrangement allowed the construction of the building, including building of the first story walls, to proceed before the former sidewalk framing was removed and replaced with permanent steel.

The building columns are all supported by concrete piers extending down into solid bed rock. The column loads are distributed over the concrete piers by means of heavy steel billets alone for loads up to 2,600,000 pounds, and by single-tier, beam grillages with steel billets on top for heavier loads. Where the column loads exceeded 4,500,000 pounds the cover plates were cut at a point 4 feet or more above the bottom of the column, and wing plates of the same thickness as the cover plates were spliced in with milled bearing surfaces in order to spread the load over the grillage beams. A typical column base for one of the tower columns is shown in Fig. 2.

The steel columns used are of three general types, depending upon the loads carried. These are shown in Fig. 3. Type 1 consists of a rolled steel column section alone or with cover plates up to 24 inches wide and 3 11/16 inches thick used for loads up to 4,530,000 pounds. Type 2 consists of the heaviest rolled column with two 32-inch wide cover plates which have their projecting edges supported by diaphragms at intervals of about 3 feet. This type carries loads up to 5,700,000 pounds. Type 3 columns are box columns with a core section of the heaviest rolled column, two plate webs, four angles, and cover plates 32 inches, 41 inches or 42 inches wide. The heaviest column of this type has 693 square inches of steel in cross section; weighs, without adding weight of connections, 2,360 pounds per foot; and supports a load of 10,340,000 pounds. The lowest section of this column is 26 feet, 8 inches long and weighs 44 tons. As far as the writer knows, this is the heaviest column for its length ever used in a building. On account of the large loads and the thickness of material involved, the rivets connecting the various parts of built-up columns are 1⅛ inches or more in diameter.

The great height of the building naturally created a difficult problem in wind bracing. This was simplified considerably by the almost ideal arrangement of columns arrived at by the architects in the development of their plans. Practically all of the main column lines are continuous, and none of the tower columns are offset. The number of columns carried by girders is surprisingly small for a building of its size in this day of setback building construction. The building was designed to resist a wind pressure of 20 pounds per square foot on the total area above the sixth floor, and in addition a pull of 50 tons which might be produced by anchoring a dirigible at the top of a mooring mast to be placed on the roof.

The bracing used was of two types. First, in the interior of the building adjacent to elevator

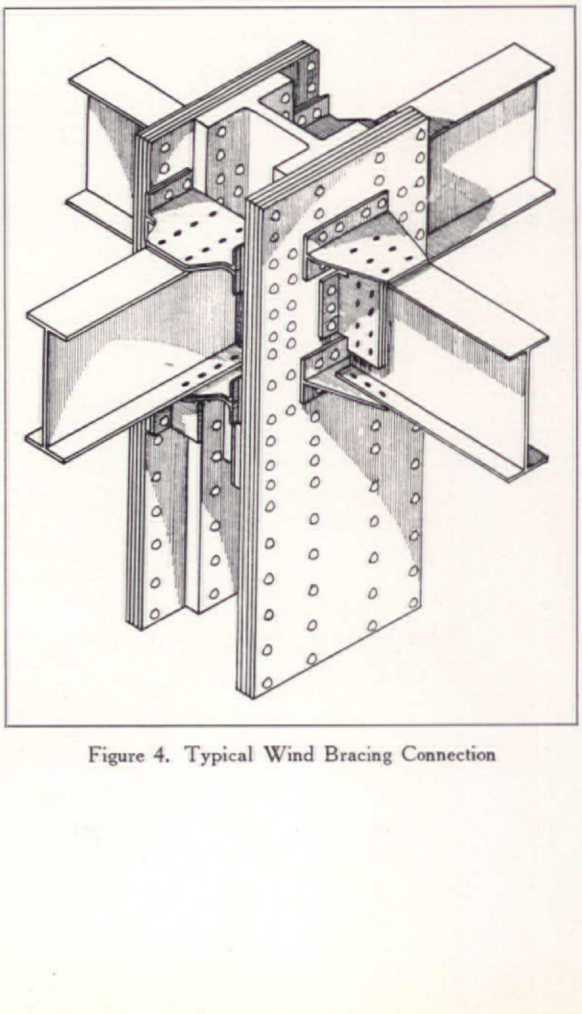


Figure 4. Typical Wind Bracing Connection

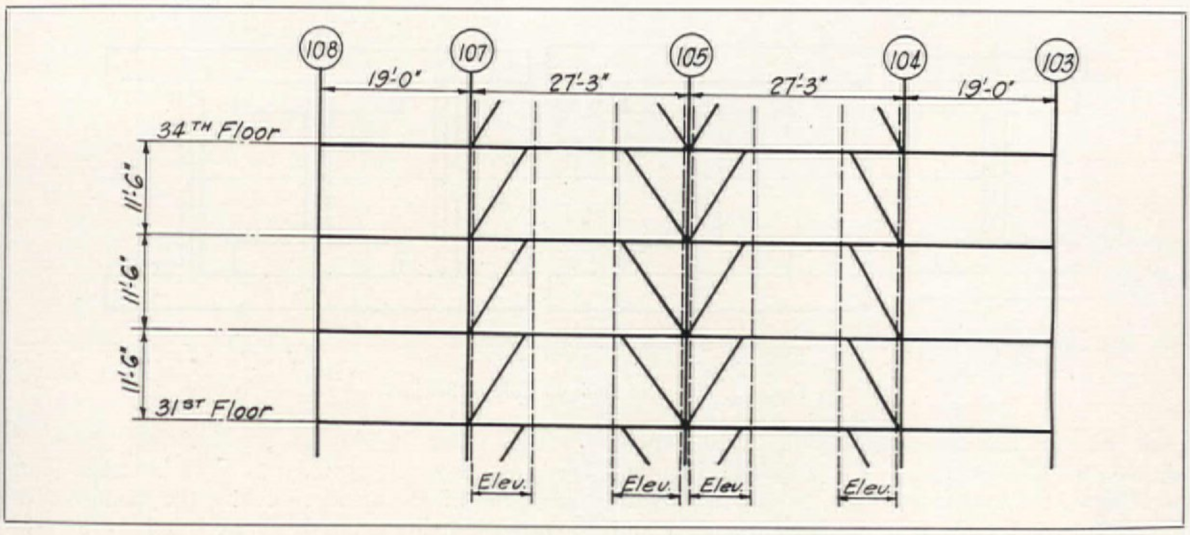


Figure 5. Typical Knee Bracing, Looking East

shafts, knee braces were used extending from the top of one beam, at the column, to the bottom of the beam above at a point as far out as possible without having connections encroach on the ceilings of elevator halls. Since this bracing acts as a partial support for the girders, these members were designed taking this into account, and the sizes are in some cases smaller than would have been required without knee braces. Where knee braces were not permitted, and for constructions carrying smaller wind moments, the stiffening was obtained by using beam stubs or angles riveted to the top and bottom flanges of the beams as shown in Fig. 4. A diagram showing the bracing on one of the north and south column lines in the tower portion is shown in Fig. 5. This shows how the knee braces were used in the center of the building. A typical floor plan for a lower floor is shown on which the location of knee-braced panels are indicated (Fig. 6). In distributing the wind shears among the columns, the direct wind loads were assumed to be pro-

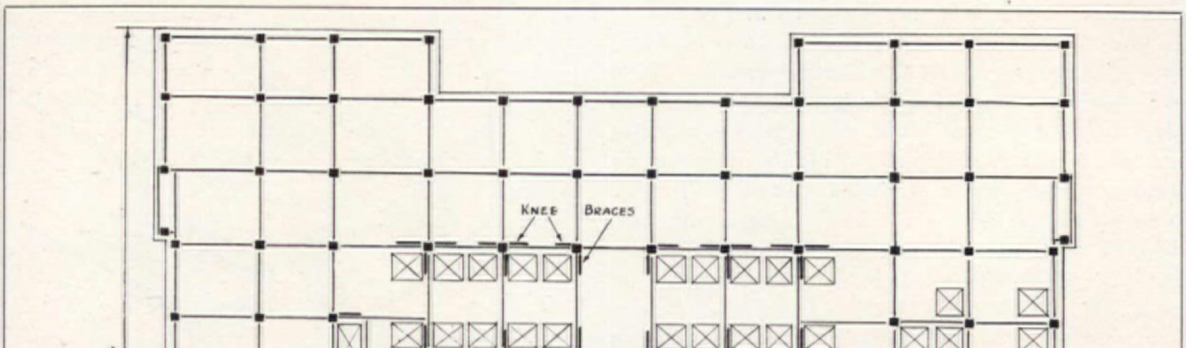


Figure 6. Plan Showing Location of Wind Bracing

KNICKERBOCKER

Nearly 30,000 Tons of Steel Set by June 9, 1930

portional to the capacity of the columns in resisting overturning moment. The direct stresses in the columns vary in a straight line from zero at the center to a maximum at exterior columns, and the total loads depend both on area of section and distance from the center. After the shears were determined by this method and the moments calculated, the various members were designed with such relative stiffness as to follow approximately the same horizontal movement at each column under wind loads. Knee braces were used at the back of the elevator shafts in the east and west direction up to the 71st floor and at the sides of the shafts, in the opposite direction, up to the 68th floor.

The total wind pressure on the north or south faces of the building is figured to be 4,340,000 pounds, of which 318,000 pounds, or a little over 7 per cent of the total, represents the wind pressure on a mooring mast and the pull of a dirigible anchored at its top. For the lower columns the direct wind stress due to the mooring mast loads is about 23 per cent of the total due to their relatively greater share in producing overturning moments. An attempt will be made to measure accurately the wind stresses in some of the columns and girders during high winds by reading, with sensitive instruments, the shortening or elongation of the steel. On account of the symmetrical column plan and the relative simplicity of design, the results obtained from such tests should be highly valuable in determining how closely actual stresses agree with those arrived at by theoretical calculations.

On account of the size of the project, which required an enormous amount of work to be done in a short period, it was of prime importance to schedule all work carefully. Erection of steel was scheduled to begin on April 1, and the roof framing is planned to be completely erected by September 1. The first small scale architectural plans for use in making the structural design were completed about the middle of November. Two months later, in the middle of January, the first steel plans, showing grillages and lowest tier of columns, were turned over to the steel contractors, and information was given to the men working on the site to enable them to begin work on the necessary concrete column foundations and walls. Completed structural design drawings for steel were furnished to the contractors at frequent intervals, several floors at a time, so that they could proceed without delay in their work of preparing detail drawings and fabricating steel. The structural design was completed to the roof over the 85th floor by the middle of June.

Except where built-up sections were necessary, Carnegie Broad Flanged Sections were used. All steel was furnished by the Carnegie Steel Company and was largely rolled at their Homestead plant in Pittsburgh. Though the schedule allowed about five months for complete fabrication, the erection schedule necessitated the fabrication of about 15,000 tons for each of the two first months. In order to avoid any possibility of delay, the fabrication was divided between the Ambridge, Penn., plant of the American Bridge Company, and the Rankin, Penn., plant of the McClintic-Marshall Company. If the American Bridge Company had done all the fabrication, it would have required practically the entire facilities of its Ambridge plant, which is its largest mill, to keep pace with the schedule. The fabrication was divided between the two fabricators in alternate groups of six or eight floors.

The steel work is being erected by Post & McCord of New York. In the beginning when the building covered the entire site, nine derricks were used, five of a 30-ton rated capacity and four more of 20-ton capacity. To handle several of the larger pieces, two derricks were necessary. Photograph No. 133, taken on April 7, shows the first columns in the basement being set. Photograph No. 205 shows the condition of the work on June 9, about two months later. In this time, nearly 30,000 tons of steel had been set, or about 50 per cent more than all the steel required for the 40 Wall Street Building, or for the Chrysler Building. Due to the large size and simplicity of construction, this building set a per-ton speed of erection which is greater than any before attained on building work and has set a record which will probably stand for a long time.

The structural steel painting followed the usual standard for this type of work, consisting of an iron oxide and linseed oil paint for the shop coat, which protected the steel during transportation and erection, and an asphaltum paint for the field coat which is alkali-resisting and will not break down when brought in contact with cement. The floor construction steel was fireproofed throughout with cinder concrete, as is usual when cinder concrete floor arches are used. The exterior columns above the street level were fireproofed with 4 inches of brick work. The basement columns and the lower story interior columns, where the fire hazard is great, especially during construction, were fireproofed with cinder concrete. All other columns are fireproofed with 2-inch terra cotta blocks.

TRAVERTINE AND ITS IMITATION

BY

CLIFFORD W. SPENCER

OF PEABODY, WILSON & BROWN, ARCHITECTS

SOME 20 years ago considerable interest and curiosity were expressed by many of those interested in architecture as to the nature of a new kind of building stone that was being used in the interior of the new Pennsylvania Station in New York. Although this material had already been used in the beautiful Della Robbia Room of the Vanderbilt Hotel, and perhaps in one or two other small installations, its use in the Pennsylvania Station was the first case to arouse widespread interest and speculation. The stone was of a warm buff color with laminated markings of darker tone, and it showed in its surface just enough imperfection in the form of bubble holes, somewhat similar to those in Swiss cheese, to lend interest and variety to wall surfaces.

At first few of those who noticed the material realized that it was a variety of calcareous tufa known as travertine, of which so much is to be found in and about the Roman Forum. In fact, it came from the same district that furnished the travertine of which the exterior of the great *Amphitheatrum Flavium* or Colosseum and many other Roman edifices and early churches, including St. Peter's, were so largely constructed. Having been thus formally introduced into this country, its popularity increased so rapidly that at the present time many large buildings and not a few smaller structures make use of it to a greater or less extent. Its use as ashlar and ornamental work in banking rooms, office building lobbies, apartment house entrances, and various other places is well known, and its non-slipping and long wearing qualities as flooring material have had a thorough test under the countless feet that pass over it daily in the Grand Central Terminal and other public buildings.

NATURE OF REAL TRAVERTINE. In spite of the great amount of travertine used, there is surprisingly little general knowledge as to its nature. If asked what travertine is, a great many, even among architects, will say that it is a volcanic rock or a sort of lava. This impression is probably due to the fact that the bulk of commercial travertine comes from the Tivoli district of Italy, which is in close proximity to extinct volcanoes, and that most other great deposits occur in volcanic regions. As a matter of fact, travertine is a deposit from lime springs or other lime-bearing waters. In the case of the Tivoli deposit, it was from a great lake that existed in that region at the close of the period of volcanic activity. According to Lyell, Bischof and other eminent geologists *Lapis Tiburtinus* was formed by precipitation of calcareous matter from water charged with carbonic acid gas. The gas accounts for the cellular and porous nature of the stone. More richly figured and compact varieties of this precipitation are known as onyx marble and alabaster. Hot springs are especially productive of this form of calcareous tufa. Deposits of travertine are found in all parts of the world, including the United States. Domestic travertine is of good quality and compares favorably with many types of imported stone. Minnesota and Colorado produce a good quality of travertine which has been used in large quantities and there are many undeveloped deposits in other sections of the country, notably one in Georgia, which is about to be made available for use. In general, the domestic product is slightly grayer in color than most of that imported.

As in the case of marble, there is a tendency toward the use of the more exotic and richly marked varieties of travertine, and we find an increasing number of hotel lobbies and other public places decorated with such special varieties as Siena travertine, which is warmer in color and more strongly marked with dark veinings and takes a high polish. Then there is Travertine Fleuri of about the same color value as Roman travertine but having strong yellowish markings. Travertine D'Or is of a warm brown color, and a still darker variety is known as Travertine Antique. The use of black travertine in this country is quite rare but its decorative possibilities are important. These are only a few of the variations in color and markings which are available to the architect in search of new and pleasing effects. Most of these varieties are used with a polished surface, but they are also very effective with a honed finish. The Roman type, which constitutes the bulk of travertine used in the past, is seldom polished, being more attractive in a rough sanded finish. The quarrying processes for travertine are about the same as those employed in removing marble from the earth, travertine having the advantage of being quite soft when first removed and becoming harder on exposure to the air. This quality is dependent largely on the age of the deposit. In the case of more recent deposits, it can almost be cut with a

Artificial travertine ashlar, closely resembling the natural stone

shovel, while in other cases the deposit has been formed so long that it has attained such a hardness as to make quarrying operations quite difficult. Italian travertine is usually imported in block form to avoid loss by breakage and to secure the advantage of a lower duty.

ARTIFICIAL TRAVERTINE. As is natural in the case of such a popular building material, which must be brought from a great distance and is therefore quite expensive, the reproduction of travertine by the use of plastic substances has become very extensive, and the usual practice of cheapening these reproductions to meet competition has filled our cities with installations which, to say the least, are not pleasing. These abuses have given rise to the mistaken impression in the minds of a few architects that all imitation of travertine is to be avoided. In the early days of use of imitation travertine, some installations were made which have since turned out to be rather unsatisfactory. It must be remembered, however, that at that time very little was known about the making of imitation stones of any kind, and that work done then was of a highly experimental character. Artificial travertine was used in connection with the real stone in the Pennsylvania Station, and since that time new manufacturing methods and materials have been introduced from time to time so that now it is possible to produce an imitation stone that is said to have all the advantages of real travertine at a considerable saving in cost.

The various types of artificial travertine can be roughly grouped into three major classes, not including the many plastic paint preparations by the use of which a travertine effect is often obtained. They are, first, the more carefully prepared pre-cast imitations which match the genuine stone in all respects; second, other pre-cast products which only approximate the appearance and physical properties of real stone; and, third, the work which is applied directly to the wall in the

Newark. Guilbert & Betelle,
Interior North Ward Bank,
Architects

Carved and moulded decorations are easily executed in artificial travertine

same manner as ordinary plaster and then given a travertine effect by some one of the many processes which will be described later.

MATERIALS used include gypsum plaster, Keene's cement, and in rare cases Portland cement. These are mixed in some instances, and many manufacturers have secret formulæ, some of which make use of one or more of the materials named. Some manufacturers produce a high grade artificial travertine, using a large proportion of marble dust and aggregate mixed with a secret-formula binder, which does not contain either Keene's cement, gypsum or Portland cement. There are also available on the market ready-mixed and colored travertine plasters, which any plasterer can buy and apply in his own way. The travertine color effect is attained by the use of mineral colors, usually having some form of iron oxide mixed with the cement or plaster. An advantage of the use of artificial travertine lies in the way in which the color variation can be controlled. If it is desired to have walls of uniform color and shade, it is easy to obtain it, or the various slabs may show any range of color variations to meet the architect's wishes. There have been some cases where the coloring has been forced or made unnatural to agree with some particular treatment, while the travertine texture is retained. This practice, however, is not to be commended as a general procedure. Cements employing a magnesium base have also been used, but it is generally conceded that work done with this material is subject to shrinking, expanding or warping due to the tendency of the magnesium to remain active, and to the large amount of moisture which is absorbed. It is possible that this material is used in some of the secret formulæ, and that by experimentation the unfavorable features have been corrected. The magnesium base cement has the advantage of being very hard, and if its faults could be corrected, it would be ideal material for such work.

Dime Savings Bank, Brooklyn. Halsey, McCormack & Helmer, Architects

The warm color and the texture of travertine make it especially desirable for interiors

PROCESS OF MANUFACTURE. There are numerous ways of imitating the texture and markings of travertine in the various materials. Perhaps the most satisfactory method is to cast the slabs in moulds taken from carefully selected samples of actual travertine. This method has the advantage of reproducing exactly the markings of travertine, but care should be taken that a sufficient number of matrices are used so that "repeats" are not noticeable in the finished wall. In the case of moulded or carved work it is not profitable to carve the matrices from real travertine unless the same motif is to be repeated a large number of times. In other cases the markings have to be obtained by some mechanical method or by the use of some secret process known only to the manufacturers. This method of casting from travertine blocks gives artificial travertine an advantage over the real in that blocks to be used in this way will be all carefully selected examples, and the slabs made from them will be of a uniform high quality as regards markings and texture, whereas a wall of real travertine is likely to contain some blocks that are not up to standard in every way. Another method of producing the characteristic marks in pre-cast travertine is by putting a powdered chemical on the moulding table and pouring over it the wet cement. This causes a chemical action, and the powder effervesces, the bubbles forming holes quite similar to those in travertine, which are formed by a similar bubbling of gas. Still another method is by rolling up small "dough balls" of slightly moistened and crumbling cement or plaster and then pouring the wet mixture over it. When the slab has hardened, the dough balls which were not wet enough to cause them to set can be scraped out, and the holes they leave give a good approximation of the desired effect. The point of a trowel or a wire brush is also used to introduce markings in the surface of both pre-cast travertine and that applied to the wall in the form of plaster, with varying success, depending on the skill of the workman.

APPLICATION. Pre-cast travertine can be made in practically any thickness from ⅜ inch up. Slabs under ¾ inch may be set by plasterers and are buttered onto the brown coat plaster. Non-staining cement or plaster-of-Paris should always be used. This method is quite satisfactory, especially for smaller rooms, but the slabs applied in this manner should be limited in size, the largest dimension not exceeding 2 feet. When the slab is to be made of a thickness of ¾ inch or greater, it should be treated exactly as marble in the setting,—that is, it should be set by marble setters and anchored to the backing in every course with brass hook anchors and set with non-staining cement or plaster. In the New York metropolitan area and some other districts the setting of this material is defined in the labor union rulings, but in all cases it is best to carefully cover this matter in the specification in order to insure satisfaction. Whatever the thickness of pre-cast slabs, it is always more desirable to have them set by marble setters, as it is essentially a stone setter's problem, and ordinary plasterers are not equipped to handle it satisfactorily. Labor rules, however, in some districts prevent this being done in the case of thin slabs.

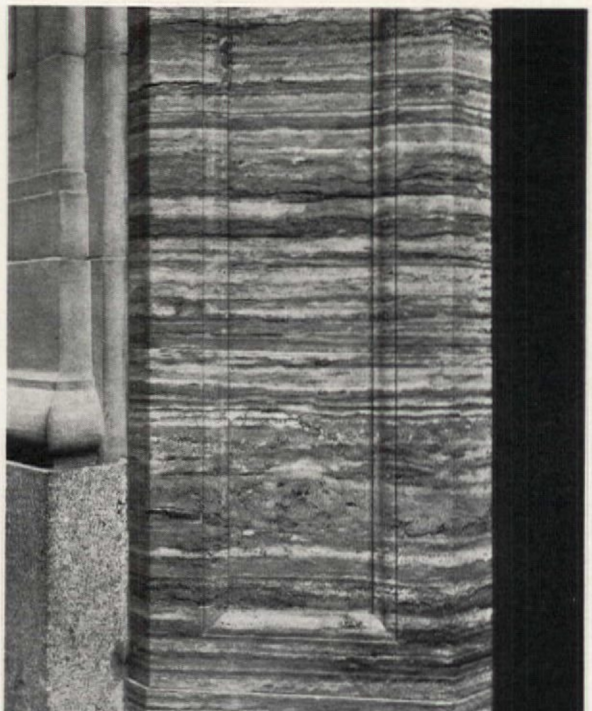
QUALITIES. The advantages of plaster work and Keene's cement are well known to all, and it will not be necessary to discuss here the quality of work done in these materials, since the same

Arch details, People's National Bank and Trust Co., White Plains, N. Y. H. P. Zoller, Architect

conditions would apply to artificial travertine made of these substances as would apply to ordinary plaster and Keene's cement work. In the case of travertine made by secret formula, the appearance of real travertine is imitated as nearly as possible. One of the principal advantages in the use of real travertine is its comparative light weight, a slab one inch thick and one foot square weighing about 11 pounds. This quality of lightness can be and is obtained in some of the better grades of artificial travertine. A high degree of sound absorption is another of the desirable qualities of travertine, and it is attained to an equal degree in some brands of artificial travertine. Resistance to stain and moisture absorption of good artificial travertine should be at least equal to that of the genuine. Most artificial travertine is not suitable to use in places where it will be subject to wear. If its use as flooring or stair treads is contemplated, the manufacturer should be required to furnish satisfactory proof that it will withstand hard usage to the same extent as will the real.

COST. As the paramount advantage of using artificial travertine is the saving in cost, a rough approximation of the relation of the prices of the several varieties of artificial travertine to that of the real is of special interest. If the material is carefully made to equal real travertine in all its important characteristics, its cost may be about 60 per cent of that of genuine stone. The range of pre-cast material of good quality will vary from 40 to 50 per cent, while the plaster work colored and treated to imitate travertine can be applied to the walls at a cost of only 10 or 15 per cent of the real stone. Of course many factors enter into the determination of cost, as for instance, the amount of carved or moulded work. On an important bank recently built in New York, a building containing a large amount of ornament, the bid for the real travertine was $69,000, and only $27,000 for high class artificial.

SPECIFICATIONS. Since artificial travertine is a material which if not properly made can result in producing very unsatisfactory conditions, a careful investigation should be made of any product that is to be used. The contractor or manufacturer should be required to guarantee it against warping, shrinking, expanding, changing color, or cracking and chipping for a period of at least a year after the work is completed. Care should be taken to specify exactly the kind of material and methods to be employed, since there is such a great variation in the quality of artificial travertine work that a general specification will be very likely to result in a low grade of work. In one specification which the writer has examined the travertine specification opened with this statement: "In general, all travertine work may be run directly on the walls or may be set up in the form of pre-cast blocks at the contractor's option." This provision would certainly allow the contractor sufficient leeway, as there is great difference in quality. Fortunately, the specification writer had included other provisions which precluded the use of low grade materials and processes. The artificial travertine contractor should always be required to furnish for approval adequate samples of the work he proposes to do and should be rigidly forced to maintain the standard set by the approved samples. Work done in place on the walls should be specified according to the best usages governing the usual plaster or Keene's cement work, with the addition of explicit direc-



Door enframement of Siena Travertine in contact with limestone and granite. 10 West 40th Street Building, New York. Ludlow & Peabody, Architects

tions as to the manner in which the surface is to be colored and the characteristic travertine markings to be produced.

Here are some provisions gleaned from various specifications, and they may be altered to fit special cases if necessary:

(1) "For walls of ½-inch material or less, the artificial travertine shall be applied with pure plaster-of-Paris (or other non-staining cement or plaster). The plaster shall be buttered over the entire back of the moistened travertine slab, which is then to be applied immediately to the backing, which is also to be moistened, and carefully lined up and plumbed. Where tight joints are required, the edges of each slab shall be buttered as it is set in place. All pointing to be be done with stainless cement.

(2) "For walls of heavier material:

(a) All artificial travertine work shall closely imitate the genuine travertine stone in texture, and the contractor shall submit samples for the architect's approval before estimating on the work.

(b) All slabs shall be set in the form of tiles with an average thickness of ¾ inch (this may be modified to suit conditions), set on a backing of non-staining cement and white sand.

(c) Return ends shall be cast on the blocks (alternating and breaking bond on each course) at all exterior angles. . . . The voussoirs and keystones of arches shall be cast in one piece the joints on soffits to carry through without cross joint. Return ends on vertical exterior angles shall not be of less than 8 inches, and in no case shall the true thickness of the slabs show on the return.

(d) There may be slight variations in the color of the individual blocks subject to the approval of the architect.

(e) The slabs shall be laid up with fine joints not to exceed ⅛ inch in thickness in setting mortar composed of non-staining white cement and white sand in the proportion of one part of cement to three parts of sand, or as may be required to work easily. The slabs are to be anchored to the backing in every course, using heavy brass wire hook anchors, all according to the best marble setting practice.

(f) The relation of the face of imitation travertine to the backing will be established on the working drawings, and in no case shall this be changed without the consent of the architect.

(g) All ornamental work shall be cast in the same material as used in the ashlar, and all shall be careful and accurate reproductions of approved models.

(h) All surfaces shall be plumb and true with all angles true right angles, and arrises clean and sharp. Horizontal joints shall line through level and vertical joints plumb.

(i) Samples not less than 3 x 3 feet, divided into ashlar, shall be submitted for the architect's approval, and the work shall not be gone ahead with except upon the basis of an approved sample, which shall be closely duplicated in color and texture.

(j) If blocks of real travertine are to be used as models, the manufacturer should be required to use not less than ten selected blocks (the number may be varied according to the size of the installation) as matrices from which to cast the artificial travertine slabs.

(3) "If artificial travertine is to be used for floors or stair treads, the voids in the surface and joints should be filled with a grout of white Portland cement. The surface may then be rubbed slightly with a dry rubbing machine. Floors should be laid on a 1-inch bed of one part Portland cement to three parts of sand over an even underfill. When the concrete sub-floor is fairly dry, the floor slabs are buttered on the underside with a thin coat of pure cement and immediately set and leveled. Stair treads are set in a similar way, except that the bed may be only ¼ inch.

A NEW PROCEDURE IN PUBLIC WORK

BY
CHARLES E. KRAHMER
OF GUILBERT & BETELLE, ARCHITECTS

AN architect commissioned to produce a building for a state, county or municipality is in effect a public servant. His duty consists in producing this building in accordance with the best legal, economic, business, constructive, engineering and artistic practices. His duty is to safeguard the interests of the public he represents. The question of public policy with its multitude of adverse interests makes the production of a building under these conditions extremely difficult. Desirable materials, methods of construction and administrative practices are very often sacrificed upon the altar of public policy. This is a condition which must be overcome, as the public interest is, or should be, always paramount. The purpose of this article is to indicate some ways in which success has been obtained in eliminating some of the handicaps imposed by these conditions.

All agents of the states, counties or municipalities are strictly governed by the laws or acts under which they operate. These laws or acts define the authority vested in the various public officials and outline the conditions which bind an architect in producing a building. The first principle in awarding a contract for public work is that the work must be awarded to the lowest responsible bidder. This requirement, which in effect ignores the relative ability, integrity and financial responsibility of the respective bidders, places a handicap upon the architect that is extremely difficult to overcome. As the award is made strictly on a price basis, there exists no reason for good will between the owner and the contractor, or between the architect and the contractor. With the element of good will non-existing, the architect's duties become extremely difficult. The normal "set-up" is: *A good client, a good architect, a good contractor, good subcontractors, and good materials equal a good building.* That is elementary. On public work we have, let us assume, *a good client, a good architect, a questionable contractor, a questionable subcontractor, and questionable materials.* That is the condition which an architect labors under in attempting to give the public a given result.

QUESTIONNAIRES. To overcome some of the undesirable features in public bidding, questionnaires have been developed. These are intended to define the responsibility of a bidder. The writer has found in his experience that these questionnaires have proved in most cases valueless, due to the fact that after they are used and the contractor rejected as irresponsible, the laws safeguarding public work in the states, counties and municipalities that the writer is familiar with allow the contractor the right of review in open court. He must there be proved irresponsible. Needless to say, this is an extremely difficult task and one which few wish to attempt. The state of New Jersey has a law which allows the state, under certain conditions, to reject a contractor if he is considered irresponsible without the right of review. This covers work executed for the state and its branches, but apparently does not apply to counties or municipalities.

SUBCONTRACTORS' LISTS WITH BIDS. In a desirable attempt to control the second questionable element, *the subcontractor,* there has been developed a practice of requiring with the bid of the general contractor the name of each subcontractor who will execute the work if this work is awarded. The theory behind this practice is to prevent the shopping of sub-bids after the award of the contract. This theory seems excellent, but in practice it has proved questionable. The weakness in submitting subcontractors with the bid is shown up in this example.

If the second low bidder had used the same subcontractors as the low bidder, he would have been the low bidder. Who is the low bidder in this case? The logical development of the principle of establishing subcontractors with the bid would be to obtain sub-bids on every portion of the work. This in effect would eliminate the general contractor, and, therefore, it appears to be unworkable under the present organization of the building industry. The writer believes the establishment of subcontractors with the bid is impractical. The establishment of all subcontractors before the contract is signed has proved to be a desirable procedure.

"OR EQUAL." Our third questionable item, that is, *materials,* brings up the question of our old friend "or equal." Public policy requires that free and open competition be had on all materials that enter into the construction of a building. There are three methods by which this can be handled.

First, the material can be specified in competition with two or three similar materials, allowing the contractor to submit to the architect at any time material which in his opinion is equal to that specified; and, if the architect approves this material, the contractor has the right to use it in place of the material called for.

The second method is to require the contractor to estimate upon exactly the material specified, giving him the right to submit with his proposal alternative prices on any other material which in his opinion is equal to that specified, with additions to, or deductions from, the contract price. This system causes considerable confusion before the signing of the contract. It can also be used as a means of switching the award of the contract from one to another of the contractors, and in some cases it opens up the question as to whether all bids were submitted on exactly the same basis, which is one of the main requirements in public work. It is the writer's belief that this method should not be used.

The third method of handling the situation, and one in line with legal opinion, is for the architect to specify the exact kind of material that he desires, allowing the contractor to request approval on any other kind of material within a given number of days of the receipt of the bids, so as to allow the architect sufficient time to investigate the material submitted and to bulletin all other contractors, notifying them that this material is also approved. This method conforms to the policy that all bids must be made on exactly the same basis. The practical effect of this, however, is that shopping is practically eliminated, as the contractor is not anxious to save the owner any money. All he is anxious to do is to obtain an advantage over his competitors. Inasmuch as his competitors will be bulletined and will be allowed to use the same material that he has asked to be approved, it has been found that very rarely will a contractor ask approval on a material other than that specified, unless he does so as a personal favor for some materialman or manufacturer.

The writer has found that there are many items in which open bidding is desirable as protecting the best interests of the public. On these items the "or equal" clause is used, which allows the contractor to do his legitimate shopping after the contract is awarded, the architect reserving the right to judge what *is* equal. There are some items on which it is important that the exact materials specified be used. For these materials, the method of specifying the article outright is used, requiring the contractor to request approval within a given number of days of the receipt of the bids.

PROCEDURE IN OBTAINING QUALITY. The following method of obtaining quality in public work has worked with considerable satisfaction over a number of years. To get back to our original statement: *"A good client, a good architect, a good contractor, good subcontractors, and good materials equal a good building."* As the contractor, our key man, in this "set-up" is an unknown quantity, and as he receives the award on a strictly price basis in a "free for all" against all competition, without respect to his ability, experience or character, the system was reversed; so that we now have the following "set-up:" *"A good client, a good architect, good materials, good subcontractors, and an unknown general contractor, equal a good building."* To make this "set-up" work, manufacturers outstanding in their line were approached. The "set-up" was explained to them, and, realizing that the ultimate aim was to obtain quality in public work, they coöperated to the fullest extent. In specifying materials, two or three materials of a given kind were specified so that the better class of manufacturers had legitimate competition. These manufacturers furnished written assurance from their responsible officers that under no circumstances would they sell materials other than those which were specified. This blocked shopping as far as materials were concerned. The contractors and subcontractors soon found out that they could not purchase materials other than those specified, as the manufacturers frankly told them that they had written agreements with the architect to that effect.

Now we come to the subcontractor. As the architect reserves the right, and has the right, to approve or disapprove a subcontractor as capable to produce a given work, he controls this element in this manner: Through the manufacturer who sells the subcontractor his materials, a credit rating and trade rating can be obtained on the particular subcontractor proposed. This allows the architect to establish the financial standing, the kind and class of work a given subcontractor has produced, where he buys his materials, and the number of men he has normally in his employ. When this information is requested from the manufacturer, the manufacturer obtains a "lead" and in effect investigates the subcontractor before he sells him, instead of selling him first and investigating him afterwards. Under this "set-up" the legitimate manufacturer gains, the legitimate subcontractor gains, the legitimate contractor gains, the owner gains because he is assured that he will obtain exactly what he paid for, and the architect gains because it simplifies his supervision and he is able to sell the owner a superior service, inasmuch as he is in a position to assure the owner that he will obtain exactly what he paid for. This procedure allows complete control of materials and subcontractors irrespective of the general contractor. The ultimate result of this policy has been that legitimate manufacturers are attracted, legitimate subcontractors are given a fair chance and are also attracted; the general contractor, realizing under the "set-up" that there is little opportunity for the illegitimate contractor to "crash the gate," he in turn is attracted.

Polished Aluminum Spandrel in Lobby of 450 Sutter Building, San Francisco. Miller & Pflueger, Architects

ALUMINUM IN ARCHITECTURE

BY
DOUGLAS B. HOBBS

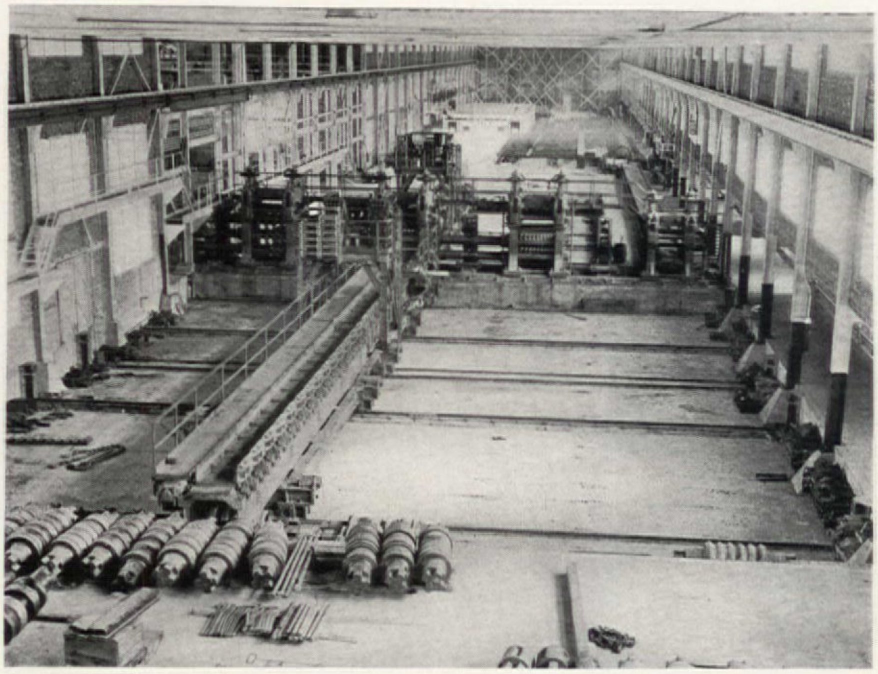
MODERN architecture is using new materials for old purposes in keeping with the thought and spirit of this generation. This is the age of simplicity, speed and lightness; the architectural trend is toward use of those materials which best express these present-day feelings. Over-ornamentation belongs to another generation. Architects are using simple, unassuming metal forms, not only in grilles, balustrades, spandrels, etc., but in mouldings and inlays and for other interior decorative effects in which simplicity is the keynote.

True, some aluminum was used in architecture in the nineties, a few short years after the present commercial process for its electrolytic reduction was developed, but principally because it was a new metal, a departure from the then-accepted standard. Its use, however, was short lived for then and during the next two decades use of brass and bronze,—the yellow metals,—held sway.

PRODUCTION PROCESSES. While Charles Martin Hall was still in school, with his mind set on discovering a process for producing aluminum cheaply, a small ornamental casting was placed on top of the 3,300-pound capstone of the Washington Monument. This was in 1884, and was probably the first architectural use of aluminum. The casting weighed only 100 ounces, yet at that time it was the largest ever produced. The metal was made by the reduction of anhydrous aluminum chloride with metallic sodium. Both of these materials were expensive, and as a result aluminum was too costly to be used on a commercial scale. However, early in 1886 Hall, an American, and Heroult, a Frenchman, both working independently, perfected similar processes for producing aluminum electrolytically. The electrolytic process eliminated the costly sodium treatment and permitted the use of aluminum oxide in place of the chloride. The ore from which aluminum oxide is obtained, is beauxite. It is found in this country in Arkansas, Georgia, Alabama and Tennessee. Some beauxite is imported for domestic use from the Guianas. Briefly the Hall-Heroult process consists of dissolving aluminum oxide in cryolite in a carbon-lined pot and passing an electric current through the mixture. With the advent of the electrolytic process for the production of aluminum, the price of the metal was reduced materially.

EARLY USES. The Venetian, Monadnock and Isabella Buildings, erected in Chicago in the early nineties, had aluminum elevator enclosures on the first floors and aluminum stair panels between the first and second floors. In 1901, a number of exterior beam casing castings were placed on the Frick Building in Pittsburgh. An examination of these early installations shows clearly the durability of the metal.

Aluminum may be obtained in plates, sheets and foil; in bar, rod and wire; in structural shapes and mouldings; in tubing, in die, permanent mould and sand castings; in screw-machine products; and in forgings. Because it can be produced in so many different forms, one problem the architects have reluctantly been forced to accept is practically eliminated. This is the use of dissimilar metals. Unless the installation is of the same material or of materials which are closely associated in the electromotive



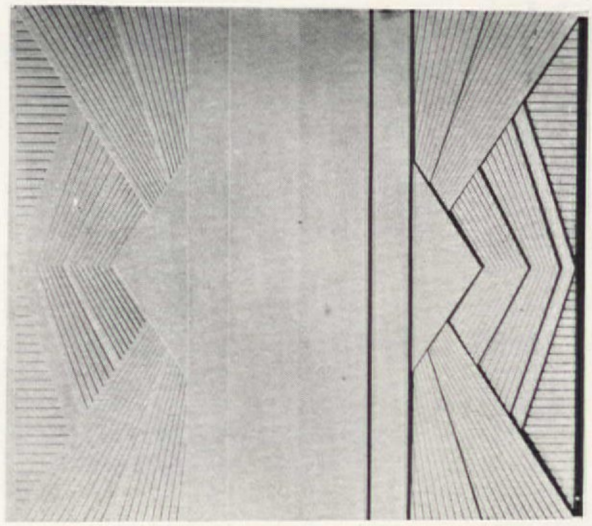
Interior of a Mill to Roll Structural Aluminum Shapes

series, electrolysis often takes place in the presence of moisture and reduces materially the life of the composite structure. With aluminum bolts, nuts, rivets, screws and nails available, the entire assembly may be fabricated from the same material, and the danger of galvanic action avoided.

WROUGHT ALUMINUM products may be formed either hot or cold. Commercially pure aluminum and the less complex alloys are more plastic than steel or brass in that they can be deformed to a greater extent without fracturing. Hence, they can be given a greater number of successive draws without requiring intermediate anneals. The workability of any metal is, of course, a function of its mechanical properties, and the different tempers of the same alloy will have different degrees of ductility.

FORMING. In the hot forming of aluminum, the principal factor to control is temperature. This, of course, varies with the shape to be formed, but in general it is the highest temperature at which the metal will retain its ductility. The standard type of steel-forming equipment may be used in the hot forming of aluminum; in fact, practically all of the hot forming of the metal has been carried out in plants normally operating on steel.

JOINING. Aluminum may be joined by welding or by riveting. Soldering is not recommended except for covering surface defects not exposed to moisture. Soldered joints have very little strength, and if the joints are exposed to moisture, electrolysis is very likely to occur. The usual methods employed for torch, spot and arc welding are used in connection with aluminum and aluminum alloys. Butt, lap, tee fillet welds may be made on aluminum sheets. Castings may be welded either by means of a welding stick and torch or by pouring molten metal into the area to be welded.



Cast Aluminum Spandrel, Deplated. Empire State Building, New York. Shreve, Lamb & Harmon, Architects

Either steel or aluminum rivets may be employed in the riveting of an aluminum structure. Steel rivets can be driven hot in aluminum plates and shapes with the same equipment which is used in ordinary steel construction practice. Although the heat of the rivet produces practically no effect on the properties of the adjacent material, it is often advisable to avoid localizing the heat by driving the rivets at random rather than progressively. Aluminum rivets can be readily driven, but, because of certain characteristics of the metal, the driving practice differs from that of steel. Since aluminum has a greater capacity to absorb energy, it is necessary to use a larger hammer to drive an aluminum rivet than is necessary to drive a steel rivet of corresponding size. Experience has indicated that the compression or squeeze method of riveting is best suited for aluminum.

THE MACHINING of aluminum presents no problems if the proper tools are employed. The cutting tools have appreciably more side and top rake than those commonly used for machining steel. They should have very keen edges, obtained by hand stoning with an oil-stone. In many cases, these tools do not differ from those used for machining hardwoods. Generally, aluminum can be machined to the best advantage by using high speeds and fine-to-medium feeds.

RESISTANCE TO CORROSION. Besides the ready workability of aluminum, certain other inherent characteristics of the metal make it particularly adaptable for architectural purposes. Chief among these is the resistance of the metal to atmospheric corrosion. The compounds of aluminum are colorless, thus eliminating the danger of streaking and staining adjacent surfaces. Since aluminum is resistant to corrosion, it requires no painting to preserve it. This not only eliminates the trouble and expense of upkeep, but insures against the loss of sharpness and of refinement of detail that invariably results from the filling up of ornament by successive coats of paint.

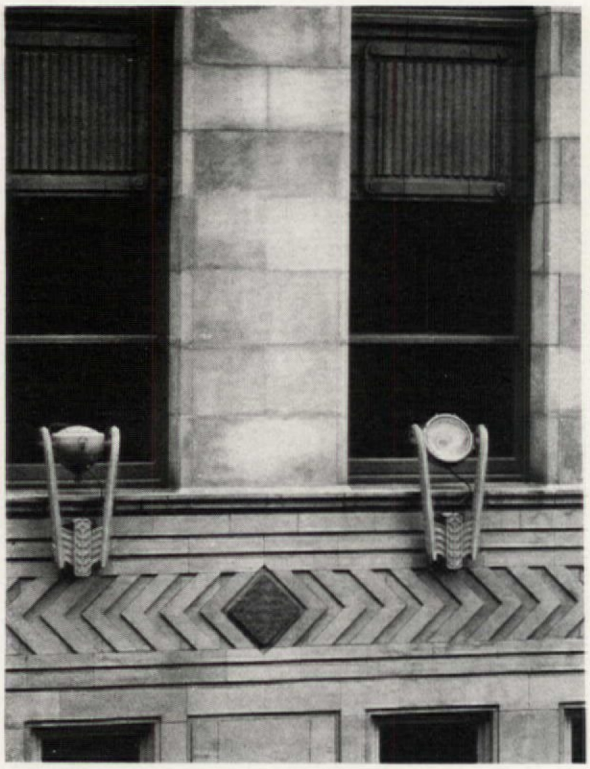
Deplated Aluminum Spandrel. City Bank, Farmers' Trust Building, New York. Cross & Cross, Architects

In color, aluminum resembles silver, but with a slightly bluish tint. On weathering, the color becomes darker. This is due in part to the protective coating of oxide which forms on the surface, and to the accumulation of foreign particles from the atmosphere. A polished surface will remain bright much longer than a rough or "as cast" surface, since the dust and dirt in the air can not collect on it as easily.

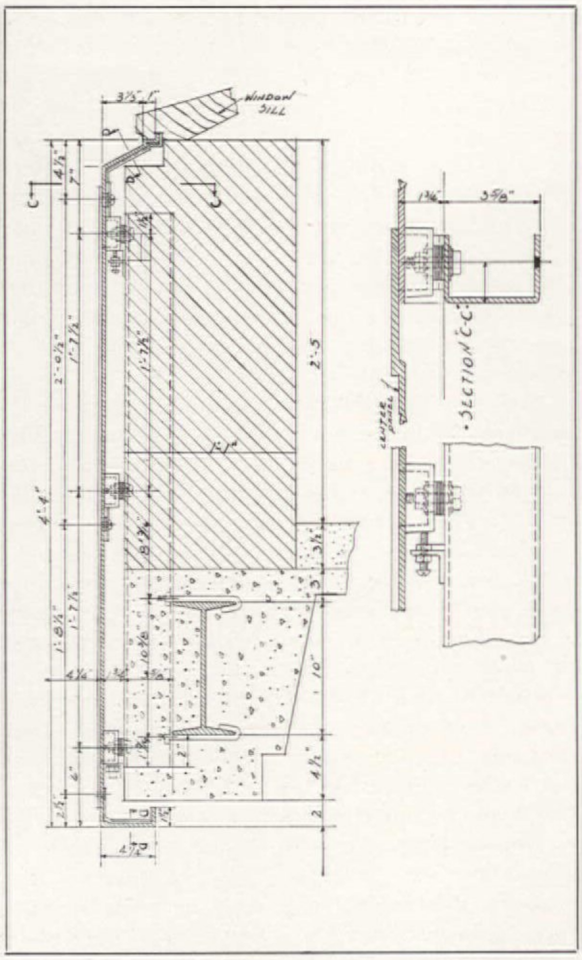
PROPERTIES. Aluminum is the lightest of all the metals used in architecture. It has a specific gravity of 2.7 (approximately .1 pound per cubic inch). Commercially pure aluminum is quite soft and ductile. Its strength is not over 10,000 to 12,000 pounds per square inch, yet by the addition of small percentages of other elements, alloys are obtained which have tensile properties ranging upwards to 60,000 pounds per square inch. The physical and chemical properties of the strong aluminum alloys commonly used in architecture are shown in Table 1. The maximum properties are obtained only after the cast structure has been completely obliterated and the alloys have been fully heat-treated and aged. There are, however, other tempers besides the fully heat-treated and aged tempers; these are the annealed and the heat-treated tempers. The various tempers are designated by letters added to the alloy numbers, "O" standing for dead-soft or annealed temper; "W" for heat-treated temper; and "T" for heat-treated and aged temper.

Where maximum strength is not a requisite for the wrought alloys, commercially pure aluminum, designated 2S, 3S or 43S alloy, may be employed. In the strong aluminum alloys, the tempers depend upon the heat treatment, while in 2S and in 3S and 43S alloys, the tempers depend upon the amount of cold working. The properties of wrought aluminum and of 3S and 43S alloys are shown in Table II. The physical and chemical properties of some of the more common casting alloys are indicated in Table III.

The modulus of elasticity for practically all of the commercial aluminum alloys in both the as-cast and wrought conditions is approximately 10,000,000 pounds per square inch. Since steel has a modulus of elasticity of 29,000,000 pounds per square inch, this means that under the same unit stress, aluminum alloys will deform about three times as much as steel, provided the proportional limit is not exceeded. For the majority of ornamental aluminum castings, No. 3S alloy



Cast Aluminum Floodlighting Brackets. Merchandise Mart, Chicago. Graham, Anderson, Probst & White, Architects



Erection Drawing for Aluminum Spandrels. John Hay Commercial High School, Cleveland. J. M. Hopkinson, Architect

is employed. This alloy has a low solidification shrinkage, making it possible to cast intricate shapes having both heavy and thin sections and to obtain sharpness of detail. Spandrels, mullions, window sills, copings, roof crestings and cornices, facias, grilles, radiators and covers, statues, and many other decorative details are commonly cast in this aluminum-silicon alloy, as are some extruded parts, such as mullions, casement and double-hung windows and window sills.

Most of the sheet metal work is executed in No. 3S alloy because it has a slightly higher yield than commercially pure aluminum. Many extruded sections for doors, windows and store fronts are regularly produced in this alloy. Sheets of this aluminum-manganese alloy are generally used for cornices, marquises and shingles. For parts which receive maximum strains in service, and in which the strength of steel and the lightness of aluminum are requisites, the strong alloys, 17S, 25S and 51S, are used.

FINISHES. A number of different finishes and combinations of finishes may be obtained on aluminum ornamental castings and wrought metal products. The natural finish is that of silver with a bluish cast. However, there is a slight difference in the color of the different products depending upon the method of manufacture. The surface of a casting, for example, appears darker than that of a wrought object because of its coarser texture. On polishing an aluminum surface, the tinge of blue becomes more pronounced, and the surface has a greater reflectivity for light. Sand-blasting reduces the reflectivity of the surface, and produces a finish similar to that of etched glass. A carborundum blast gives a darker shade of gray since in this operation small particles of carborundum are deposited on the aluminum. A satin finish is obtained by wire brushing the surface or rubbing it with an emery cloth. A caustic dip merely cleans the surface. Different shades of gray may be produced by "deplating" products made from the aluminum-silicon alloys. Aluminum surfaces may be enameled or painted. As a base for paints and enamels, and since the metal does not corrode and has a pleasing color, it may serve as one of the colors in a combination color effect.

TABLE I—AVERAGE PROPERTIES OF STRONG ALUMINUM ALLOYS

Alloy (1)	Nominal Composition—% Copper	Manganese	Magnesium	Silicon	Aluminum (minimum)	Tensile Properties Yield Point (2) Pounds Per Square Inch	Ultimate Strength Pounds Per Square Inch	Elongation % In 2 Inches
17 SO	4.0	0.5	0.5		92.0	10,000	26,000	20.0
15 ST	4.0	0.5	0.5		92.0	35,000	58,000	20.0
25 SO	4.5	0.8		0.8	92.0	10,000	26,000	20.0
25 SW	4.5	0.8		0.8	92.0	25,000	48,000	18.0
25 ST	4.5	0.8		0.8	92.0	35,000	58,000	20.0
51 SO			0.6	1.0	96.5	5,500	16,000	30.0
51 SW			0.6	1.0	96.5	20,000	35,000	24.0
51 ST			0.6	1.0	96.5	35,000	48,000	14.0

NOTES:

1. The alloy numbers referred to are those of the Aluminum Company of America. The letters at the end of the alloy numbers designate the heat treatment: "O" standing for the annealed condition; "W" for the heat-treated condition; and "T" for the heat-treated and aged condition.
2. The yield point is the stress at which the stress-strain curve shows a departure of .2 per cent from the initial modulus line produced.

TABLE II—AVERAGE PROPERTIES OF WROUGHT ALUMINUM AND THE ALLOYS 3S AND 43S

Alloy (1)	Nominal Composition—% Manganese	Silicon	Aluminum (minimum)	Tensile Properties Yield Point (2) Pounds Per Square Inch	Ultimate Strength Pounds Per Square Inch	Elongation % In 2 Inches
2 SO			99.0	4,000	13,000	40.0
2 S½H			99.0	14,000	17,000	20.0
2 SH			99.0	21,000	24,000	10.0
3 SO	1.2		97.0	5,000	16,000	40.0
3 S½H	1.2		97.0	17,500	21 000	20.0
3 SH	1.2		97.0	25,500	29,000	10.0
43 SO		5.0	92.5	10,500	19,000	21.0
43 S½H		5.0	92.5	22,500	25,500	7.0
43 SH		5.0	92.5			

NOTES:

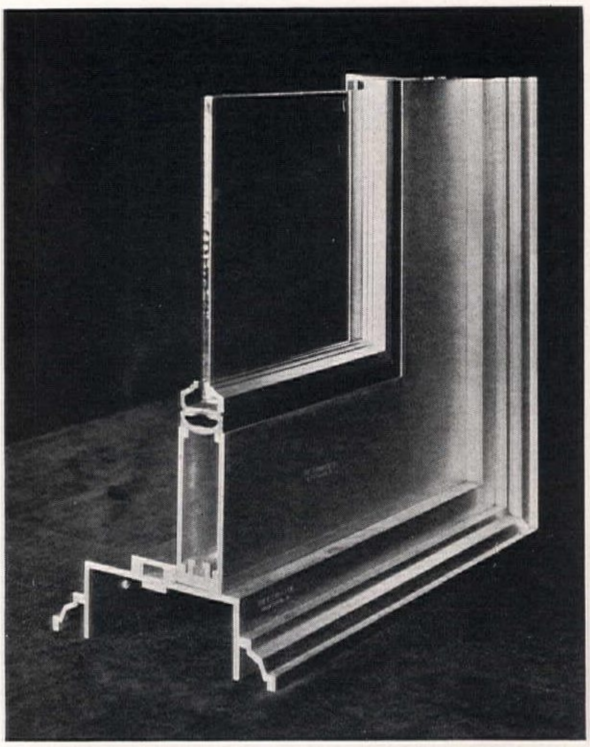
1. The alloy numbers referred to are those of the Aluminum Company of America. The letters at the end of the alloy numbers designate the temper; "O" standing for the annealed condition; "H" for the hard temper; and "½H" for the half-hard temper.
2. The yield point is the stress at which the stress-strain curve shows a departure of .2 per cent from the initial modulus line produced.

TABLE III—AVERAGE PROPERTIES OF SAND CAST ALUMINUM ALLOYS

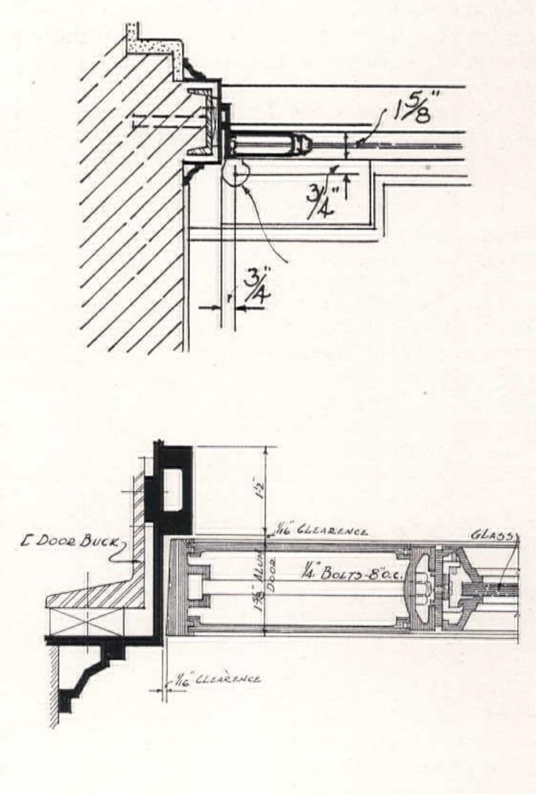
Alloy (1)	Nominal Composition—% Copper	Silicon	Aluminum (minimum)	Tensile Properties Yield Point (2) Pounds Per Square Inch	Ultimate Strength Pounds Per Square Inch	Elongation % In 2 Inches
43		5.0	92.5	9,000	19,000	4.0
47 (mod.)		12.5	85.0	11,000	26,000	8.0
195-4	4.0		93.0	16,000	31,000	8.0
195-16	4.0		93.0	22,000	36,000	4.0
195-10	4.0		93.0	27,000	40,000	2.0

NOTES:

1. The alloy numbers referred to are those of the Aluminum Company of America. The numerical suffixes "4," "16" and "10" designate the heat treatment: "4" standing for the heat-treated condition; "16" for the heat-treated and partially aged condition; and "10," for the heat-treated and fully aged condition.
2. The yield point is the stress at which the stress-strain curve shows a departure of .2 per cent from the initial modulus line produced.



Section of Door and Door Jamb Fabricated from Extruded Aluminum Moulding. Details Below



POLICY AND OPINION

LET US BE HONEST

THE element of camouflage has been a characteristic of American architecture since its beginnings. The cause can be attributed to an owner's desire to reproduce the architecture of his foreign origin or to a blind conformity to the dictates of fashion, in any event excusable only as measured by his intelligence and culture. Camouflage does not excuse the architect who understands and honors his art. On the other hand, engineering in all of its manifestations has been essentially honest. Engineering deals with the elemental forces of all kinds which are utilized to serve mankind. Simplicity and dignity characterize the engineer's art.

One function of engineering is to conduct forces from their points of origin through a stress-resisting structural medium safely to an adequate foundation. This applies to buildings and bridges. The engineers of the new Hudson River Bridge designed its massive steel towers in the most simple and direct manner. It was understood that they would be encased in a stone masonry shell designed by an architect; another example of architectural camouflage.

We are deficient indeed, if unimpressed by the majestic proportions, dignity and adequacy of these steel towers which support the cables now being spun from shore to shore. It does not require engineering knowledge to resolve the forces caused by the weight of the bridge and the pressure of the winds nor to trace the invisible stresses in their course down to the foundations. Will the Hudson River Bridge be improved in appearance if the two steel towers are enclosed in stone masonry shells that perform no structural function except to support themselves and *pretend* to support the cables? Is not the appearance of these sturdy steel towers satisfying to every reasonable æsthetic demand?

Everyone admires the proportions and dignity of the stone towers that support the cables of the old Brooklyn Bridge, the old Cincinnati-Covington Bridge and the rugged masonry towers of the Ferrenz-Aulne Bridge in Finistere. These masonry towers actually support the imposed loads. Improved methods in suspension bridge designing permit a certain flexibility in the steel towers as a feature of economy of cost and efficiency of structure. The stone tower is outmoded and its use as in the new Hudson River Bridge is a mere architectural camouflage, the cost of which can better be expended where more needed.

The steel towers of the Delaware River Bridge at Philadelphia-Camden were designed in part by Paul P. Cret, as architect, associated with Ralph Modjeski, Laurence Adams Ball and George Smedley Webster, engineers. Theodore E. Blake, as architect, was associated with Robinson & Steinman, engineers, on the new Mount Hope Bridge in Rhode Island. These steel suspension bridge towers, along with Ralph Modjeski's new towers at Poughkeepsie, are unrivaled for their beauty of design. Why, then, should anyone resort to an outmoded method of suspension bridge construction in *appearance* only, by constructing fake masonry towers and covering the beautiful, inspiring and adequate steel towers?

A. T. N.

ARCHITECTURAL CRITICS

IN a recently published essay (*The New Republic*, July 23, 1930), Professor Hook writes: "A genuine critical tradition helps *to make* creation significant; its task is not merely to recognize such creation, when once it is achieved, as a chance variation in a riot of creative action. Criticism not only makes art significant, but all life and thought as well; and American culture lacks genuine significance because it lacks genuine criticism. Its critical voices have not yet made themselves heard above the din and clack of strident self-adoration from the right, and empty denunciation from the left."

Printed architectural criticism is practically nonexistent in America; it is, however, quite stridently vocal and voluminous among architects. Sporadic and superficial observation detects an unusual combination of, perhaps, brick and marble or the use of a new metal for spandrel panels of unusual design. Then the chorus of critics is heard. It is of no consequence that the structure is not one-half completed, something unusual has been done!

When the building has been enclosed and a roof termination of unusual form and construction has been completed or perhaps the building has been cut off short at a dead level with no roof in sight, the chorus of disapproval and carping comment is most vociferous. The principal objections are based on the fact that something *unusual* and non-conforming has been done. With time, they may be accepted as a fine forward step, as is the once shocking, to some, American Radiator Building. In any event, is it not better from a sense of fairness, sportsmanship and a decent regard for a man's effort, to withhold the barrage of adverse and flippant, superficial criticism until the structure has been completed, observed under all conditions of weather and light, and rationally discussed? Admitting that the style and form is unusual, it may possess great merit,— and beauty, of course, is always an individual interpretation which should be tempered with tolerance.

Can we not justly paraphrase the quotation to read: "American architecture lacks genuine significance because it lacks genuine criticism"? What would result from a genuine public criticism of architecture such as is found in the leading European publications? It would cause the uncultured parvenu owner, or the owner who has acquired a patter of alleged artistic culture, to subordinate his own half-baked and immature ideas to the dictum of an architect who has acquired the reputation of producing acceptable buildings. Criticism would cause architects properly to qualify themselves, to think twice and then make an honest creative effort rather than to be satisfied to reproduce or adapt in the all too commonly prevalent mechanical manner. First of all, we should determine whether American architecture as a whole does possess genuine significance. That is a matter for interpretation and demonstration. Is it possible to set up a system of genuine criticism, and through what mediums? Of course, genuine criticism cannot eliminate architectural mediocrity, but it certainly will recompense creative architectural ability.

A. T. N.

TO MODERNIZE OR TO BUILD?

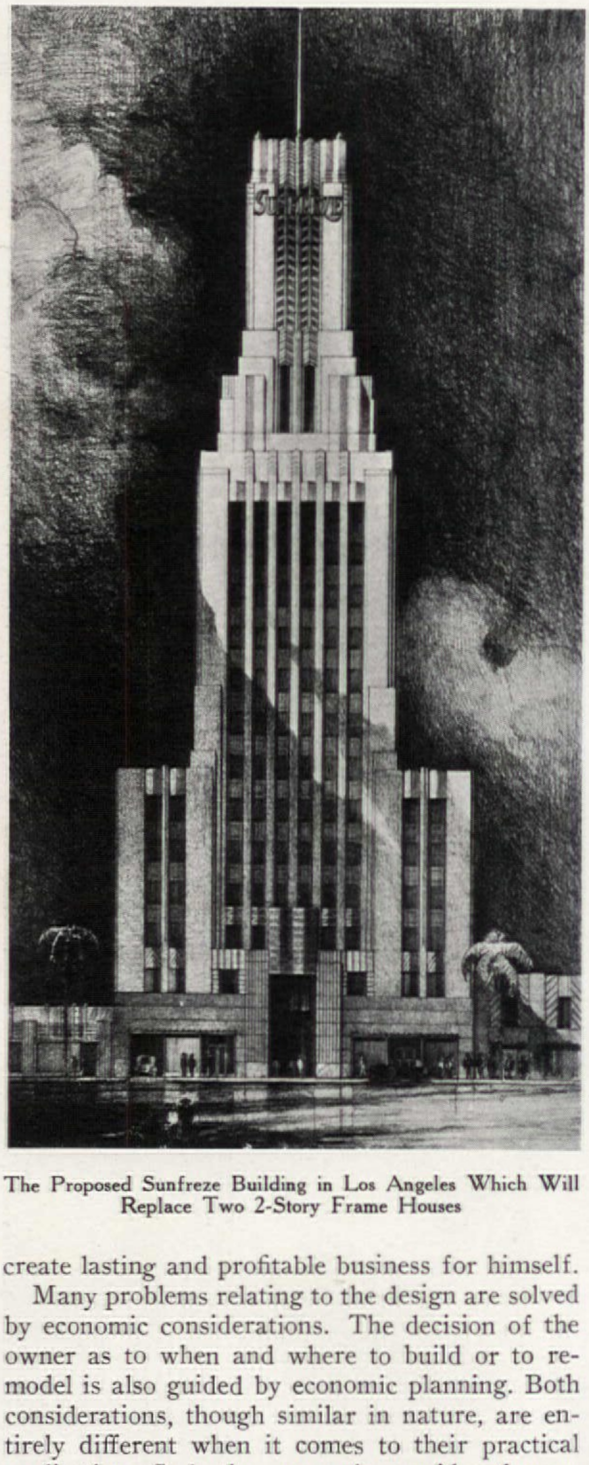
BY

G. HIRSCHFELD

THE volume of business which is being done year after year in the building industry has considerably changed during the last decade, and, in general, continues to grow toward new record figures. Changed also is the position of the architect,—not because his skill is less than what it used to be; not because his art has undergone any deterioration; but rather on account of the general shifting of the economic conditions of this country. It is not the problem of satisfying the demand of the client so much as the problem of finding new demands. A decade or two ago the client or the owner of a building would seek the architect to design a new building, or to remodel or to replace an existing structure, and the architect would proceed according to the wishes of his client. But in the building industry, as in other industries with but few exceptions, supply has advanced so rapidly that the demand is not monopolizing the market. Business has to be fought for, and demand must be created.

The architect cannot afford to wait until his prospect has definitely made up his mind as to whether he should build, remodel or rebuild, but should be in a position to advise him. If new business is looked for, new fields must be invaded; in other words, the architect may have to seek the owner of property and convince him. To do this, he must know more than is usual at present. The present knowledge of the architect in general is concerned with matters of design and structure; the future knowledge will have to comprise the other factors of the enterprise. So far the architect has devoted himself chiefly to the problem of *how* to build; it seems as if he will have to study the question of *why* to build, should he desire to

A Striking Contrast Between the Concentrated Demand for Space in the Grand Central Section, New York, and, Right Next Door, Rows of Old and Obsolete Buildings Waiting for Their Turn of Increasing Land Value and Higher Rentals



The Proposed Sunfreze Building in Los Angeles Which Will Replace Two 2-Story Frame Houses

create lasting and profitable business for himself.

Many problems relating to the design are solved by economic considerations. The decision of the owner as to when and where to build or to remodel is also guided by economic planning. Both considerations, though similar in nature, are entirely different when it comes to their practical application. It is the economic consideration on the part of the owner which shall be discussed here; it is the knowledge of these economic conditions on the part of the architect that will enable him to give advice to the client, thus opening up a new field of professional activity which is bound to pay rich dividends in the future, for the architect will no longer wait for his prospect but will be in a position to exercise a certain control upon the latter's plans and intentions. When the architect shall have developed his knowledge of economic principles to such an extent that he can give sound economic advice to his client, then it will be time to speak of a sound architectural profession.

BUSINESS GETTING. The present attitude of the average architect is to "wait and see." If this is a modern business method, then the other industries must be wrong: the department store which invades private residences with invitations to open accounts; the automobile manufacturer who sells cars on installments; the whole advertising industry, which has no aim other than to get out and create customers; and all those who annually sell goods valued at $25,000,000,000 on a credit basis. They do not sit and wait, but get out on the street and look for business. Applied to the architectural profession, it means that the architect must get acquainted with the economic principles which form the basis for the owner's final decision. This survey will refer to already existing buildings and to when they should be remodeled and when replaced by new structures. It will show, to be more exact, the advantage of new over remodeled structures.

DEMAND FOR NEW BUILDINGS. It might be said that the question of remodeling or replacing has little to do with the building and more with the property. The architect, for instance, would ask: "Is the building still in good condition?", but the owner is more interested in the question: "Is there some way in which I could make more money on that same plot?" In the section around Grand Central, New York, few buildings will be found which have been remodeled since the boom in land value started. The reason is simple; land value is rising, rentals go higher, the old buildings have limited area, and even remodeling could not considerably increase rentable space. But space means earning capacity; so, new and tall buildings are being erected simply because they bring an income many times greater than that of a reconstructed building.

NO DEMAND. Take the opposite case, for instance, some of the sections of the older part of Brooklyn around Livingston and Joralemon Streets. The buildings are obsolete, and still they stay; demand for space is unchanged (perhaps even reduced); rentals are static, and the existing space meets whatever demand there is. Therefore, the best thing the owner can do is to let the building stand as it is and cash in on its present earning capacity. Here, neither remodeling nor replacing is advisable, for there are no changes in demand.

PARTIAL DEMAND. Between these two extremes is some section where a definite trend of development is not clearly visible but where business is pushing and moving,—for instance, Broadway between Duane and Bleecker Streets. Lying between two business centers,—City Hall and Union Square,—this district, with its glorious past, is by no means at the end of its commercial development. At the present time, however, the future looks uncertain, and it must be left to each individual case as to whether it merits remodeling or whether a building should be torn down and replaced by a new structure, and this in spite of the fact that the buildings are obsolete and could very well stand some overhauling from an architectural point of view. But the latter would be without practical value. The fact remains that, generally speaking, to erect a new and tall building would involve tremendous expense, while on the other hand one cannot be sure of a real demand to fill its space. Remodeling would also cost money and would, no doubt, bring better income. However, it is very questionable whether this income increase would be high enough to justify the remodeling work. High rentals are ordinarily based on two things: increased land value and new buildings providing modern accommodations, and neither exists in the aforementioned district.

One of the best examples to prove the influence of land value upon the question of remodeling or replacing can be found in Manhattan between 30th and 50th Streets. Business expansion has been such in recent years that a great amount of space was needed in order to meet the demand. Land value rose accordingly, and so did rentals. The owners of existing buildings faced the golden opportunity to profit by this sudden demand. They could decide for either remodeling or erecting new buildings. Why in most cases they have favored the latter alternative, shall be shown later on.

SHIFT OF TRADE. The department stores which were located for many years along lower Fifth Avenue, New York, later showed a decided tendency to move to the upper part of the same thoroughfare. This is chiefly accounted for by the shift of trade in general to a more convenient neighborhood. Here is a factor well worth remembering when deciding the question of remodeling or replacing. This shift of trade is clearly noticeable in different sections of the city and has an important bearing upon the earning capacity of a building, for the newest and tallest and most spacious building is without value if the trade it caters to is located in an entirely different section of the city. A loft building would be out of place in an office district or an apartment house in a manufacturing section or an office building in a residential zone, and so on.

In Minneapolis, the Rand Tower Replaces the 4-Story Minneapolis Club and a Small 2-Story Taxpayer. Some Years Previously, the Club Building Had Been Remodeled for Office Space, But This Was Only Temporary Relief

CONCENTRATION TENDENCY. We come now to the problem of concentration toward trade centers. This concentration movement is in intimate connection with the shift of trade, or rather it is supposed to prevent this shift. In all large cities there are concentration centers growing up. In New York one is the office center around Grand Central; another is the loft building section around the Holland Tunnel; the most important is probably the garment center between 34th and 42nd Streets. The underlying reason for this concentration tendency is neither land

Concentration Tendency as Expressed in a Los Angeles District; the New Ferguson Building. Walker & Eisen, Architects

value nor earning capacity but the growth of the city in general and the subdivision into certain trade sections in particular. A city can grow uncontrolled in its sectional division to a certain limit, but not beyond it. This limit has been passed in large cities such as New York, Chicago and others, and a slow but steady contraction into trade centers is the logical consequence.

Traffic, transportation facilities and ease of access are some other factors which are influential, inasmuch as from the higher land value which they create there originates partly the necessity of either remodeling or replacing an obsolete building. The new subway (Municipal Line) which will be constructed within the next few years will tremendously increase land value along Eighth Avenue, and most of the owners of buildings will take this increase with the accompanying rise in rentals as a fine opportunity for increasing the earning capacity, be it by way of reconstruction or of replacement by new structures.

ECONOMIC PRINCIPLES. Thus we always come back to the value of the land, which has the final word to say. Most of the time it is demand for space which drives the value of the property up and up; it should only be added that demand for space in turn is caused by the different circumstances just explained, shift of trade, concentration movement, accessibility, traffic and transportation facilities, and other factors. The architect must take into consideration these economic factors if he wants business, for they are the guiding principles behind the owner's projects, and to anticipate them means to improve his chance of obtaining the contract. Today the majority of owners or prospective owners are getting their advice from the real estate people because they want to sell. The architect's interest should not be less intense; if the realtor wants to sell, the architect wants to build; if one is anxious to get rid of certain properties, the other is just as anxious to obtain the owner's confidence, i.e., his contract. The fact remains that the architect has to adopt (out of shrewd business sense) the interests of his client, and even before he becomes his client. If the man from the real estate ranks talks business with his prospect, there is no reason in the world why the architect cannot put his activities on a business basis. More than one of the outstanding and truly successful architects have adopted business methods without prejudice to their work as artists.

REMODELING. It has been explained what circumstances raise the question of remodeling or replacing an old and obsolete building. While remodeling has certain advantages, there are disadvantages also. We have seen that land value is the real factor behind building development, and right here lies the grave point of danger, for remodeling can only change the building more or less superficially, while land value may change the whole aspect within a couple of years. Take some building in a section of rising value,—for instance, the former Lorraine Hotel at 545 Fifth Avenue. While many changes have been made, thus justifying better rentals, as a whole space has not been increased nor has the earning capacity increased to such an extent as to keep pace with the rising value of the land along Fifth Avenue. It seems, therefore, safe to say that within a reasonable time the property value will have risen so high as to demand the construction of a new building with sufficient space to meet the demand. In other words, remodeling by its very nature is of only temporary value as long as the value of the property is rising.

This characteristic of a temporary project in remodeling is not limited to the building itself but is often related to the character of the immediate neighborhood. Generally speaking, it is of little use to remodel an apartment building in the garment center, for the chances are that soon additional space will be required by the garment people, and then the apartment house must give way. However, as long as the sectional change is not completed, as long as there is no way of saying whether this particular district is definitely going to be an apartment center, an office district, a loft section or a manufacturing division, it is advisable to remodel obsolete buildings if thereby the earning capacity can be increased. The construction of a new building in one of the aforementioned instances would definitely establish the character of the structure and would, later on, leave no chance of changing it according to the eventual change in the character of this section. The *Pictorial Review* building on 39th Street and Seventh Avenue, New York, was only seven years old when it had to be torn down, partly because trade had shifted in that time and partly because its earning capacity had fallen far behind the gross rental obtainable on the basis of the greatly increased property value.

Another reason why remodeling pays only in exceptional cases is that space cannot be created (generally speaking) by the reconstruction process; and space is the most valuable asset in building construction. Besides, economic considerations such as accessibility, light and air, traffic facilities, etc., can only occasionally be taken into account. There are cases, however, where remodeling is the wisest thing to do. The former Belmont Hotel, now the "Peerless," on 45th Street, had two front apartments on the ground floor which brought in only small revenue. The building has been remodeled, and the ground floor converted into stores, whereby the rental of this floor has been multiplied by four. In the upper 70's in Manhattan there are some brown stone dwellings which have been remodeled, converting each floor into one or two apartments. The change of this neighborhood is not yet completed; it is not profitable as a section of small dwellings nor is it ripe for large apartment houses. The sensible thing to do is to wait and just use the time for bridging between the past and the future development. Remodeling as a temporary measure is an excellent way out of temporary problems, and it is therefore estimated that a remodeled building should pay for the outlay within three or five years.

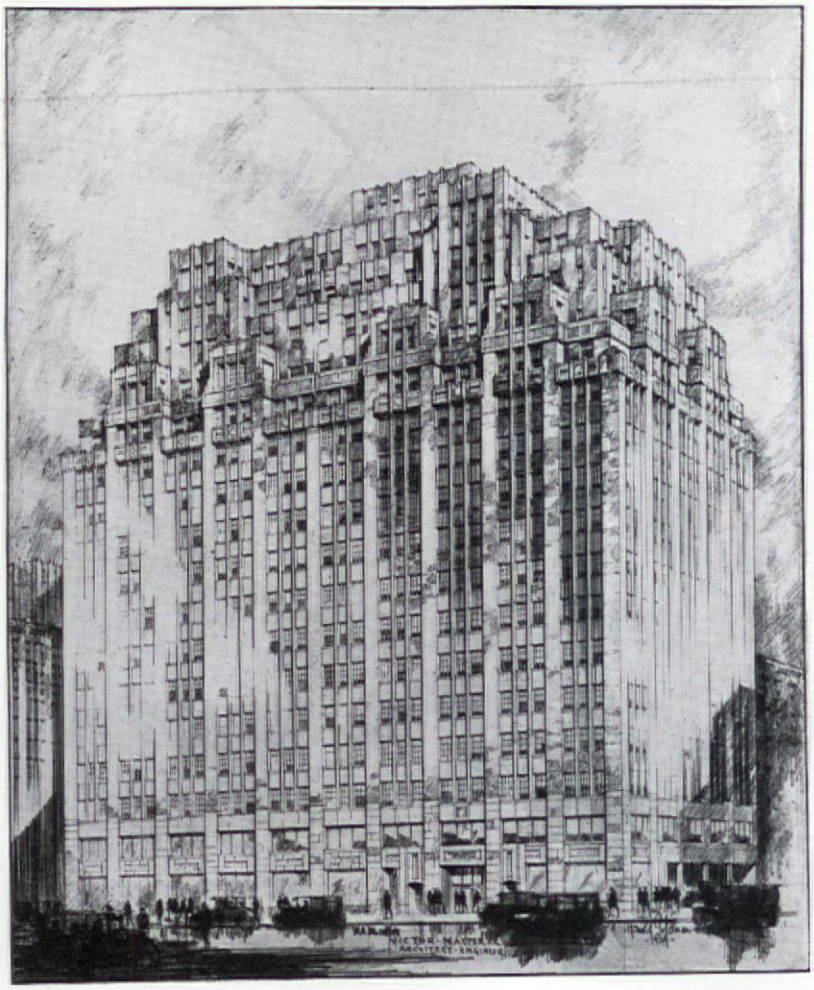
NEW BUILDINGS. The chief advantage of new structures over remodeled buildings lies in the fact that it will be in precise accordance with the possibilities growing out of the value of the property. All the economic principles which can be traced back to demand for space, trade conditions, traffic, transportation, etc., can be considered in the new structure, thus allowing for the highest possible exploitation of earning power

"Land Value is Rising, Rentals Go Higher." Edison Building, Los Angeles. Previously the Site Was Used for Parking Space

according to the prevailing circumstances. The ground floor space can be doubled by keeping the height of the floor down to 13 feet or even less and giving the second and perhaps the third floor a margin of 22 feet, the first floor being reserved for brokers and retail stores and the second being occupied by a bank, thereby also doubling the high ground floor rental. Besides, a new building can be constructed in such a way that after a number of years it can be used for a different purpose. Some of the loft buildings around Varick Street have been built so that they can easily and with little expense be converted into office buildings. In this case the building facilities are put at the center; true, ground floor space is being sacrificed, but considerably more space is saved in the 20 or 30 stories above.

BUILDING AS BUSINESS. The trend of modern building development is, no doubt, toward the tall building, and rightfully so. The question as to whether remodeling or rebuilding is preferable is not one of the building itself, but one of profit. If the architect wants to exercise a certain control upon building activities (and only such control can obtain for him valuable contracts), he has to look at the matter from the business point of view. The man who controls the building industry, as well as building development, is the owner, no matter whether he is a speculator or an investor. The architect has to subordinate his interests to the owner's financial, or rather material viewpoint. So far the average architect has been very careful indeed not to step out of his bounds. In fact, he has not only not stepped out but he has secluded himself in his strictly artistic atmosphere. But how does he reconcile his attitude with the modern building development? Building is no longer a matter of art but a matter of area. The fundamental question is not how to erect buildings of great artistic excellence, but how to erect profitable buildings, i.e., buildings at the least possible expense, with the largest possible space.

It is surprising to see how many an architect has held aloof from business methods when it is considered that no one should be more interested in creating new space, in replacing old buildings, in furthering modern urban development, than the architect himself. Who builds the new structures, lofts, skyscrapers, apartment towers and the like? Who is the modern city builder? The owner? Or the real estate man? By no means! And yet, in the hands of these two lies the control of actual building development. The architect who bears the responsibility and gets the contract sits idly by. True, there are a few architects who go out and talk to owners and give advice and get the contracts before anyone else even hears of the pending projects, but it is a fact that the great majority of architects just fulfill their professional duties as their fathers and forefathers have done,—basking in the sun of artistic intuition. If our great industrialists were sitting and waiting for orders, the United States would not be where it is,—neither financially nor commercially nor industrially. It is up to the architect to follow this modern industrial leadership.



The Graybar-Varick Building, New York, Victor Mayper, Architect; So Planned That It May Be Used for Loft or Office Purposes to Correspond With the Economic or Trade Changes in the District

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 18—CONTINUED; MISCELLANEOUS METAL WORK

AS to the materials entering into the construction of articles of miscellaneous metals, we find, to begin with, that nomenclature is needlessly loose in general practice. For instance, one finds steel angles referred to as "angle irons," and the terms "brass" and "bronze" used more or less interchangeably. Where steel is called for in this division, it is supposed to conform to the requirements for structural steel described in the preceding chapter. Although no inspector can detect the finer variations in pig iron products (subjects for laboratory tests), he should know, in a general way, the differences between steel and the various forms of iron. Quoting from the Century Dictionary, these are "(1) *cast iron,* which is hard, comparatively brittle, and readily fusible, and cannot be forged or welded; (2) *wrought iron,* which is comparatively soft, malleable, ductile, weldable, and fusible only at a very high temperature; (3) *steel,* which is also malleable and weldable, but fusible, and,—what is of great importance,—capable of acquiring, by being tempered, a very high degree of hardness, so that it cuts wrought iron with ease. By the processes ordinarily followed, wrought iron and steel are made not directly from the ore, but from iron which has been smelted in the blast furnace or that has the form of cast iron. The name *cast iron,* however, is ordinarily given to iron which has been re-smelted in the cupola furnace and cast in any form desired for use. . . . *Malleable iron castings,* or (as more generally called) *malleable cast iron,* is cast iron de-carbonized by packing it with oxide of iron and subjecting it to the temperature of red heat for several days. Iron thus treated and carefully cooled may be bent considerably without breaking and is malleable in a slight degree."

A superintendent does not seriously concern himself as to whether or not wrought iron or steel has been used in the make-up of balustrades, railings and similar ornamental work for which either material is specified. He ascertains that details have been faithfully followed, in the medium best suited to the purpose, which is as far as he need go. In the matter of cast iron, however, he must be more careful. Different foundries may vary widely as to their practice in the use of admixtures of junk metal with their pig iron, as well as in the care in making the moulds and pouring the flux. Specifications for cast iron vary in the perfection demanded, depending upon the purpose of the member. Greater refinements of modeling and finishing are demanded for ornamental work; better chemical constituents for columns, baseplates and similar members subjected to special loadings. An experienced inspector can satisfy himself superficially, by visual inspection, as to the general characteristics of such castings, but he must have chemical analysis of the pouring, if he is to be sure of the composition. This is so inconvenient and the composition of cast iron so unequal and uncertain, that it is seldom used under severe conditions of heavy loadings, except with a high factor of safety. Another feature of structural castings, one that can and must be watched by the inspector, is the thickness of the metal, especially throughout large areas. Variations in thickness of from ¼ to ½ inch have been detected in the shells of columns supposed to be uniformly ½ or ¾ inch thick. For purposes of inspection and measuring, cast iron columns should be designed with open ends or with small test holes cast in the shells at intervals. Both columns and base plates should have turned bearing surfaces, except for light loadings.

At one time, it was customary to delay stair setting until toward the finishing of a building, and to install temporary stairs for use during construction. But with the increased use of substantial steel stairs, one sees them installed as rapidly as the progress of other work will permit, and their free use by all mechanics deemed a matter of course. Treads may be either of checkered steel, slate, marble, or a composition, such as concrete or terrazzo, into which anti-slip aggregates are mixed, or dusted and troweled. For such stone or concrete treads, the stair framing is suitably depressed and fitted with steel angles or plates, on which temporary planking is attached during the construction period. Platforms and other landings should be similarly cared for until time to apply the finished treads and floor surfacings.

Exterior stairs and fire escapes that come under this heading must be watched as carefully as those inside. In all cities, and in some states, fire escapes are required for certain types of buildings and must conform to code specifications. The superintendent must know if these apply to his work, and, if a public inspector has jurisdiction, see that he is notified and that the contractor secures a certificate of inspection and approval of everything in which such an official is concerned.

Bronze and brass are metal alloys used to a large extent for decorative features of buildings, such as tablets, grilles, railings, sash-frames, hardware, etc. They may be cast, rolled, drawn or extruded. (Sheet bronze and brass will be treated of in the chapter on Sheet Metal Work.) Chemically, there is much variation in each of these materials. Bronze is from 70 to 95 per cent copper (usually about 85 per cent) and the remainder tin, though some bronzes contain small amounts of zinc, lead or aluminum. Phosphor bronze is an alloy rendered exceedingly hard by the introduction of less than 1 per cent of phosphorus. Brass contains from 60 to 90 per cent of copper and the remainder zinc, with an occasional admixture of small percentages of tin or lead, the usual proportion being 2/3 copper and 1/3 zinc. There are government standards for all these various alloys, which standards are frequently mentioned in architects' specifications. However, inasmuch as few architects call for chemical analyses, or even dependable proof, of the constituency of either bronze or brass, the superintendent has no recourse but to accept the statement of the producer as to what is being supplied. This means that he must either insist that such purchases be made from a concern of known dependability or he must take his chances with substitutes. In the latter event, the architect might save money by specifying "commercial" grades, thus allowing the foundry or mill to supply its regular product. Inspection of these materials is thus, of necessity, confined to the degree of excellence of the workmanship and to the comparison of finishes with those of approved samples. Such finishes are applied equally well to plated work, such as is sometimes used for counter grilles in offices and the less expensive banks. Occasionally, a superintendent will discover that members that should be solid bronze or brass are, through oversight or dishonesty, actually plated steel. Such substitution is easily detected by the application of an ordinary magnet which will adhere to steel, but which has no attraction for bronze or brass. This test should be applied to various members, as it is quite possible that only the heavier parts are of steel, and that others conform to the specification demands.

Ordinary sash bars for store fronts are generally designed in accordance with the details as shown in the catalog of some particular manufacturer, "or approved equal," the material being drawn or extruded bronze in natural color. The architect must determine whether or not a suggested substitute (if any) is to be accepted and must pass upon the details submitted. The superintendent must see that the material delivered is in accord with such details, or those originally shown, and that it is installed as the makers intended, substantially secured in place, and with all rebates and connections so formed as to make perfect receptacles for the glass; with due allowances for setting, condensation and drainage. More elaborate sash frames are detailed with members of cast or rolled bronze or iron. Some of these have all the refinements of the most ornate doors, gates and grilles and must be made to conform to full-sized details and models. The same is true of bronze tablets, medallions, etc., all of which are subjects for the mature judgment of experts.

Nothing in connection with building operations is of more importance than the anchorage of one material to another, yet nothing is so easily slighted by the artisan,—or so frequently overlooked by the inspector. Carelessness in this particular is one of the first things manifest in the deterioration of a building. Members that should be rigid work loose for every conceivable reason,—or for no apparent reason, as is the case with many individual bronze letters used for exterior signs. It thus behooves the superintendent to give particular attention to this matter in every instance. The need of extra care in the case of wall rail brackets has already been mentioned. Such precautions should be applied also to the attachments of all pipe railings and similar members. The posts should be grouted into sleeves cast into the concrete, wherever possible. Elsewhere nothing but the most effectual bolting should be held to suffice. Corner guards and thresholds are likewise likely to leave their moorings, and hence need special attention.

The superintendent should check up his thresholds (sometimes termed "saddles") early in the proceedings. These may vary to a considerable extent throughout the building. Present custom is to use them only in doorways where a change in floor material occurs, the old time wood "carpet strip" being seldom used. Thresholds must be of full length and correctly located in reference to the door above, as well as rigidly secured. Some drawings are vague as to which doorways are so equipped, and the uncertainty should be cleared up before orders are placed.

The question of location of access doors in relation to concealed valves and other operating conveniences also demands forehandedness. These are sometimes located tentatively on drawings, sometimes merely specified in quantity, to be located entirely according to the judgment of the superintendent. He must consult with the contractors for the pipe trades and make sure that nothing needing access is left out of reach, though he has to requisition more doors for the purpose. Bucks for such doors and for register openings and the like must be set and anchored with the same care as those for larger openings.

(To be Continued in the October issue of THE ARCHITECTURAL FORUM*)*

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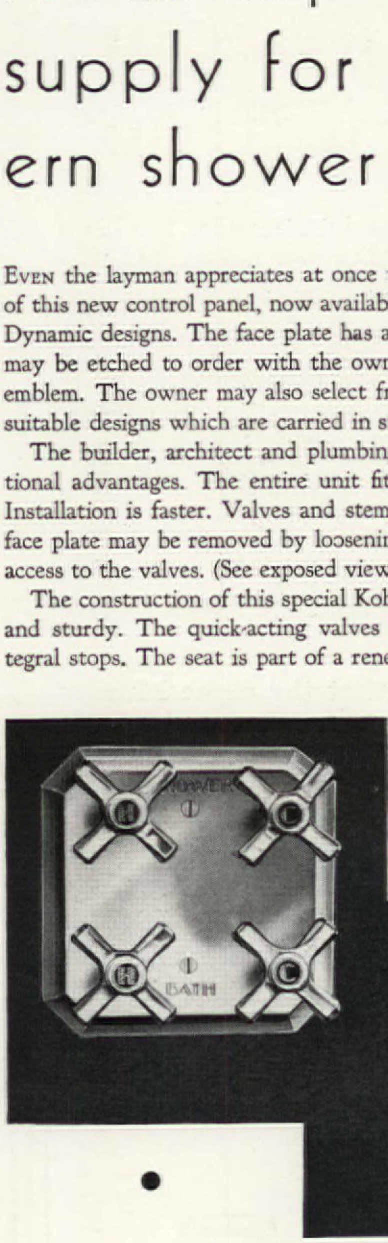

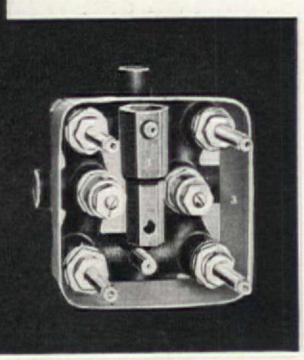

(At outer left) The removable outer panel, which is of metal, chromium plated, can be furnished plain or especially etched with an appropriate design.

(At left) The one-piece yoke exposed, showing (1) socket wrench furnished with fitting; (2) integral stops; (3) tile guide.

(At right) A coat of arms, a trade-mark, a seal, or some other distinctive emblem will be etched to order. Several interesting stock designs are available.

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Shower Head
(Pat. Jan. 2, 1923)

WOULD you like to have a celluloid mechanical model of this Anystream Self-Cleaning Head? The coupon is for your convenience.

SPEAKMAN COMPANY
WILMINGTON, DELAWARE

SPEAKMAN
SHOWERS & FIXTURES

SPEAKMAN COMPANY
Wilmington, Delaware

Please send me celluloid mechanical model of the Speakman Anystream Self-Cleaning Shower Head, as advertised in ARCHITECTURAL FORUM.

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COWING
Pressure Relieving
JOINT

Patented September 1, 1925

OHIO BANK BUILDING AT TOLEDO
Mills, Rhines, Bellman and Nordhoff, Architects

Architects Adopt This Positive Method of Insuring Great Facades

THE Cowing Joint is installed in the columns and weight carrying mullions at a mortar course. Its purpose is to relieve pressure thrown on the facing material by compression of steel, temperature changes, vibration and wind stresses. Experience has proved that these severe stresses, unless relieved, will crush and break the stone, terra cotta or marble.

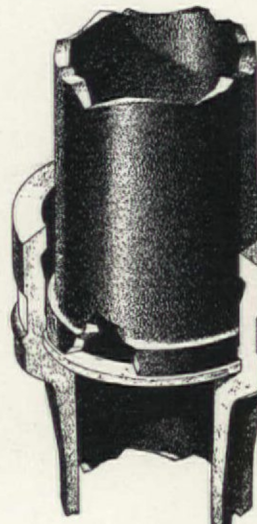
Where the Cowing Joint is installed at each story height the building is completely insured against cracks and spalls, the mortar joints are protected from crushing and the maintenance cost of tuck-pointing is eliminated. The facade is in no manner weakened because the Cowing Joint carries the normal weight of the facing material and compresses only enough to relieve the stress.

See "SWEETS" Catalogue

Cowing Pressure Relieving Joint Co.
226 WEST SUPERIOR STREET CHICAGO, ILLINOIS

EXPAN-HUB SOIL PIPE

Expan-Hub Soil Pipe *can't* stop the movements due to the natural settlement of buildings, nor can it prevent soil stacks from expanding and contracting. *Nothing can do that.*



A Real Improvement

But the specially designed gasket (inserted in each length at the factory) absorbs all these movements so the stack remains gastight permanently.

In sizes from 2 to 15 inches—in Standard, Medium and Extra Heavy weights.

Manufactured and sold by
ALABAMA PIPE COMPANY STRINGER BROS. CO., Inc.
ANNISTON FOUNDRY CO. THE WETTER PIPE CO.
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442 Franklin Street
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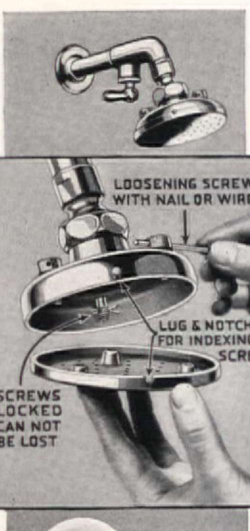
NIEDECKEN

The NIEDECKEN Mixer . . . . .

Interestingly Descriptive Literature of All NIEDECKEN Shower, Tub and Lavatory Fixtures and Patented Features Sent on Request.

This newly patented NIEDECKEN MIXER for both bathtub and shower, eliminates water waste and prevents scalding and its opposite discomfort. The economic supply control can be set to a predetermined temperature and water can be drawn by the operation of *one handle only* instead of the inconvenient two-valve fixture. In action, the NIEDECKEN MIXER is such as to overcome the necessity of gradual regulating water temperature, from cold to hot as regulated by ordinary fixtures. With this NIEDECKEN MIXER the water can be turned to the temperature desired immediately, and maintained throughout the flow. That the NIEDECKEN MIXER is the best device of its kind is attested by the endorsements of many leading national authorities: as most practical, most economical, most correct and satisfactory in every respect.

Easy Clean Shower Head



Write Now for Interestingly Descriptive Literature of All NIEDECKEN Shower, Tub and Lavatory Fixtures and Patented Features.

As the illustration shows: the face of the shower head can be readily removed for thorough cleaning of sediment—by merely loosening 3 small screws. A patented lug and notch act as the index for replacing the face of the shower head in proper place and correct alignment, making it as secure and perfect as when originally assembled. Obviously, this complete removal of the face of the shower head permits access for easy cleaning and *thorough* cleaning of the shower face: a decided advantage in maintaining the shower head absolutely clean, sterile and sanitary; and with the replacement accuracy and security assured keeping the face of the shower head in true alignment and of permanently enduring construction.

HOFFMANN & BILLINGS MFG. CO.

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SHOWER STALLS, SHOWER HEADS, MIXERS - BATH AND LAVATORY FIXTURES COMPLETE FOR HOMES, HOTELS, HOSPITALS, SCHOOLS, CLUBS AND ALL OTHER BUILDINGS

MEETING ARCHITECTURAL STANDARDS OF QUALITY

Above: Solid Nickel Silver shower installation in Marine Officers' Apartment Building, Quantico, Va., furnished by Standard Sanitary Manufacturing Co., Pittsburgh, Pa.

Above: Standard Sanitary Solid Nickel Silver bath tub fixtures in Marine Officers' Apartment Building.

Center: Standard Sanitary Solid Nickel Silver faucet as installed in Marine Officers' Apartment Building.

SOLID NICKEL SILVER PLUMBING FIXTURES BY STANDARD USED IN MARINE OFFICERS' APARTMENT BUILDING, QUANTICO

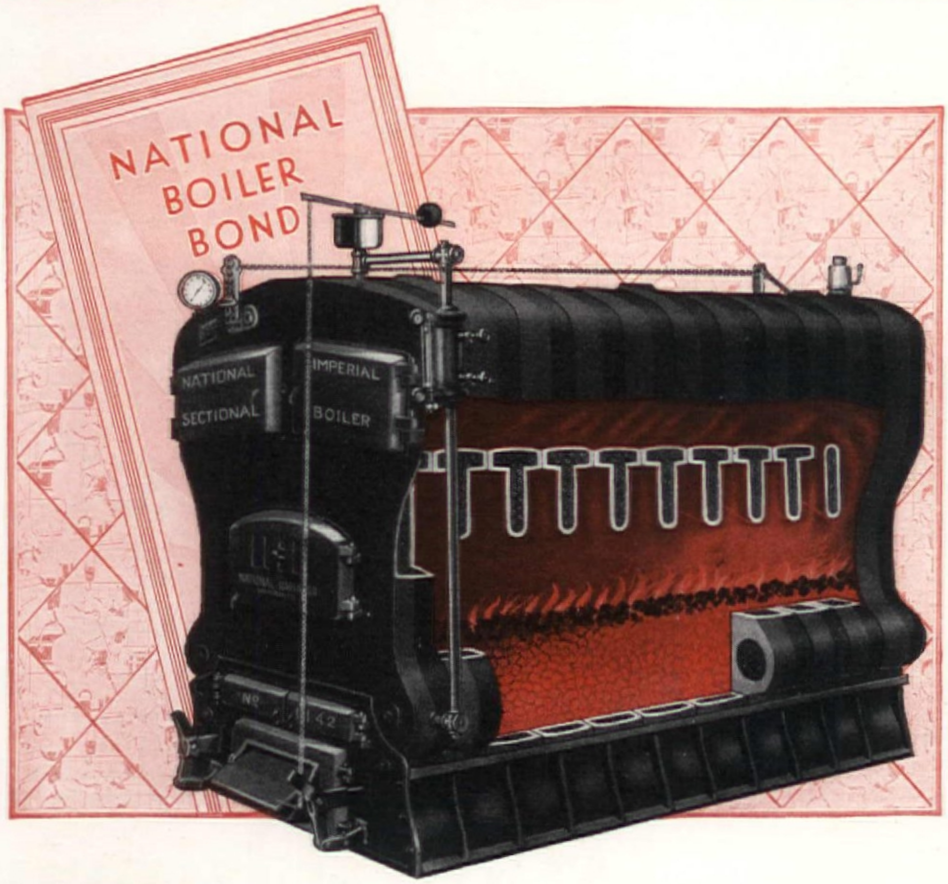
THESE beautiful clean-looking fixtures, containing 18 to 22% Nickel . . . the amount necessary to secure the accepted color and essential physical properties . . . retain their lustrous sanitary appearance during years of severest use.

Solid Nickel Silver fixtures resist corrosion, are easily cleaned, and do not chip, mar or discolor during installation or use. In hardness, toughness and strength, plumbing fixtures of Solid Nickel Silver are similar to tough bronze. These properties give exceptional wear-resistance to valve seats and in general insure sanitary equipment that measures up to the very highest architectural standards.

18% 22 Nickel SILVER

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

THERE'S A NATIONAL HEATING SYSTEM FOR EVERY BUILDING NEED



Cutaway view National Imperial Sectional Boiler No. S-1142. One of 118 types and sizes.

National Novus Boiler

National Bonded Imperial Sectional Boiler

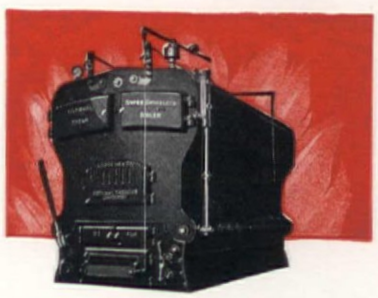
The Hard-Coal Brother to the Famous Super-Smokeless

Load in the fuel—there's still an abundance of combustion space that permits the gases to completely mix with air, completely consume. The red-hot gases swirl and eddy past the overhanging fire surfaces, swing up into the side flues, move with a scouring, rotative motion to the front of the boiler, then to the back again. The heat is sucked out of the flames, absorbed by the water, rushed to the radiators.

This boiler is designed to perform efficiently with all leading types of fuel; coal, coke, oil and gas. It can be converted on the ground to meet the individual requirements of the fuel selected. Engineering design scientifically coordinates every part to produce economical combustion and thoroughly satisfactory heating. The National Boiler Bond, furnished with each boiler, not only guarantees workmanship, materials, and design, BUT MOST IMPORTANT OF ALL SPECIFIES AND GUARANTEES BOILER PERFORMANCE.

Complete and helpful information gladly furnished. Just write.

National Low Water Line Boiler

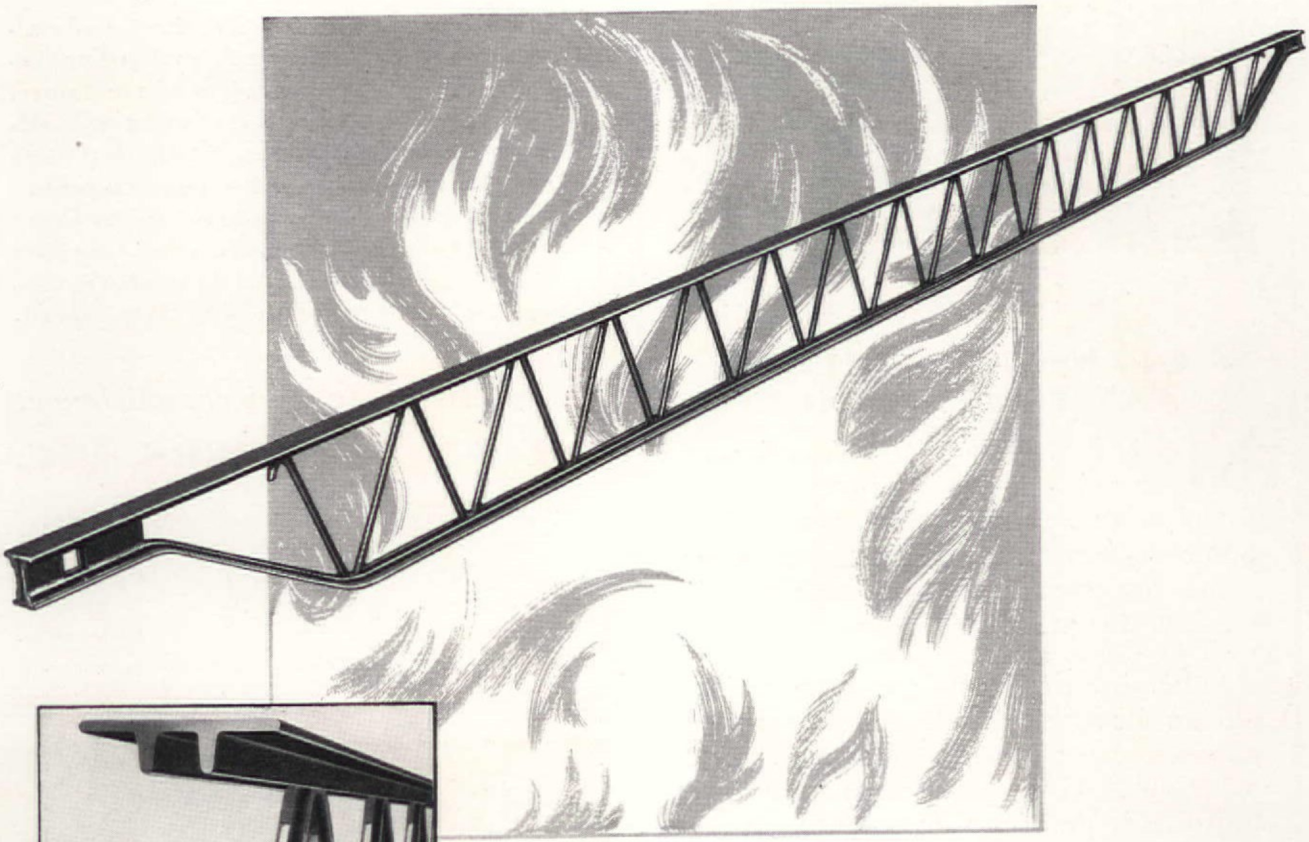


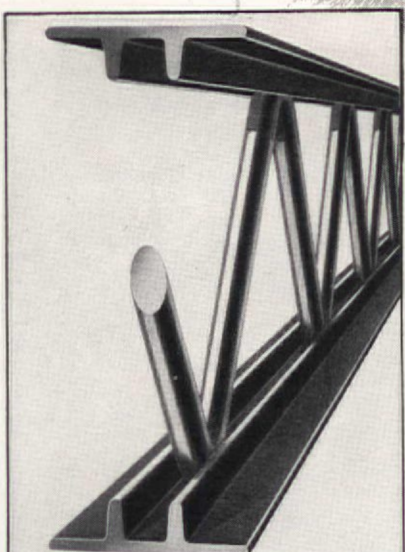
National Super-Smokeless Boiler

NATIONAL RADIATOR CORPORATION
JOHNSTOWN, PENNSYLVANIA

NATIONAL
Made-to-Measure
HEATING SYSTEMS

The new HAVEMEYER
STEEL JOIST





The Havemeyer Steel Joist is an electrically welded unit with chord members composed of a specially rolled "Twin-tee" steel section. The flat surfaces of chords provide extreme lateral rigidity as well as simplify the attachment of metal lath and other reinforcement used in slabs and ceilings.

. . . insures maximum fire safety

IN the type of buildings in which fire is most to be feared — hospitals, schools, hotels, apartment houses and residences — the Havemeyer Steel Joist offers a high degree of fire protection. Used in the construction of floors and roofs, Havemeyer Steel Joists form an effective barrier against the spread of fire from floor to floor.

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Concrete Steel Co.

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Concrete Steel Co.

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IN no department of architecture have the last ten years seen quite the progress which has been made with schoolhouses, a class of buildings of the first importance, since they exert a strong influence upon their communities, and by their architectural excellence or the lack of excellence they elevate or lower the architectural standards of entire districts. Study of school structures, particularly at the hands of a group of well known architects, has resulted in their being given a high degree of architectural distinction and dignity in the way of design, while study directed toward their planning and equipment has led to their being practical and convenient far beyond what was regarded as an advanced standard of efficiency anywhere in America even a few years ago.

Kensington Schoolhouse, Great Neck, N. Y.
Wesley Sherwood Bessell, Architect

THIS volume, a companion to another published in 1914, records the results of endless study and experiment in different parts of the country, summed up and presented. By illustrations of exteriors and interiors, by floor plans and carefully written descriptions and articles by well known architects and educators, the present high standard of schoolhouse design is made plain, and these results which have been achieved by a few architects and school boards are thus made possible to all architects who are interested in schoolhouse design. The compiler has selected from almost 1000 exteriors and floor plans the school buildings to be illustrated, and the volume records "a process of innovation and elimination, namely, the introduction from time to time of features which have been deemed desirable and practical, and the elimination of things which, owing to changed school methods, are no longer required."

400 pages; 7¾ x 10½ inches
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KERNERATOR
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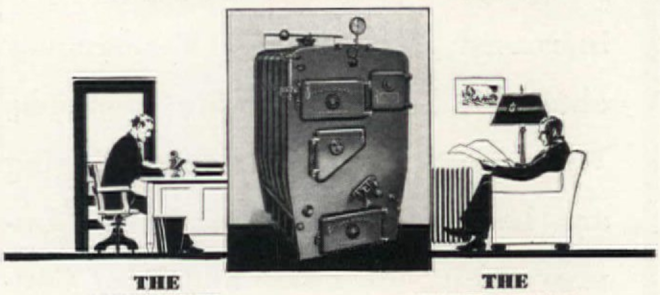
LOOKING AT THIS HEATER FROM BOTH SIDES



THE ARCHITECT

in looking at any Spencer sees a heater whose sloping Gable-Grates and magazine feed provide the most efficient method known for burning hard fuels. In place of commercial ratings he sees guaranteed capacities which tell the exact amount of radiation that a Spencer Heater will carry under actual working conditions. In back of this heater he sees a 33-year record of faithful performance which assures him more than any words that he can rely absolutely on the statements of the Spencer Heater Company.

THE HOME OWNER

sees the same heater but a different set of facts. The Gable-Grates and magazine feed mean less time and worry in "tending the furnace." The No. 1 Buckwheat anthracite used in place of the large, higher-priced sizes means a cut of about 50% in a Spencer owner's fuel bills. The precision construction means a more even flow of heat in all kinds of weather. The home owner also sees a heater whose matchless efficiency assures him of many long years of faithful service.

These are two different views of the same heater, but in the end they both mean the same thing—satisfaction. To the home owner they mean the satisfaction that comes from Spencer's low cost heat and ease of operation; to the architect, the satisfaction that comes from the knowledge that in specifying a Spencer he has given his clients "the lowest cost heat they can buy" and at the same time increased his own prestige. Spencer Heater Co., Williamsport, Pa.

SPENCER
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HEATERS
for steam, vapor or hot water

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Architects

H. G. Balcom
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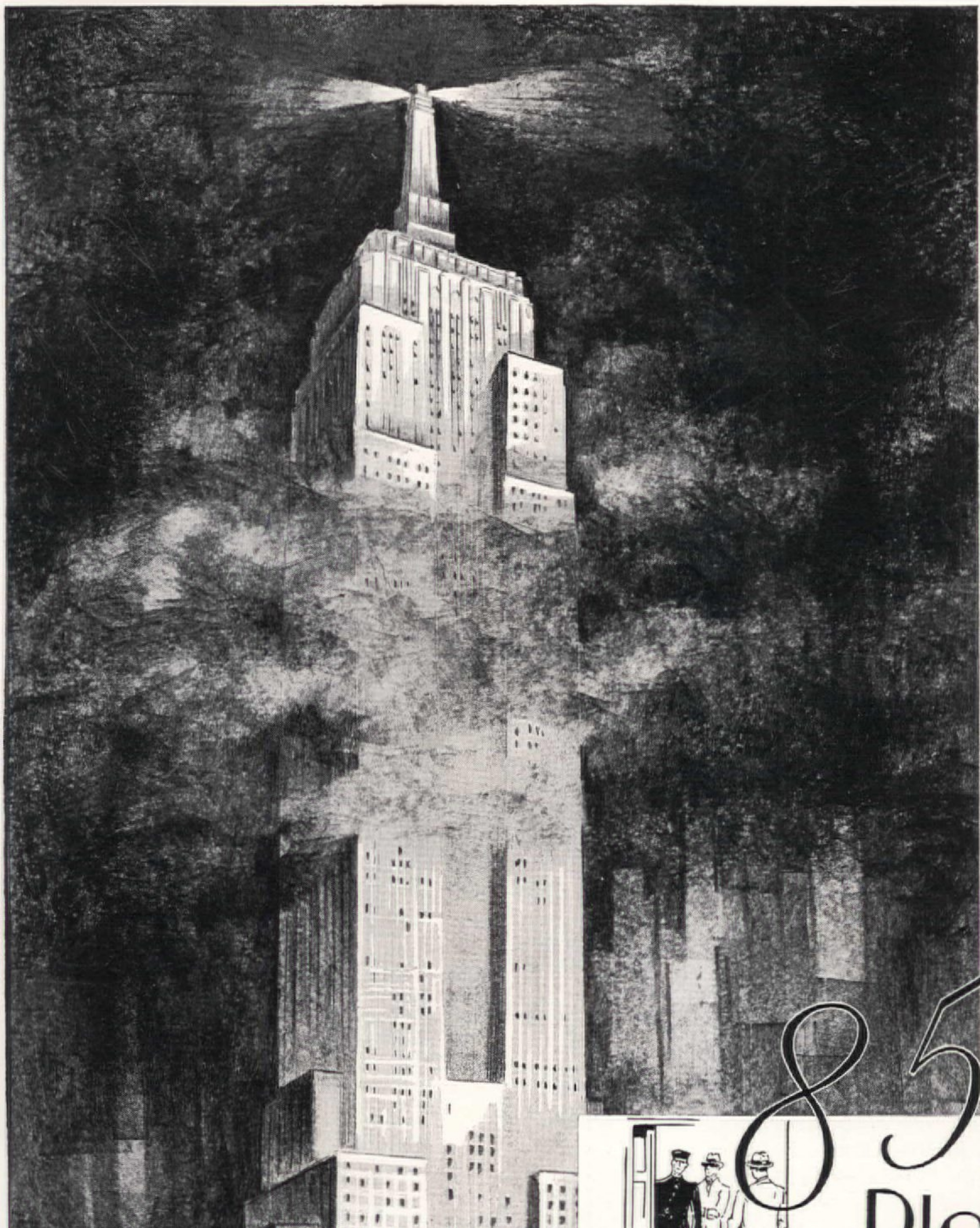
Structural Steel Contractors

American Bridge Company
Fabricators



85th floor Please!

Truly a triumph of Structural Steel—the 85-story Empire State Building, now under construction in New York City! Carnegie Beams form the steel framework of this modern Colossus. The many unique advantages of these sections, responsible for their wide popularity, merit the investigation of those interested in efficient steel construction—whether for a bridge, a factory, or a building in which you ride to the eighty-fifth or walk up to the second.

CARNEGIE STEEL COMPANY - PITTSBURGH, PA.
Subsidiary of United States Steel Corporation 82

CARNEGIE BEAMS

SPLIT-SECOND CONTROL HAS SAVED ST. PAUL'S

St. Paul's Cathedral, London
Started A. D. 1675
Completed A. D. 1710
Photo by Ewing Galloway

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Sika* was used to control the setting of the Portland cement grout used in the foundation work. It was timed so accurately that each batch flowed freely into its appointed place and then set immediately. This split-second accuracy was essential to the successful use of the grout.

You ought to know about Sika. Send for complete information.*
** Pronounced See-ka; Sanskrit word for "Dry."*

Sika

WATERPROOFS UNCONDITIONALLY

Sika* is a liquid. Used in the gauge water it makes Portland cement completely crystalline and therefore insoluble. Frost, dilute acids and oils do not affect it. It becomes impervious to water even under high pressure. Portland cement aggregates made with it are many times stronger than the same aggregates made without it. With split-second accuracy it controls the time of setting from 5 seconds up to 7 hours.

AMERICAN SIKA CORPORATION

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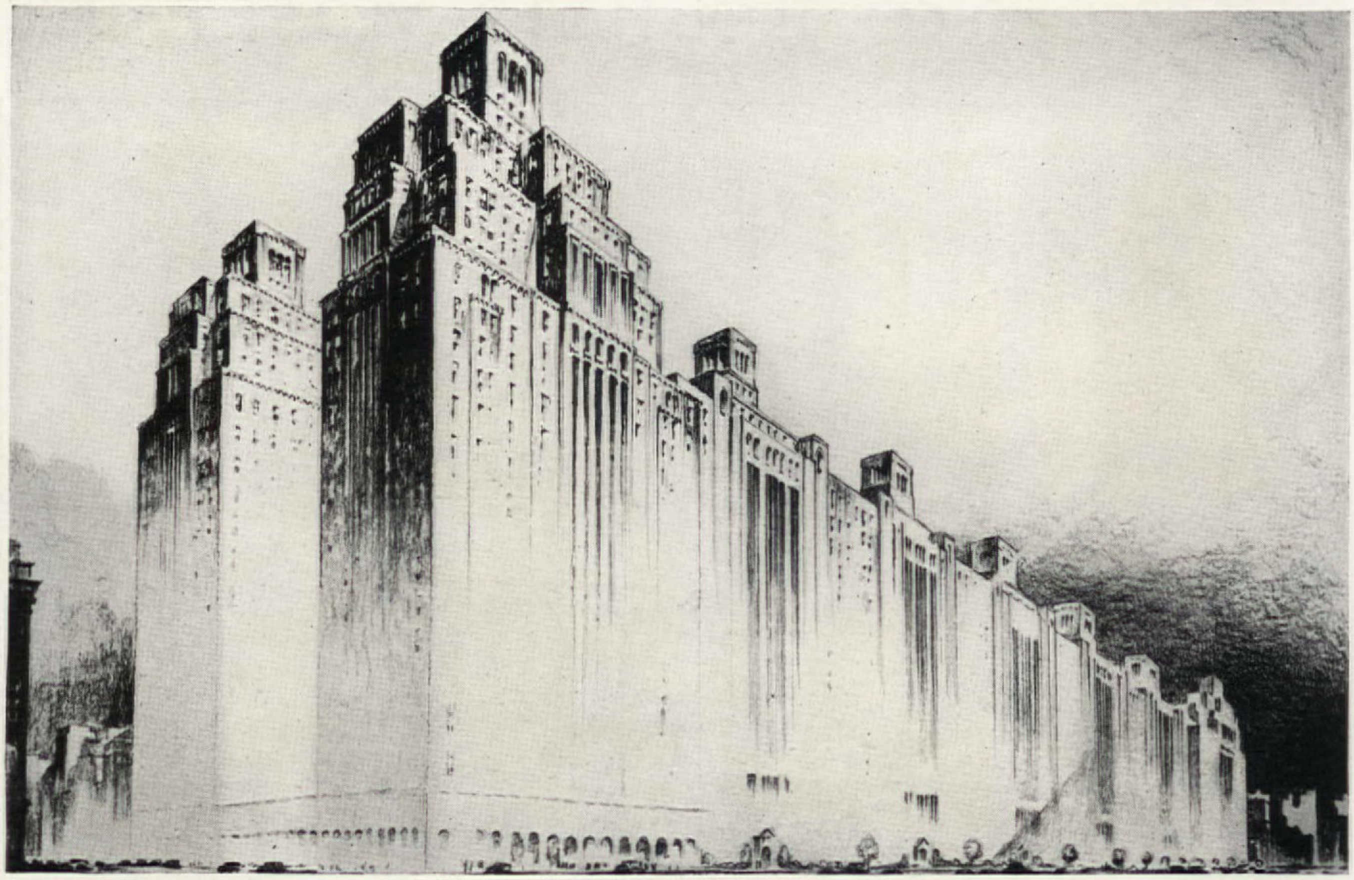

London Terrace Apartments, New York City—The Henry Mandel Company, Owners and Builders; Farrar & Watmough, Architects

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

MINWAX METHOD

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

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

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

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

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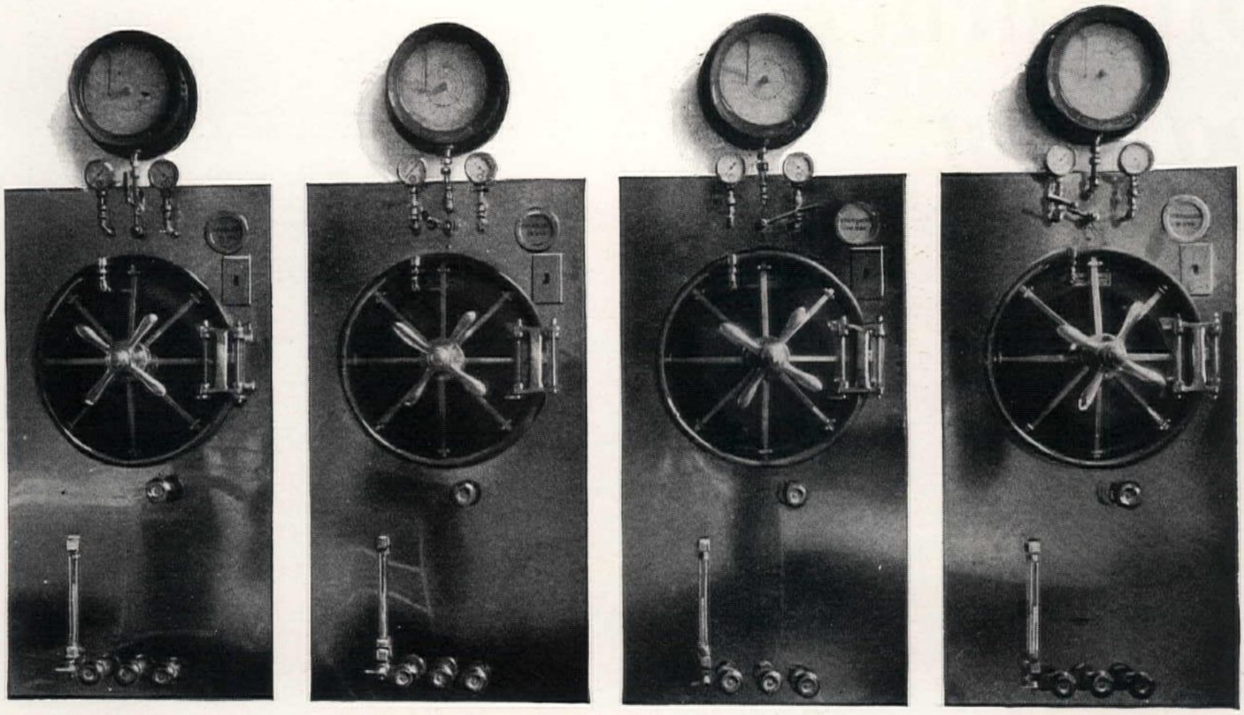
Leading Hospitals favor *Sanitary* Monel Metal for clinical service



"Climax" built-in sterilizers with Monel Metal panels, installed in the Beth Israel Hospital, New York, N. Y., by THE HOSPITAL SUPPLY COMPANY *and* WATTERS LABORATORIES, CONSOLIDATED. *Architect:* LOUIS ALLEN ABRAMSON, N. Y.

IN planning the modern hospital no factor deserves more careful attention than the selection of clinical equipment—particularly in regard to construction and quality. Here, above all, the question of first cost is subordinate to the principle of lasting efficiency and long-run economy.

For this reason, many of the most important hospitals have standardized on Monel Metal equipment for clinical use. They know that the many advantages which this silvery Nickel alloy has manifested in food and laundry service can be applied with equal success to the professional side of hospital work.

Inherently clean, Monel Metal provides scrupulous sanitation with minimum cleaning labor. Its lustrous, rust-proof surface resists the repeated attacks of cleaning compounds and disinfecting solutions. It has no coating to chip, crack or wear off. It offers the strength and toughness of steel with greater durability.

You can insure your clients' lasting satisfaction by specifying Monel Metal wherever service conditions demand low cost sanitation with enduring strength and beauty.

Send for "Modern Hospital Equipment", an illustrated book on the use of Monel Metal for clinical, food service and laundry equipment.

The story of Monel Metal — its properties and uses — is told in a fascinating 2-reel motion picture film now available for free distribution. Write for details.

MONEL METAL

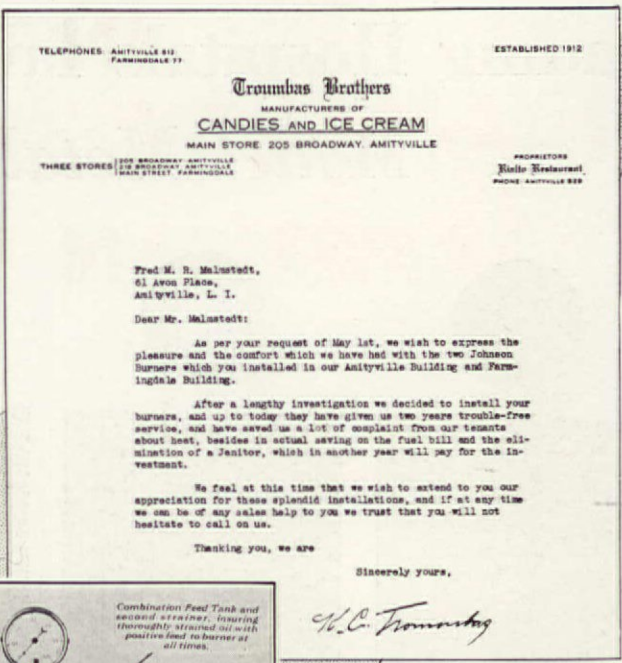
INCO MONEL METAL TRADE MARK

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

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

The Johnson Oil Burner

pays for itself...



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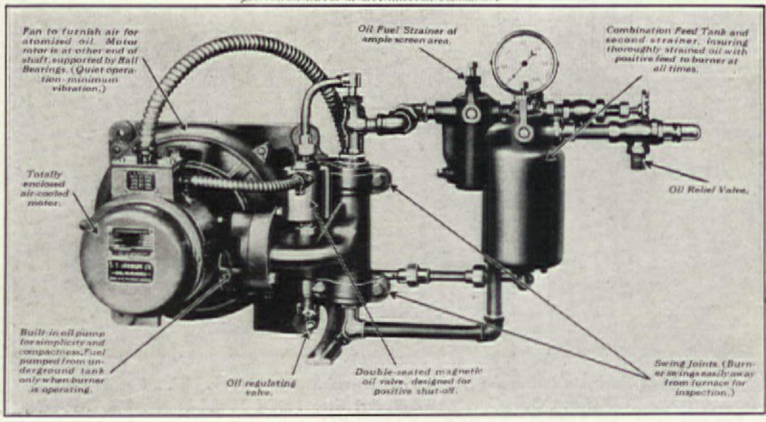
After a lengthy investigation we decided to install your burners, and up to today they have given us two years trouble-free service, and have saved us a lot of complaint from our tenants about heat, besides in actual saving on the fuel bill and the elimination of a Janitor, which in another year will pay for the investment.

We feel at this time that we wish to extend to you our appreciation for these splendid installations, and if at any time we can be of any sales help to you we trust that you will not hesitate to call on us.

Thanking you, we are

Sincerely yours,

One of the thousands of unsolicited letters in our files, praising the dependability and efficiency of Johnson Oil Burning Equipment.



IN HUNDREDS of cases Johnson Oil Burners have paid for themselves by reducing fuel costs, eliminating janitor service and ash-removal expense. And these savings continue year after year.

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Our Engineering Department, thoroughly experienced in all phases of heating and power problems, will be glad to assist you in any way.

We will also be pleased to send a copy of our catalogue as published in "Sweet's," for your files. Just write *"Bulletin 4-B, please,"* on your letterhead or business card, no obligation incurred, your copy will be sent at once.

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Selected List of Manufacturers' Publications

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

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

ACOUSTICS

R. Guastavino Co., 40 Court Street, Boston.
Akoustolith Plaster. Brochure, 6 pp., 8½ x 11 ins. Akoustolith as Related to Architectural Acoustics. Booklet 10 pp., 8½ x 11 ins.

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.

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

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.

CARPETS

Collins & Aikman Corporation, 25 Madison Avenue, New York.
"Seemingly Seamless Carpets." Booklet, 8 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.

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.

Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
Medusa Waterproofed Gray Portland Cement. Booklet, 30 pp., 8½ x 11 ins. Illustrated.
Medusa White Portland Cement, Non-Staining. Brochure, 30 pp., 8½ x 11 ins. Illustrated.

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.
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.

CLUB EQUIPMENT

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

CONCRETE BUILDING MATERIALS

Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Modern Concrete Reinforcement. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CONSTRUCTION, FIREPROOF

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.

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

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.

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Tubular Steel Doors. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

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.

REQUEST FOR CATALOGS

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 163*

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. 4¼ 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.

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.

Ward Leonard Electric Co., Mt. Vernon, N. Y.
Mobile Color Lighting. Booklet, 46 pp., 8½ x 11 ins. Illustrated. Valuable work on the subject.

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, 4¼ 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.

FIREPROOFING

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

FIREPROOFING—Continued

Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Economical Fireproof Floors for Suburban Buildings. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Havemeyer Steel Joist. The Joist with the Twin-Tee Chords. Booklet, 24 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.

FLOODLIGHTING

National Terra Cotta Society, 230 Park Avenue, New York, N. Y.
Terra Cotta Buildings Are Superior for Floodlighting. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

FLOOR HARDENERS (CHEMICAL)

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, 2 Park Avenue, New York, N. Y.
Havemeyer Steel Joist. The Joist with the Twin-Tee Chords. Booklet, 24 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.
Service Sheet No. 3. Specifications and Details of Design and Construction for Gypsteel Pre-Cast Floors and Ceilings. Folder, 8½ x 11 ins. Illustrated.

FLOORING

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

Blabon-Sandura Company, Inc., Finance Building, Philadelphia.
Blabon's Linoleum Styles for 1930. Booklet, 64 pp., 6¾ x 8½ ins. Illustrated.
Detailed Instructions for Handling and Laying Linoleum. Brochure, 40 pp., 3¼ x 5¾ ins. Illustrated.
Blabon's Linoleum Floors and Where You Will Find Them. Booklet, 8 pp., 8½ x 11 ins. Illustrated.
Comparison of Tests. Folder, 8½ x 11 ins. Illustrated.

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.

Goodyear Tire & Rubber Co., Inc., Akron, Ohio.
Beautiful Floors, Architects' Reference Book. Brochure, 32 pp., 8½ x 11 ins. Illustrated. Valuable data on flooring.
Rubber Flooring News Monthly publications. 8½ x 11 ins. Illustrated. Giving data on flooring for buildings of many types.
Manual of Goodyear Rubber Tile Installation Booklet. 7¾ x 10¾ ins. Illustrated.

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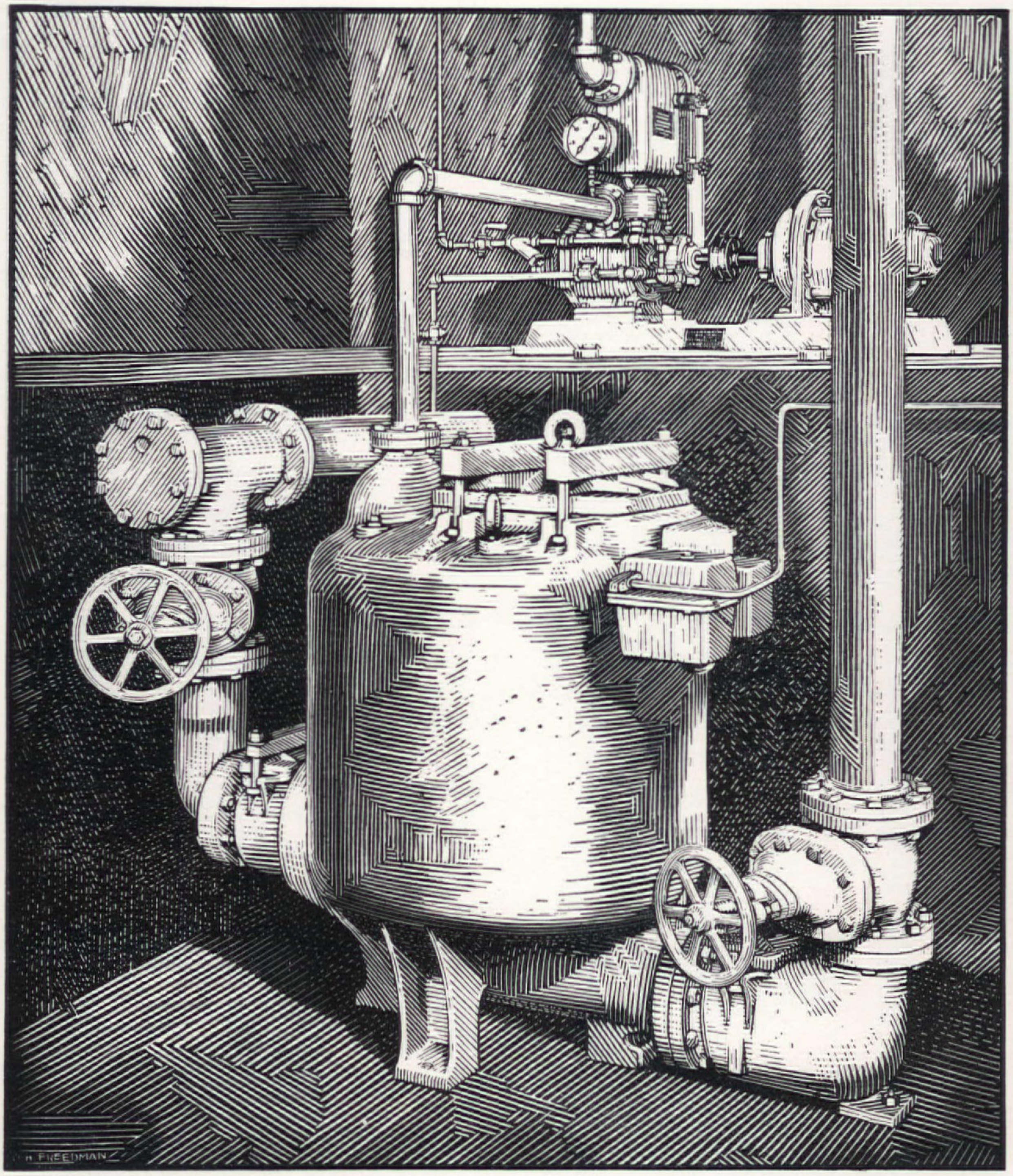

Jennings Pumps

JENNINGS Type A Pneumatic Sewage Ejector has proven to be by far the most satisfactory equipment for lifting unscreened sewage from deep basements and discharging this sewage into the street sewer. For installation in large buildings and institutions, this Type A unit is furnished in capacities of 50 to 1500 g. p. m. Heads up to 50 ft. *Write for Bulletins.*

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

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 164*

Continued from page 164

FLOORING—Continued

C. Pardee Works, 101 Park Ave., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.
Pardee Tiles. Bound Volume, 48 pp., 8½ x 11 ins. Illustrated.

Stedman Rubber Flooring Company, South Braintree, Mass.
Stedman Ray-Proof Rubber. Booklet, 12 pp., 5½ x 8 ins. Illustrated. For X-ray Rooms.
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.

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 9½ ins. Illustrated. Deals with fine line of furniture for hotels, clubs, institutions, schools, etc.
Kittinger Club and Hotel Furniture. Booklet, 20 pp., 6 x 9 ins. Illustrated. Data on furniture for hotels and clubs.
A Catalog of Kittinger Furniture. Booklet, 78 pp., 11 x 14 ins. Illustrated. General Catalog.

GARAGES

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

GLASS CONSTRUCTION

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

Libbey-Owens Sheet Glass Co., Toledo, Ohio.
Flat Glass. Brochure, 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.

GYPSUM

Structural Gypsum Corporation, Linden, N. J.
Service Sheet No. 1. Specifications and Details of Design and Construction for Gypsteel Pre-Cast Long-Span Roofs. Folder, 8½ x 11 ins. Illustrated. Service Sheet No. 2. Specifications and Details of Design and Construction for Gypsteel Pre-Case Short-Span Roofs. Folder, 8½ x 11 ins. Illustrated.

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.

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.

HARDWARE—Continued

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.

Todhunter, Inc., 119 East 57th St., New York, N. Y.
Colonial Hardware. Booklet. 12 pp., 8½ x 11 ins. Illustrated. Deals with hardware of the best type for exterior and interior use.

HEATING EQUIPMENT

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

American Radiator Company, The, 40 West 40th St., N. Y. C.
Ideal Boilers for Oil Burning. Catalog 5½ x 8½ ins., 36 pp. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.
Corto—The Radiator Classic. Brochure, 5½ x 8½ ins., 16 pp. Illustrated. A brochure on a space-saving radiator of beauty and high efficiency.
Ideal Arcola Radiator Warmth. Brochure, 6¾ 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.

Bryant Heater & Mfg. Co., 17825 St. Clair Ave., Cleveland, Ohio.
Handbook on Heating Buildings with Bryant Gas Furnaces. Booklet, 12 pp., 8½ x 11 ins. Illustrated.
Handbook on Heating Water with Bryant Gas Boilers. Brochure, 20 pp., 8½ x 11 ins. Illustrated.
Handbook on Heating Buildings with Bryant Gas Boilers. Booklet, 20 pp., 8½ x 11 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.

Grinnell Company, Providence, R. I.
Grinnell Discovers a Superior Heating Trap. Folder, 4 pp., 8½ x 11 ins. Illustrated.

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.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 166*

HEATING EQUIPMENT—Continued

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.

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.
The Crimson Flame. Folder, 6 pp., 4¼ x 7 ins. Illustrated.
Contento Brings Contentment to Your Home. Folder, 12 pp., 3½ x 6 ins. Illustrated.
National Jacketed Boiler. Folder. 4 pp., 8½ x 11 ins. Illustrated.
National Super-Smokeless Boiler. Folder, 4 pp., 8½ x 11 ins. Illustrated.
Aero, the National Radiator Sizes and Ratings. Booklet, 16 pp., 5 x 7⅞ ins. Illustrated.

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.

Rome Brass Radiator Corp., (Aul-Brass Heater Division) 1 East 42nd St., New York.
Aulbras Hot Water Heaters. Booklet, 12 pp., 8½ x 11 ins. Illustrated in color.

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., 6⅝ x 9 ins. Illustrated. Complete line of magazine feed cast iron sectional and steel tubular heaters.
Spencer Magazine Heaters, for Steam, Vapor or Hot Water. Brochure, 28 pp., 5¾ x 9 ins. Illustrated.
The Fire that Burns Uphill. Brochure, 24 pp., 6⅛ 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."

HEATING EQUIPMENT—Continued

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.

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.

Wilmot Castle Company, Union Trust Bldg., Rochester, N. Y.
The Hospital Sterilizer Data Sheets. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Data on planning sterilizer installations.

HOTEL EQUIPMENT

Pick-Barth Company, Inc., Albert, 1200 West 35th St., Chicago, and 34 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 7¾ 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. 18, 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.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 168*

INSULATION—Continued

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.

Cork Import Corporation, 345 West 40th Street, New York.
Novoid Cork Covering for Cold Pipes, Coolers and Tanks. Folder 8½ x 11 ins. Illustrated.
Novoid Corkboard Insulation. Folder 8½ x 11 ins. Illustrated.

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

JOISTS

Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Havemeyer Steel Joist. The Joist with the Twin-Tee Chords. Booklet, 24 pp., 8½ x 11 ins. Illustrated.
Modern Concrete Reinforcement. Brochure, 32 pp., 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 Club Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.
Practical Planning for School Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.
Planning Restaurants That Make Money. Booklet, 78 pp., 8½ x 11 ins. Illustrated. Excellent work on equipment.

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, Inc., 119 East 57th St., New York, N. Y.
Lanterns. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Deals with a fine assortment of fixtures for exterior and interior use.

LATH, METAL AND REINFORCING

Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Havemeyer Building Products, Booklet, 40 pp., 8½ x 11 ins. Illustrated.

Milcor Steel 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.

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 Equipment of Small Hotels, Hospitals and Institutions. Booklet, 36 pp., 8½ x 11 ins. Illustrated.

General Laundry Machinery Corporation, 608 South Dearborn St., Chicago, Ill.
General All-Metal Washer. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Timken-equipped Monel metal washer with one-lever control.
General Dry Tumbler. Brochure, 16 pp., 8½ x 11 ins. Illustrated. Specifications and details of Up-Draft Dry Tumbler with automatic temperature control.

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.

Gleason Tiebout Glass Company, 67 West 44th St., New York, N. Y.
Fragment of Celestialite. Booklet, 24 pp., 7 x 10 ins. Illustrated. Data on lighting for offices, schools, hospitals, etc.
Celestialite Catalog 727. Booklet, 18 pp., 8½ x 11 ins. Illustrated. Valuable brochure on lighting.

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.

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.

Todhunter, Inc., 119 East 57th St., New York, N. Y.
Georgian Mantels. Brochure, 12 pp., 8½ x 11 ins. Illustrated. Illustrates and describes an excellent assortment of fine mantels based on Georgian precedent.

MARBLE

The Georgia Marble Company, Tate, Ga.; New York Office, 1328 Broadway.
Why Georgia Marble Is Better. Booklet, 3⅜ x 6 ins. Gives analysis, physical qualities, comparison of absorption with granite, opinions of authorities, etc.
Convincing proof. 3⅜ 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.

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

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.

MILL WORK—See also Wood

Curtis Companies Service Bureau, Clinton, Iowa.
Your Dream Kitchen, Booklet, 11 pp., 7¾ x 10½ ins. Illustrated. Fine line of fittings for kitchens, breakfast alcoves, etc.

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., 5¾ 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.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
"How to Paint Concrete and Masonry Surfaces." Booklet, 16 pp., 8½ x 11 ins. Illustrated.

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.

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.

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.

PARTITIONS—Continued

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.

Structural Gypsum Corporation, Linden, N. J.
Service Sheet No. 4. Specifications for Gypsteel Partition File. Folder, 8½ x 11 ins. Illustrated.

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

PIPE

American Brass Company, Waterbury, Conn.
Bulletin B-1. Brass Pipe for Water Service. 8½ x 11 ins., 28 pp. Illustrated. Gives schedule of weights and sizes (I.P.S.) of seamless brass and copper pipe, shows typical installations of brass pipe, and gives general discussion of the corrosive effect of water on iron, steel and brass pipe.

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

Bethlehem Steel Company, Bethlehem, Pa.
Bethlehem Wrought Steel Pipe, Catalog P. Booklet, 20 pp., 4¾ x 7¼ ins. Illustrated.

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.

Maurice A. Knight, Akron, Ohio.
Knightware in the Princeton Chemical Laboratory. Booklet, 16 pp., 6¾ x 8½ ins. Illustrated.

National Tube Co., Frick Building, Pittsburgh, Pa.
"National" Bulletin No. 2. Corrosion of Hot Water Pipe, 8½ x 11 ins., 24 pp. Illustrated. In this bulletin is summed up the most important research dealing with hot water systems. The text matter consists of seven investigations by authorities on this subject.

"National" Bulletin No. 3. The Protection of Pipe Against Internal Corrosion, 8½ x 11 ins., 20 pp. Illustrated. Discusses various causes of corrosion, and details are given of the deactivating and 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.

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.

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Canadian Representatives, Darling Bros., Ltd., 140 Prince St., Montreal, Que., Canada.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 172*

PLASTER—Continued

Interior Walls Everlasting. Brochure, 20 pp., 6¼ x 9¾ 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.

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.

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

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.

Yeomans Brothers Company, 1433 Dayton Street, Chicago.
Yeomans Horizontally Split Case Centrifugal Pumps. Booklet, 12 pp., 8½ x 11 ins. Illustrated.

REFRIGERATION

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

REINFORCED CONCRETE—See also Construction, Concrete

Concrete Steel Company, 2 Park Avenue, New York, N. Y.
Modern Concrete Reinforcement. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

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

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.

Examples of Theaters and Theater Roofs. Brochure, 16 pps., 8½ x 11 ins., Illustrated. Contains views of theaters designed by some of the country's leading architects.

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., 8¼ 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.

Milcor Steel 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.

SCHOOL EQUIPMENT

John Van Range Co., Cincinnati.
Practical Planning for School Food 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.

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.

Yeomans Brothers Company, 1433 Dayton Street, Chicago.
The Shone System of Pneumatic Sewage Ejectors (Screenless). Brochure. 20 pp., 8½ x 11 ins. Illustrated.
Yeomans Heavy Duty Screenless Submerged Type Sewage Ejectors. Booklet. 12 pp., 8½ x 11 ins. Illustrated.

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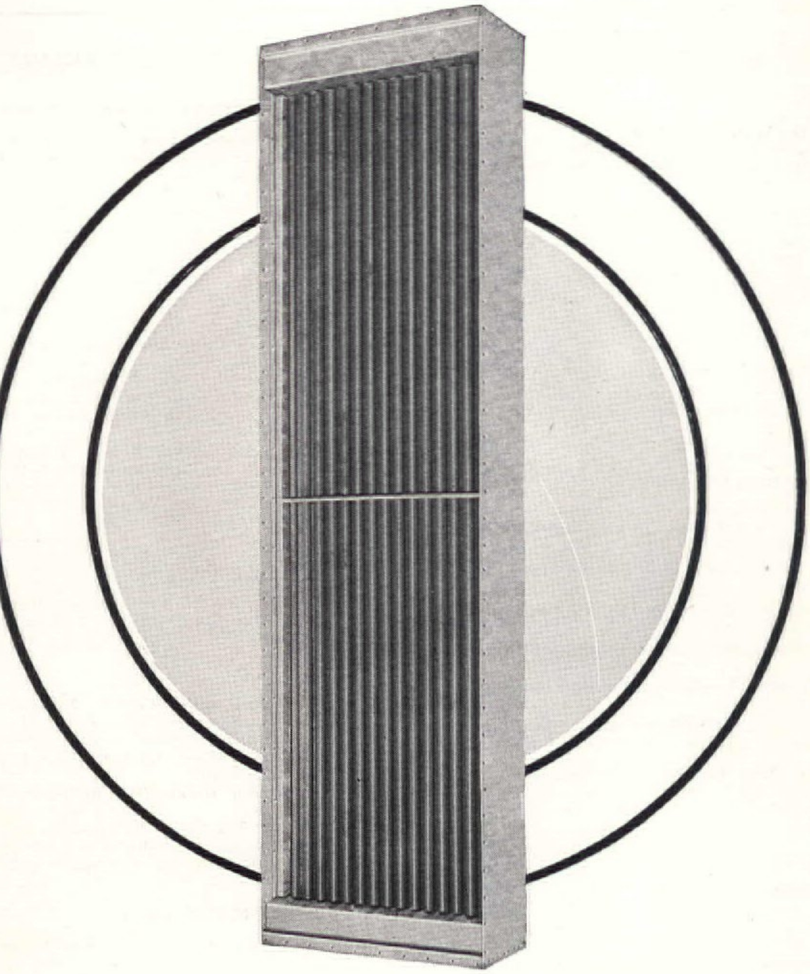

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Chicago, Ill.

40 West 40th Street
New York, N. Y.

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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.

SHELVING-STEEL

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

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.

Bethlehem Structural Shapes Bound Volume, 368 pp., 4¼ x 6¾ ins. Illustrated.

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, 11½ x 8¾ ins. Illustrated. Describes and illustrates the use of stone for small houses with floor plans of each.

Volume 6. Series B. Indiana Limestone School and College Buildings. 8½ x 11 ins., 80 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.
Catalog M, 1929 Edition, 64 pages, 8½ x 11 ins., with the A.I.A. File No., profusely illustrated. General Catalog.

Detail Sheet and descriptive folder, 8½ x 11 ins., with A.I.A. File No. featuring "B" Store Front Construction, designed along modernistic lines.

National Terra Cotta Society, 230 Park Avenue, New York, N. Y.
Terra Cotta Stores and Store Fronts. Booklet, 15 pp., 8½ x 11 ins. Illustrated.

TELEPHONE SERVICE ARRANGEMENTS

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

Planning for Home Telephone Conveniences. Booklet, 52 pp., 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.

Color in Architecture. Revised Edition. Permanently bound volume, 9⅛ x 12¼ ins., containing a treatise upon the basic principles of color in architectural design, illustrating early European and modern American examples. Excellent illustrations in color.

TIMBREL TILE VAULTS

R. Guastavino Co., 40 Court Street, Boston.
Timbrel Arch Construction. Booklet, 8 pp., 8½ x 11 ins.

TILE, HOLLOW

National Fire-Proofing Co., 250 Federal Street, Pittsburgh, Pa.
Natco. The Complete line of Structural Clay Tile. Booklet. 39 pp. 8½ x 11 ins. Illustrated. A General Catalog.
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.

TILE, STRUCTURAL CLAY

National Fireproofing Corporation, Fulton Building, Pittsburgh, Pa.
Natco. The Complete Line of Structural Clay Tile. Booklet, 48 pp., 8½ x 11 ins. Illustrated. A General Catalog.
Natco Vitritile Bulletin No. 164. 40 pp., 8½ x 11 ins. Illustrated. Shows color charts, sizes and shapes, actual installations, etc.
Natco Header Backer Tile Bulletin. 8½ x 11 ins. 4 pp. Illustrated.
Natco Unibacker Tile Bulletin. 8½ x 11 ins. 4 pp. Illustrated.
Natcoflor Bulletin. 8½ x 11 ins., 6 pp. Illustrated.

TILES

Flint Faience & Tile Co., Flint, Mich.
Vitocraft Tiles, Unglazed. Folder, 4 pp., 8½ x 11 ins. Illustrated. Details of patterns in full color. Ask for Form A-322.
Faience Tiles for Bathrooms. Folder, 4 pp., 8½ x 11 ins. Illustrated. Ask for Form A-303.
Faience and Vitocraft, Unglazed. Folder, 4 pp., 8½ x 11 ins. Illustrated. Views of installations. Ask for Form A-304.
Flintcraft Files. Folder, 4 pp., 8½ x 11 ins. Illustrated. Machine-made floor or wall tile. Ask for Form A-363.

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

C. Pardee Works, 101 Park Ave., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.

Pardee Tiles. Bound volume, 48 pp., 8½ x 11 ins. Illustrated.

TRUSSES

McKeown Bros. Company, 523 South Keeler Avenue, Chicago.
Truth in Architecture. Folder, 4 pp., 8½ x 11 ins. Illustrated. Deals with use of trusses of wood.
Factory Built Bowstring Trusses. Folder, 4 pp., 8½ x 11 ins. Illustrated.
Timber Trusses. Folder, 4 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.

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

VALVES—Continued

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.

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

Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
Medusa Waterproofed Gray Portland Cement. Booklet, 30 pp., 8½ x 11 ins. Illustrated.

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.

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.

WINDOW GLASS

Pittsburgh Plate Glass Company, Grant Building, Pittsburgh, Pa.
Pennvernon Window Glass With the New Flatter Surface. Booklet, 16 pp., 8½ x 11 ins. Illustrated.

WINDOWS

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Pivoted Windows. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Sections, hardware, and other details, and illustrations of installations.

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.
Lupton Pivoted Sash. Catalog 12-A. Booklet, 48 pp., 8⅝ x 11 ins. Illustrates and describes windows suitable for manufacturing buildings.

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.

WINDOWS, CASEMENT—Continued

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., 8⅝ x 11 ins. Illustrated brochure on casements, particularly for residences.

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.

Architectural Details. Booklet, 8½ x 11 ins., 16 pp. Tables of specifications and typical details of different types of construction.

List of Parts for Assembly. Booklet, 8½ x 11 ins., 16 pp. Full lists of parts for different units.

WINDOW SCREENS

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Pivoted Windows Screened. Booklet, 8 pp., 8½ x 11 ins. Data on screening and window ventilation.

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

WINDOWS, STEEL AND BRONZE

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Steel Window Inserts. Brochure, 8 pp., 8½ x 11 ins. Illustrated. Suggestions on correct use of inserts.

David Lupton's Sons Company, Philadelphia, Pa.
A Rain-shed and Ventilator of Glass and Steel. Pamphlet, 4 pp., 8⅝ x 11 ins. Deals with Pond Continuous Sash. Sawtooth Roofs, etc.

How Windows Can Make Better Homes. Booklet, 3⅞ x 7 ins., 12 pp. An attractive and helpful illustrated publication on use of steel casements for domestic buildings.

Truscon Steel Company, Youngstown, Ohio.
Drafting Room Standards. Book, 8½ x 11 ins., 120 pages of mechanical drawings showing drafting room standards, specifications and construction details of Truscon Steel Windows, Steel Lintels, Steel Doors and Mechanical Operators.

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

Continuous Steel Windows and Mechanical Operators. Catalog 126. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

WOOD—See also Millwork

American Walnut Mfrs. Association, 618 So. Michigan Boulevard, Chicago, Ill.
American Walnut. Booklet 7 x 9 ins., 46 pp. Illustrated. A very useful and interesting little book on the use of walnut in Fine Furniture with illustrations of pieces by the most notable furniture makers from the time of the Renaissance down to the present.

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

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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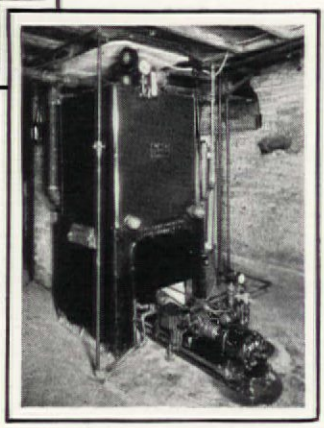

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REVIEWS OF MANUFACTURERS' PUBLICATIONS

THE CHARLES PARKER COMPANY, Meriden, Conn. "Parker Bathroom Accessories."

The modern bathroom owes much of its attractiveness to the ingenuity of the designers who have invented the accessories of one kind or another which render it spick and span. Manufacturers have kept pace with their designers, and the result is an assortment of fittings attractive in the extreme, a line to which additions are constantly being made. In this particular booklet there are illustrated and described the countless details for bathrooms carried by this well known firm, details finished in chromium, nickel plate, white enamel, nickel silver, etc., medicine cabinets; mirrors, soap, paper, sponge and towel holders; shelves, towel bars and racks; bath seats and stools; and the brochure illustrates and describes a line of fixtures designed particularly for marine use. Every type of fixture and accessory used in the bathroom is included in the Parker line. In addition, the Parker firm is particularly well equipped to design and manufacture special articles the architect may desire for unusual conditions or locations. "The architect may, therefore, specify Parker fixtures with absolute confidence that (1) all the fixtures required will be available, (2) they will be of the highest grade, (3) the finish of each article will be perfect, and (4) the date of delivery will be met regardless of how large the order is. The Charles Parker Company specializes on large contract orders where complete equipment of all bathroom fixtures is required. Parker accessories have been installed in leading hotels, hospitals, clubs, apartment houses, office buildings, etc., throughout the country as well as on several of the largest steamships built in American shipyards." The booklet should find a place in the specification files of every architect or engineer.

FRIGIDAIRE CORPORATION, DAYTON, O. "Frigidaire and Electric Range Combined."

Architects who are interested in the designing of buildings containing small apartments are likely to value anything which economizes space. The manufacturers of bathroom fittings have experimented in devising arrangements which permit placing the necessary fixtures in the "irreducible minimum" of area, and the invention of the bed which during the day may be folded into a closet meant the further economy of valuable area. But neither of these meant anything in economy of space in the kitchenette, and there if anywhere space saving was necessary. Every kitchen or kitchenette to be really practical must have a sink, a work table, a refrigerator, and a range for cooking. The use of electrical refrigeration has become general, and there has now been placed upon the market a combined refrigerator and range which of course aids greatly in reducing the square foot area which is required in a kitchen or a kitchenette. The arrangement provides for placing the range for cooking on top of the refrigerator. The exterior of the Frigidaire cabinet is finished either in cream white Duco or gray and white porcelain-on-steel, with a gleaming white porcelain-on-steel interior. There is nothing to catch dust or dirt. Surfaces, inside and out, are as easily cleaned as chinaware. And the mechanism is completely concealed. It is also equipped with the famous "Fridigaire cold control" which speeds the freezing of ice cubes and makes possible the serving of many new frozen desserts and salads. With the new Frigidaire combination model, one can not only offer prospective tenants the advantages of a superior electric refrigerator, but also a high grade electric range. The range is equipped with oven and surface burners, which can be heated at the turn of a switch. The oven burners are recessed to allow maximum cooking space. The exterior of the range is finished in durable gray and white porcelain. The interior of the oven is aluminum lined, so that it is easy to clean. The broiler and oven of the range are combined, making a more compact arrangement and eliminating the inconvenience of having a separate door for the broiler. Either open or enclosed hotplates can be secured for the surface burners. High grade nickel chromium resistance wires are used throughout. The inside wiring in the range has asbestos covering, and the connecting parts are of monel metal to prevent oxidation where they are connected to the burners.

COPPER & BRASS RESEARCH ASSOCIATION. "America's Leading Bankers Recommend Copper and Brass."

Architects and builders hardly need to be reminded of the great durability of copper, brass and bronze, but it is interesting and no doubt well worth while to have this excellence emphasized by a notable group of men, particularly when the men control the vast sums of money which are required for present-day building upon a scale which is literally colossal. This booklet, published by the Copper & Brass Research Association, gives the quoted opinions of bankers in the principal cities of America. Each page which bears a quotation presents the banker's "counterfeit presentment," while at the bottom of the page there appears a cut of what is presumably the bank of which the banker is the president or possibly the chief executive.

THE KAWNEER COMPANY, Niles, Mich. "National Magazines Broadcast This Message Each Month."

The Kawneer Company has for many years been widely known for the excellence of its metal store parts, its metal windows of one type or another, and building materials of other varieties made of metal. This particular publication is a folder of large size containing reproductions of advertisements appearing in quite a number of magazines, chiefly in national and trade publications having to do with merchandising in different forms. The advertisements deal with the bronze shop fronts, doors and windows which are supplied by the Kawneer Company and at the bottom of each advertisement in bold faced type appear the words "Consult an Architect; the Service is Valuable." This line, it is said, will appear approximately 44 million times during 1930.

ASSOCIATED METAL LATH MANUFACTURERS, INC., Engineering Building, Chicago. "Partition Handbook."

Architects who plan office buildings, hotels, apartment structures, and buildings of other kinds which are built for producing revenue well know the necessity of planning so that the utmost in floor area may be had. One of the vital factors in producing the greatest possible number of square feet is quite naturally the economizing of space occupied by interior partitions, and skilled designers and engineers experimenting with materials have rendered such economy possible. Thirty years ago speed and economy forced abandonment of the slowly built bearing-wall type of building and the adoption of the rapidly erected steel frame. Impetus to this tendency was given by rapidly increasing city property values which dictated buildings of greater heights and development of a greater percentage of each floor into useful income-producing area. Both of these conditions were met by the skeleton-frame type of building which permitted structures of the necessary height, with floor area encumbered only by relatively small, load-bearing columns, and with comparatively thin non-bearing exterior walls. This booklet is issued in the interest of the metal lath, for which during the past few years there has been a steadily increasing demand. "Thin 2-inch solid metal lath and plaster reinforced partitions: (1) add from 3 to 7 per cent to the clear, useable space of a building over and above that obtainable with other types of partitions; (2) they are built for equal or less cost than others commonly used; (3) they are 33 per cent lighter than commonly used masonry partitions; (4) are absolutely incombustible and fire-resistive to an unusual degree; (5) are superior to all others in freedom from plaster cracks; (6) possess sound-resisting qualities superior to any others of equal thickness and equal to hollow masonry partitions twice as thick; (7) are adapted for use in every type of building from the bungalow to the tallest commercial structure. For these and many other reasons it is believed that the building industry will welcome complete information on partition construction in general, and solid partitions in particular. It is to this end that this Handbook has been prepared, and it is hoped it will prove a valued source of reference in the offices of architects, engineers and others of the industry." The importance of the subject should secure for the booklet a wide circulation among engineers, architects and operators of buildings.

REVIEWS AND ANNOUNCEMENTS

YORK ICE MACHINERY CORPORATION, York, Pa. "Equipment for Dairy and Ice Cream Industries."

Particularly since the coming of Prohibition there has been an immense increase in the consumption of ice cream and all varieties of iced soft drinks. The system for pasteurizing milk and the means of keeping it fresh while being transported long distances have been highly developed for many years, and all in all the use of appliances for chilling or freezing has so grown that the production of the requisite equipment has become a highly specialized and complicated matter, much more so than might be supposed by anyone not familiar with the subject. In all this the York Ice Machinery Corporation has been among the pioneers, and this brochure deals with the matter as fully as can be done in small compass. The booklet of course has strong interest for architects, because in hotels, restaurants and cafeterias as well as in certain other types of buildings equipment of this type must be provided. And the successful application of refrigeration demands a knowledge of refrigeration engineering as thorough as that required in the designing and building of the refrigerating machinery itself. "It is important, therefore, to bear in mind that the complete line of York ice cream and dairy equipment described has been developed by an organization which has specialized for more than half a century on the production and installation of commercial and industrial refrigeration, an organization that is today the largest manufacturer of commercial and industrial refrigerating equipment in the world. The more important items of equipment are illustrated and briefly described in this booklet which is issued primarily for those who may be making a preliminary survey of the field. More detailed information about each item is available on request to the York branch nearest at hand. The services of fully competent refrigeration engineers are also easily available."

MEDUSA PORTLAND CEMENT COMPANY, Cleveland. "Medusa Waterproofed Gray Portland Cement."

The most formidable enemy of concrete, and indeed of any form of masonry, is moisture, which enters the masonry usually through cracks or fissures of other kinds and causes the deterioration if not the ruin of the wall or whatever has been built of concrete. To prevent this it is necessary to use some substance which builds up within the concrete mass a greater water-repellency force than the force of absorption exerted by means of the capillarity of the mass. Thus does one of nature's forces overcome another. Water cannot enter the concrete, and it remains waterproof for the life of the concrete itself. This brochure deals with such a material and with the same material when combined with cement for use in mixing concrete. "Medusa Integral Waterproofing is the original waterproofing for concrete which has been used in building operations in all parts of the world under severe conditions for more than 25 years and offers the greatest water repellency for the money invested. Its best recommendation is its long service record. Nineteen years ago it was decided to unite Medusa Integral Waterproofing Power and regular Medusa Gray Portland Cement. It was thought that architects, contractors and owners would prefer to purchase one single material incorporating the virtues of two recognized building products. Consequently Medusa Waterproofed Gray Portland Cement was placed on the market. It is true that one can generally purchase Medusa Waterproofed Gray Portland Cement at a saving over regular Portland cement and Medusa Integral Waterproofing purchased separately to mix on the site. There is also a real saving in labor cost, as it does away with the man required to add the waterproofing. Another saving in time is effected in supervision. Knowing that each batch will contain the exact amount of waterproofing required, it isn't necessary to supervise the mixer so closely from that angle. Medusa Waterproofed Gray Portland Cement does not vary from regular Medusa Portland Cement in tensile strength or setting time. The waterproofing element does not change them in any way." The booklet goes fully into directions for the use of the material and contains illustrations of a great number and variety of buildings for which it has been used. The brochure presents valuable data.

Louis Allen Abramson is occupying new offices at 25 West 45th Street, New York.

Joseph Halstead Roberts is occupying new quarters at 501 Termino Avenue, Long Beach, Cal.

Charles Lincoln, Greenfield, Mass., desires the catalogs and other publications issued by manufacturers.

Clarence J. Veillette, 227 Berkshire Avenue, Bridgeport, Conn., wishes to receive the publications of manufacturers of building material.

The Building Arts Exhibit, Inc., Builders' Exchange Building, Cleveland, asks that manufacturers send their catalogs and other publications for its files.

Announcement is made of the change of name of the firm of Wolf, Sexton, Harper & Trueaux. It is now Wolf, Anderson, Harper & Trueaux, with offices in the Tribune Tower, Chicago.

INDIANA LIMESTONE COMPANY, Bedford, Ind. "Contemporary Architecture."

The type of architecture sometimes known as "modern" or "contemporary," derives much of its interest from the direct and straightforward uses of materials which possess appropriate qualities of texture and color. This is particularly true of different kinds of wood and of several metals, and there are many kinds of stone which lend themselves readily to such use. This brochure or folder is one of several publications being issued by the Indiana Limestone Company. It is illustrated with views of quite a number of buildings recently constructed in American cities, buildings in which much emphasis is laid upon straight lines and particularly upon vertical lines. "The public is awake to architecture as it never has been before. It is a live thing to people who have been accustomed to consider architecture merely as an orderly arrangement of parts in the enclosing elements of buildings. These same people are today conscious not only of the change in architectural expression, but in the materials which contribute to this result with which they are in close contact. Indiana limestone is being much used by the architects in notably effective ways, because the nature of this material lends itself well to their requirements. The natural beauty in texture and tone gives interest and vitality to the masses of large areas, and refinement and elegance to smaller units. The structure of this material makes it possible in its quarrying and fabrication to provide it economically in the large-scale units essential to the spirit of today's architecture. By nature the color of this oölitic limestone, ranging from buff to dark gray, and its varied textures provide a wide range of possibilities which meet the most exacting specifications. Some architects have seen the great beauty of certain grades of Indiana limestone, previously not widely used, and are taking advantage of these natural beauties of structure and color to create striking effects in surfaces where this inherent vigor and elegance, together or separately, are needed in mass or in detail. For those designs requiring great fineness, there is possible a selection of stone that will produce a degree of lightness in color and evenness of texture essential to the architecture of highly refined conceptions. Thus it is possible with Indiana limestone, to get a whole range of what one architect calls from 'homespun to satin.' Another advantage of Indiana limestone in modern architecture is that it lends itself in an unequaled degree to carving. As it comes from the quarries, the stone is very easily worked. The result is that sculptural work can be done at low cost. Soon after quarrying, the stone begins to harden, the carved surfaces thereby retain the finest detail, thus rendering it very valuable indeed."

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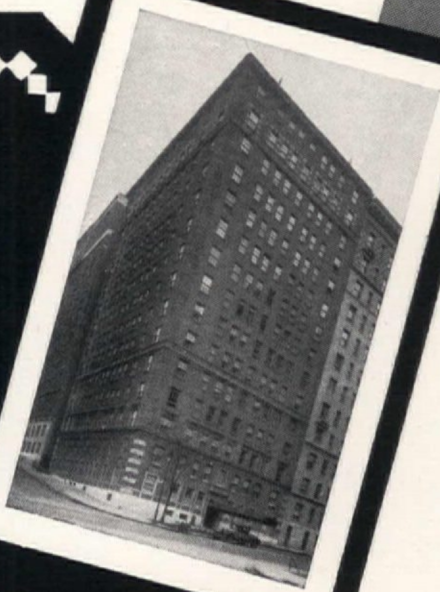

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