THE ARCHITECTURAL FORUM

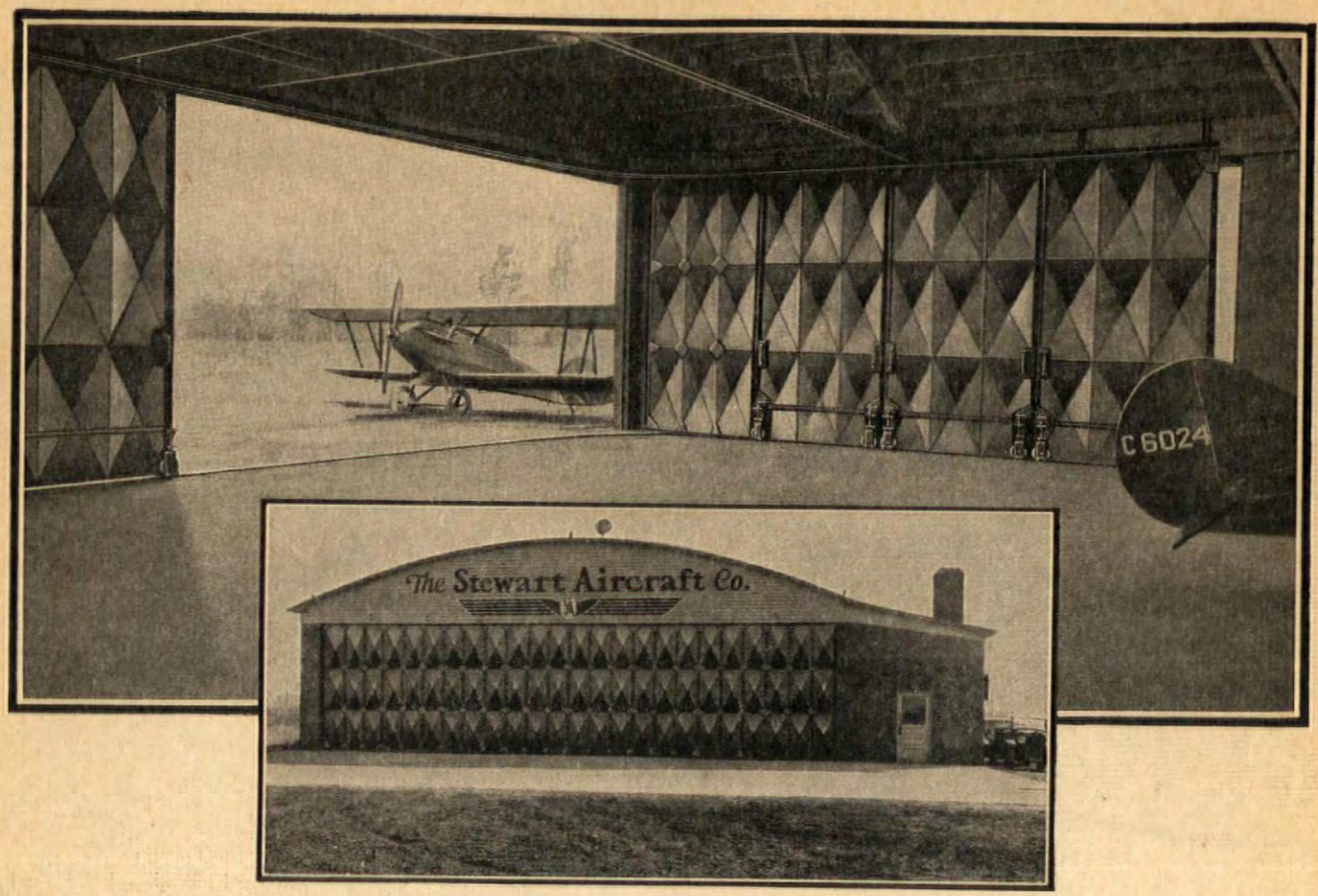
ARCHITECTURAL ENGINEERING & BUSINESS

IN TWO PARTS PART TWO

GOLF AND COUNTRY CLUB REFERENCE NUMBER

MARCH 1930

PRICE $3.00



There's an R-W Way for *every* doorway

The hangar of the Stewart Aircraft Company at the Cleveland Municipal Airport has a storage capacity of 10 planes. The doorway of the hangar is 56 ft. wide by 13 ft. 9 in. high.

When Richards-Wilcox engineers were called in to solve the doorway problem for this large opening, they installed 8 all-steel doors. They operate on curved floor rails which permit the doors to slide back to either side, allowing a full width unobstructed opening without center posts.

The top of the doors are guided by ball-bearing rollers between two channel irons. The whole weight of the doors—approximately 3 tons—is carried on R-W ball-bearing rollers running on floor rails firmly imbedded in concrete. The ball-bearing rollers give perfect balance to the doors and make one-man operation easy.

The Richards-Wilcox all-metal construction assures a door that will not warp or swell because of rain, snow, and freezing weather.

Richards-Wilcox all-metal doors and door hardware are not just so much hardware and material. Behind every installation are Richards-Wilcox engineers, who design doorway equipment to function efficiently, economically, and without trouble.

If you have a doorway problem an R-W doorway engineer will be glad to talk it over with you. There's an R-W Way.

Richards-Wilcox Mfg. Co.

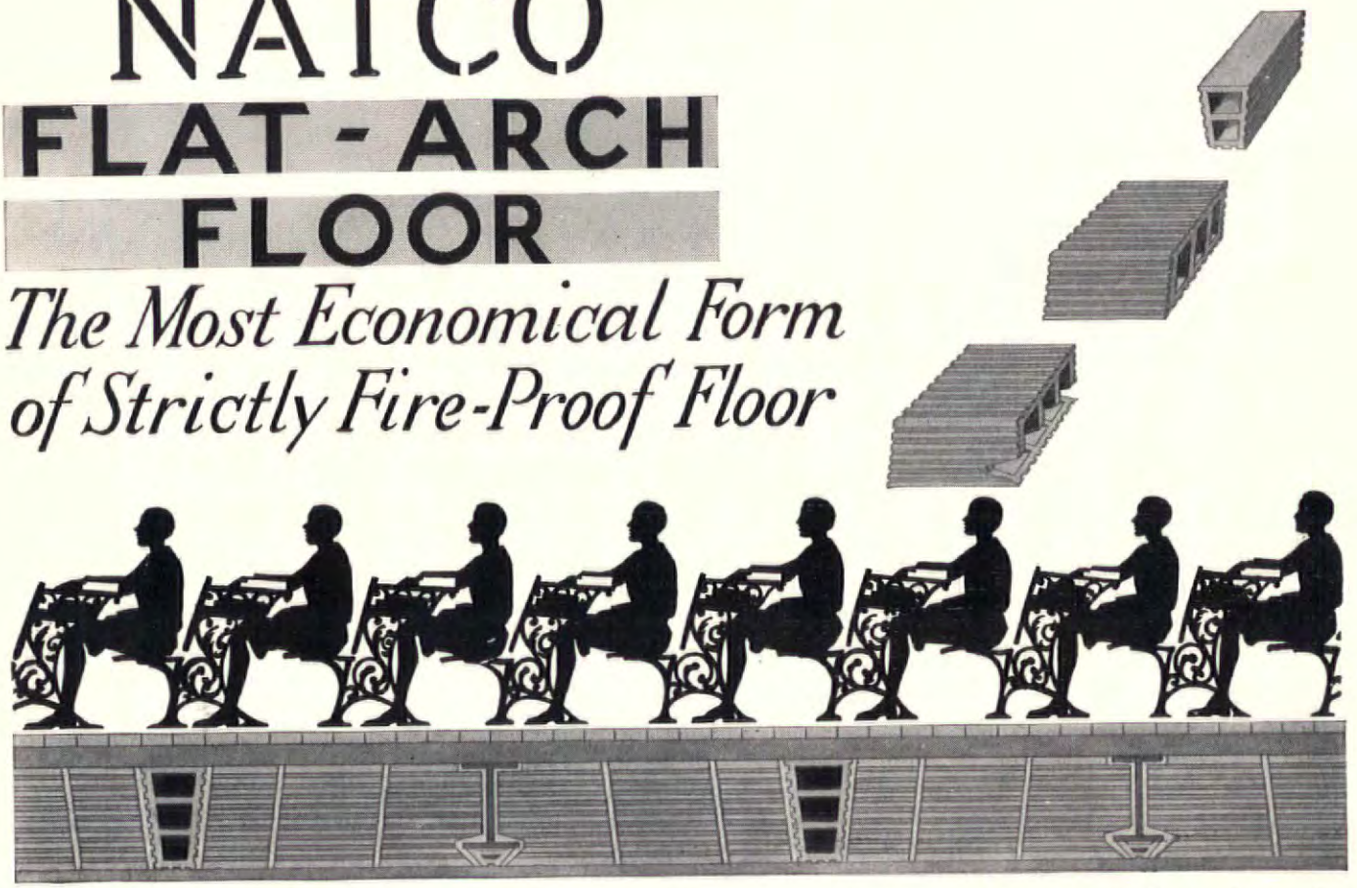
"A Hanger for any Door that Slides."

New York · · · AURORA, ILLINOIS, U.S.A. · · · Chicago

Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines
Minneapolis Kansas City Los Angeles San Francisco Omaha Seattle Detroit

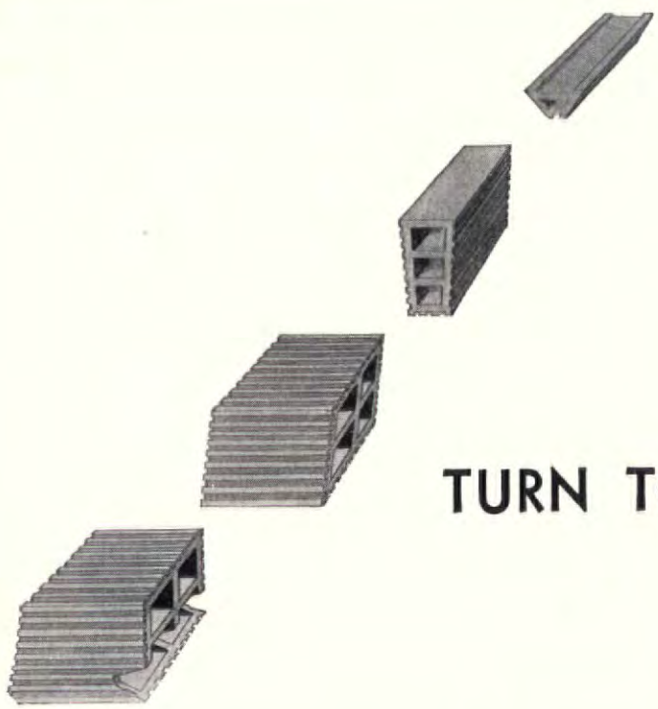
Montreal · RICHARDS-WILCOX CANADIAN CO., LTD., LONDON, ONT. · Winnipeg

NATCO
FLAT-ARCH FLOOR
The Most Economical Form of Strictly Fire-Proof Floor



SPEED in construction, independent of temperature, is a highly valuable feature of Natco Flat Arch Floor. Centering is hung; no nails are used. Centers need remain in place but one-tenth to one-fourth the time required under other forms of construction. Floors beneath are accessible for work by other trades. The all-tile ceiling requires only two coats of plaster. Holes may be left, or cut at any time to accommodate pipe work and later easily patched.

Natco Flat-Arch Floor offers outstanding advantages, in both floor and roof work. Engineering and technical data will be gladly furnished on request.



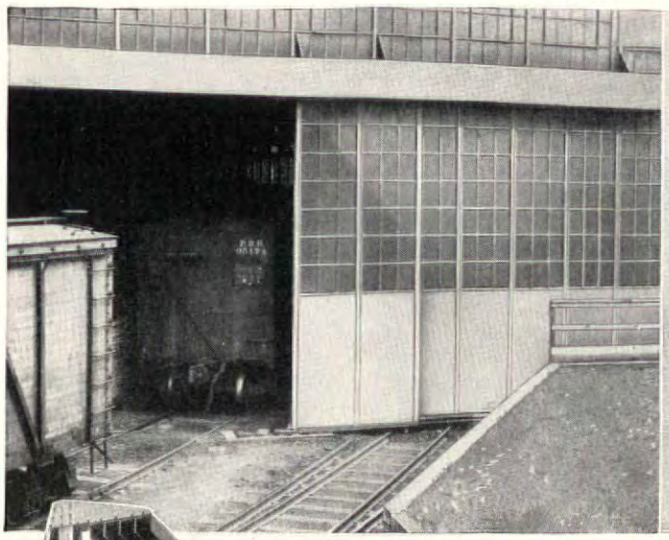
TURN TO SWEET'S

NATCO
THE *COMPLETE* LINE *of*
STRUCTURAL CLAY TILE

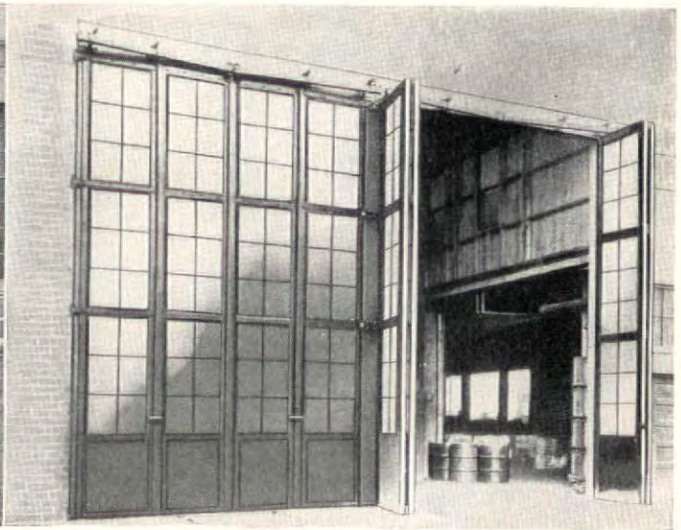
NATIONAL·FIREPROOFING·CORPORATION

THE LARGEST CONCERN IN THE WORLD MAKING A COMPLETE LINE OF STRUCTURAL CLAY PRODUCTS

GENERAL OFFICES: FULTON BUILDING, PITTSBURGH, PA. BRANCHES: NEW YORK, CHANIN BUILDING; CHICAGO, BUILDERS BUILDING; PHILADELPHIA, LAND TITLE BUILDING; BOSTON, TEXTILE BUILDING — NATIONAL FIRE PROOFING COMPANY OF CANADA, LTD., TORONTO, ONTARIO



Industrial Slide Doors



Vertical Folding Doors

Hangar Doors

A PRODUCT OF TRUSCON

Standard Doors

STEEL DOORS

Quality of workmanship, durability of construction, ease of operation and permanence of service are features which distinguish Truscon Steel Doors. They provide thorough protection for industrial buildings, garages, hangars, service entrances, etc. They are furnished in either standard stock types or in special designs to meet the individual requirements of each installation. Truscon engineers will gladly cooperate in the development of efficient doors for any building. Write for Door catalog.

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO

STEEL DOOR DIVISION

Truscon Steel Company of Canada, Limited, Walkerville, Ontario

Warehouses and Offices in Principal Cities

On a RAYMOND PILE Foundation

Job 1347

WALBRIDGE COMPANY
Buffalo, New York

Type of Building: APARTMENT HOUSE
Location: BUFFALO, N. Y.
Number of Piles: 491
Total Lineal Feet: 6798

Architects: BLEY & LYMAN
Contractor: DWIGHT P. ROBINSON
Owner: WALBRIDGE BUILDING CORPORATION

The modern apartment house, a specialized product of modern conditions, must have time-tried foundations. Hence the widespread selection of Raymond Concrete Piles by Architects and Owners, and their approval by Engineers. We shall be pleased to tell you specific reasons, in detail.

"A Form for Every Pile—A Pile for Every Purpose"

RAYMOND CONCRETE PILE COMPANY

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

Raymond Concrete Pile Co., Montreal, Canada
Branches in Principal Cities

NO MATCH

Not to mention the wind's ceaseless racking wear and tear—plenty of unarmored roofs are actually blown off!

But there is *one* roof that laughs at wind, fire, ice, rain, sun and other roof-wrecking agents. It is the ATP Roof—made of materials that actually improve under conditions ruinous to other roofs. Water preserves pitch—heat makes it self-welding, sealing up all cuts and cracks. Fire, the elements and mechanical wear are helpless against ATP slag, tile or gravel armor.

With or without bond, ATP Roofs are all made of exactly the same materials. The bond is *optional*. Dollar for dollar over periods of 25 to 40 years, ATP-type roofs consistently outwear any other type of roofing known to man.

AMERICAN TAR PRODUCTS COMPANY
Division of The Koppers Company
KOPPERS BUILDING, PITTSBURGH
New England Division: TAR PRODUCTS CORPORATION, Providence, R. I.
Plants at Chicago, St. Louis, Birmingham, Milwaukee, Kearny, N. J., Youngstown, Ohio, Providence, R. I., and Follansbee, W. Va.

Roofed with ATP
ARCADE BUILDING, St. Louis, Mo.
Architect: T. P. Barnett Company
Gen. Contractor: John Hill Const. Company
Roofing Contractor: Keystone Roofing Co.

for **ATP**

. . . . . THE ARMORED
COAL-TAR PITCH *and* FELT

ROOF

Von Duprin

Self-Releasing Fire and Panic Exit Latches

Where Simplicity Counts Most

Simplicity is of the greatest value whenever it permits stronger and more reliable construction.

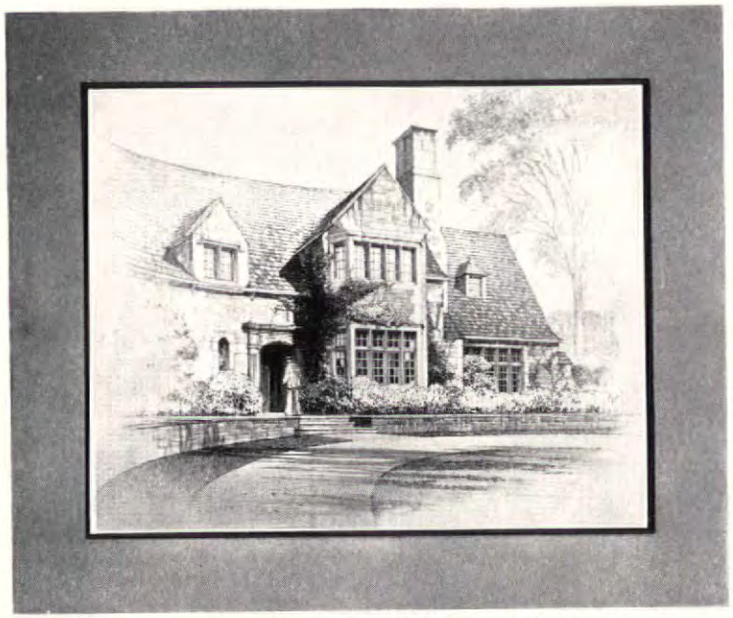
It does exactly this in the Type "B" Von Duprin devices. The remarkably simple design (fully protected by our patents) makes possible the use of actuating members far heavier than we have ever before been able to use.

The result is a durability, reliability and freedom from maintenance expense—and a consequent sureness of operation at all times—that mean everything in case of emergency. And these are the qualities without which any panic device is worse than useless.

When the genuine Type "B" Von Duprins are specified, particularly if specified as a separate item from the finishing hardware, you have the ideal solution to the problem of the best possible protection for the occupants of the building in case of panic.

VONNEGUT HARDWARE CO.
Indianapolis, Ind.

Listed as Standard by Underwriters Laboratories



Entrance detail of residence for Mr. Percival T. Gates, at Montclair, New Jersey. STEELTEX was specified and shall be used in this fine home. Lyon and Taylor, architects, New York City.

This Texarkana Country Club, Texarkana, Ark., knows the value of STEELTEX for plaster . . . STEELTEX was used throughout.

For fine dwellings small homes clubs and buildings of every character

Ribbed STEELTEX is readily cut . . . and shaped to fit around window and door openings

Ribbed STEELTEX is nailed directly to studs. Walls and ceilings are completely Blanketed

Ribbed STEELTEX reinforces plaster, insulates against heat and cold . . . deadens sound

. . Why are Architects everywhere specifying Ribbed *STEELTEX*?

. . because it is a proved plaster lath and actually reinforces the plaster with Steel ★

80% of every room, in the average home or building, consists of walls and ceilings. Therefore, the walls and ceilings are something important to consider, whether the finishes are plain or highly textured and expensive . . . and these walls and ceilings to be lasting should be reinforced with steel wires.

Reinforces and Protects

Ribbed *STEELTEX* is the modern plaster base and steel reinforcement that makes plaster permanent and protects the beauty and value of walls and ceilings. Ribbed *STEELTEX* does it this way: *STEELTEX* reinforces the walls and ceilings with a complete network of electrically-welded steel wires . . . these steel wires become automatically embedded (in the plaster) during plastering. The entire plaster slab is thus reinforced with a network of heavily-galvanized and welded steel wires . . . like reinforced concrete in principle.

Nothing new . . . nothing untried . . . nothing experimental about Ribbed *STEELTEX*. It is quickly and easily applied and plastered . . . no unusual methods are necessary. There are however, many decided advantages in home or building construction for the use of *STEELTEX* . . . it strengthens the framework of the building . . . insulates against heat and cold . . . deadens sound . . . blankets each and every room with its heavy, tough fibrous backing (preventing infiltration of air). Finally, Ribbed *STEELTEX* actually safeguards by making walls and ceilings last for a lifetime . . . by reducing plaster cracking hazards to the minimum. There are many other facts about *STEELTEX* worth knowing . . . these are fully explained and illustrated in our new FREE book, "*Better Walls for Better Homes.*" Simply clip the coupon below, send it to us and your copy will reach you promptly.

★ This *STEELTEX* method gives Lifetime Walls and Ceilings

Our new Free book tells HOW and WHY. Mail the coupon

National Steel Fabric Company, Dept. 50-B
Pittsburgh, Pa.
Gentlemen—Please send your book (without obligation), "*Better Walls for Better Homes.*"

Name.....
Address.....
City.....State.....
.....
(Indicate your business here)

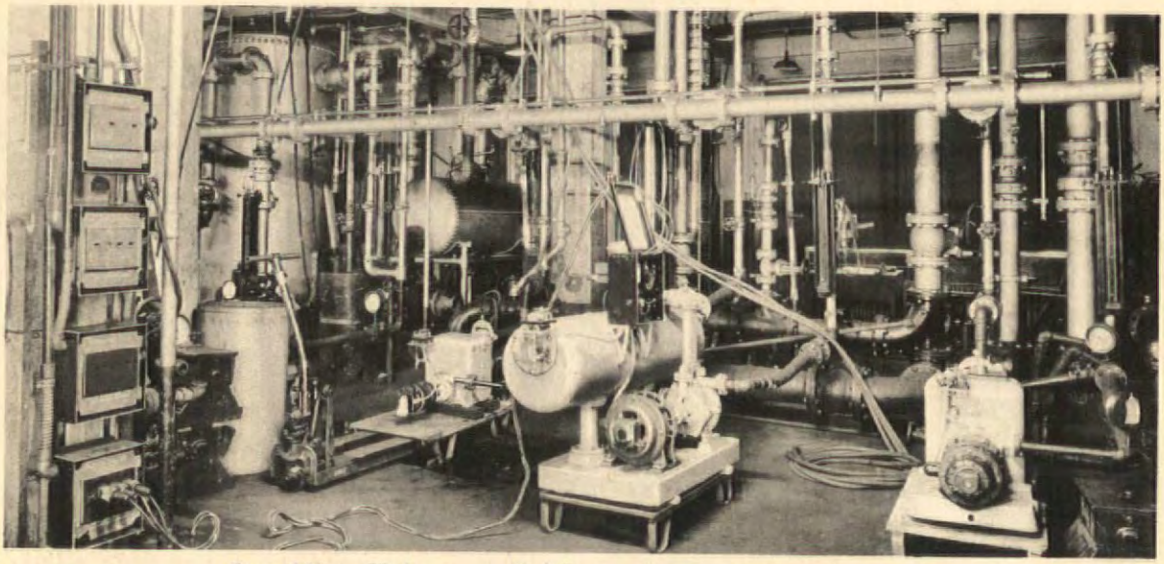
NATIONAL · STEEL FABRIC · COMPANY

UNION TRUST BUILDING — Division of Pittsburgh Steel Co. — PITTSBURGH, PA., U.S.A.

Square foot ratings *often* "bite off more than the pump can chew"

To Determine a Heating Pump's Fitness for a specified radiation

tested air and water capacity is essential



General View of Laboratory in Nash Factory where Jennings Pumps are Tested

A vacuum heating pump removes condensation and air from the return line vacuum steam heating system. The quantities it is called upon to handle depend upon several factors. One is the amount of radiation in the system. Others are the degree of tightness of joints and fittings, the efficiency of traps, and the cooling effect of the return piping.

To rate a vacuum heating pump for a given number of square feet of direct radiation is acceptable only if the pump's capacity is sufficiently large to handle the returns from the radiation under the most unfavorable operating conditions likely to exist in practice.

Simultaneous water and air capacity of the pump and not its catalog square foot rating, is the dominant factor that determines the system the pump can serve satisfactorily.

Jennings Capacities are Determined by Tests

Jennings square foot ratings are supported by actual tested capacities. Every Jennings Pump is tested at the factory before shipment. The volume of water that the pump withdraws from the receiving tank under a prescribed vacuum and delivers against a specified head is accurately measured.

At the same time the number of cu. ft. per min. of air that the pump removes from the receiving tank and discharges to the atmosphere is determined by the most reliable device available for the purpose... a calibrated test orifice. Horsepower required to deliver these quantities is found.

STANDARD TEST ORIFICE

Exclusive Jennings Design Assures Dependable, Economical Operation

Air and water are handled independently by the Jennings Vacuum Heating Pump. Air capacity is not affected by the volume of water being pumped. Water capacity remains constant when air is being handled.

A Jennings Pump will serve satisfactorily any reasonably well installed system of the size for which it is recommended, for the life of the building. Jennings capacities, as given in the table, are adequate under all conditions found in actual practice.

Condensate is handled only once. Less horsepower is required. Economical operation assured. These features are found only in the Jennings Pump.

Certified test reports, furnished to purchasers on request, guarantee Jennings capacities and horsepower, and afford the only reliable basis on which to compare vacuum heating pumps.

CERTIFIED REPORT OF TEST

CAPACITIES OF JENNINGS VACUUM HEATING PUMPS

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

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

Jennings Pumps

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

LIGHTS STAY BRIGHT

Even when normal current fails

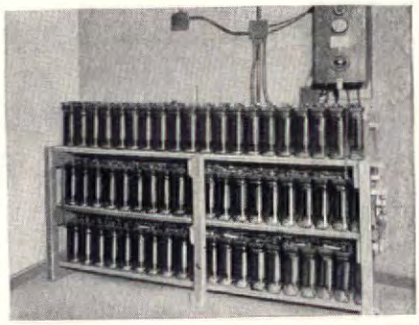
ROBERTS HALL, HAVERFORD COLLEGE, Pa., where Exide Batteries protect all important lighting circuits against current failure.

Dependable Exide Emergency Lighting Batteries protect this hall against the risk of sudden current failure.

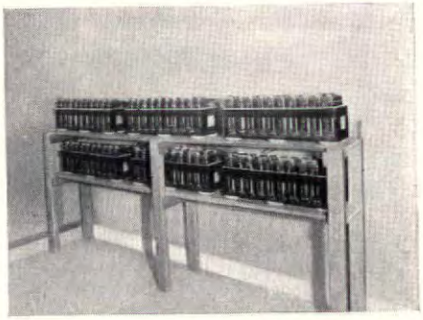
BRIGHT lights continue . . . even when the normal current supply is suddenly interrupted. Instantly, *automatically*, Exide Batteries take up the burden.

There's an Exide Emergency Lighting Battery to meet every specification . . . no matter how large or how small. Control and charging devices are extremely simple . . . absolutely automatic. And Exide's forty-two years' experience in building batteries for every purpose assures long life, dependability and trouble-free service.

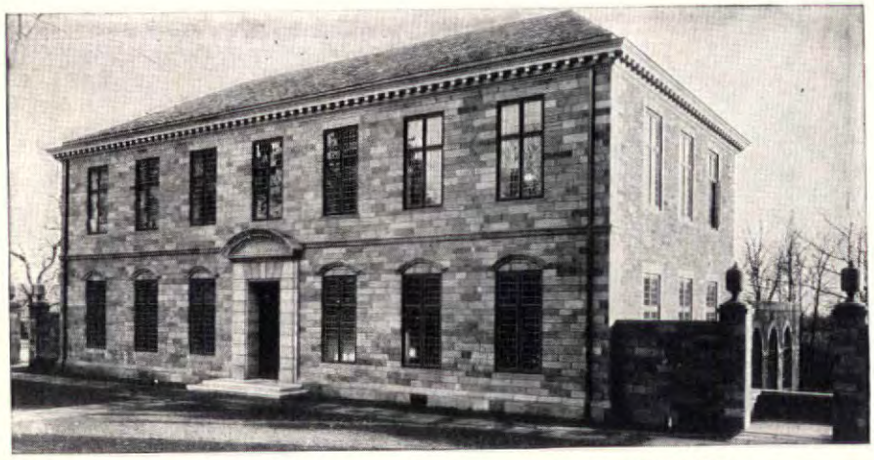
An experienced representative is available at any time to consult with you in planning emergency lighting equipment . . . without obligation, of course.



THIS EXIDE BATTERY, installed in Roberts Hall, gives complete assurance of steady, bright light at all times.



THIS PHOTOGRAPH SHOWS the 60-cell Exide Battery that supplies the Hilles Laboratory with current for experiments.



FOR LABORATORY USE, TOO . . . The new Hilles Laboratory of Applied Science of Haverford College uses an Exide installation in carrying on laboratory experiments.

Exide
EMERGENCY LIGHTING BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE
Exide Batteries of Canada, Limited, Toronto

Close-up of the Novoid Corkboard Insulation job on the roof of the British American Tobacco Company, Louisville, Kentucky

WHEN THE BUILDING IS FINISHED . . .

Adequate roof insulation must be present to protect . . . and save!

HAS the building been well constructed? Look to the roof—for your final answer! Yes, the roof can be a source of much annoyance and waste. Or it can *prevent* waste, and *increase* the efficiency of production—if it is adequately insulated.

By laying Novoid Corkboard Insulation on the roof, heat-leakage is checked. There is ample protection against the passage of heat either in or out. "But the expense?" An adequate thickness of corkboard on the roof will pay the entire cost of insulation in a few years. And the building will be so easily heated that an additional saving is effected in the original cost of the heating plant.

When an industrial building is comfortable—when it is insulated with cork on the roof—the comfort is reflected in the increased efficiency and well-being of the employees. Operatives work faster, do better work, are more contented.

Another important advantage of Novoid Corkboard is the effectiveness with which it prevents condensation. In any uninsulated building where high humidity is present, cold weather causes the moisture in the air to condense and collect on ceilings. Dripping of water follows—spoiling goods, hindering workers, and rusting machinery. Adequate cork insulation puts a stop to this by keeping the under-ceiling temperature above the dewpoint.

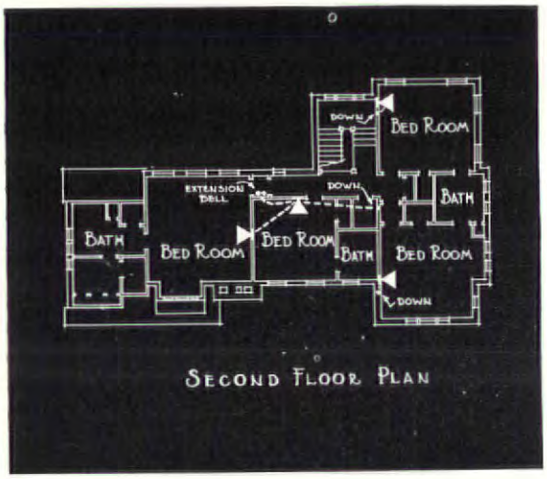
If you wish further information about your own insulation problems, write to us for complete data. Our engineering department will gladly make recommendations. Cork Import Corporation, 345-349 West 40th St., New York City.

Novoid Corkboard Insulation

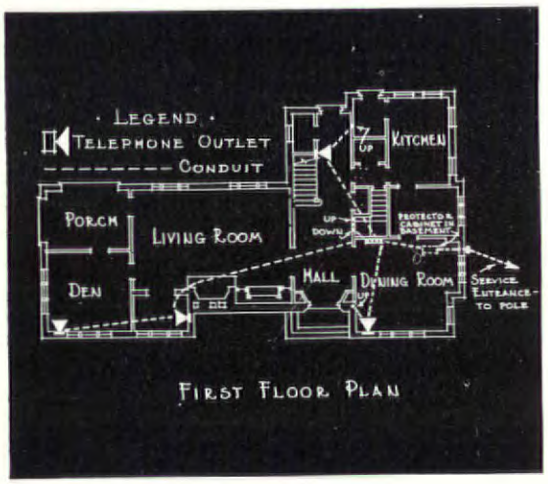
CORK IMPORT CORPORATION 345 W. 40TH ST. NEW YORK

★

Throughout the Country Architects are including Telephone Convenience in their Plans for new Houses



In the home of Mr. Joseph H. Skaggs of Atlanta, Georgia, provision for complete telephone convenience is made by nine telephone outlets, including one in the servants' quarters over the garage. FRAZIER & BODIN, Architects, *Atlanta, Georgia.*



THE APPEAL of *telephone convenience* is country-wide. In the South . . . as in the Middle West, the Pacific Coast, or along the Atlantic Seaboard . . . architects are planning for it by providing sufficient outlets and conduit for telephone service in the design of new and remodeled residences. Their clients may then have the added ease and comfort that enough telephones give, plus the improved appearance of having the telephone wiring concealed within the walls of the house.

Locations for the telephone outlets are usually determined in conferences between the architect, the client and a representative of the local Bell Company. The home owner can use just those telephone outlets which he needs, and can expand or rearrange the service in the future as he desires.

Architects may consult freely with the telephone company in planning for telephone arrangements. No charge is made for this service. Just call the Business Office.

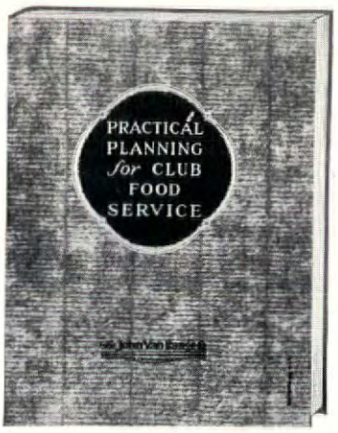
AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES — BELL SYSTEM

Cook's table and warmer in the Post and Paddock Club, Arlington Heights, Ill. . . . Part of an efficient Van Kitchen.

Benjamin H. Marshall, Arch.

Club Kitchens Should

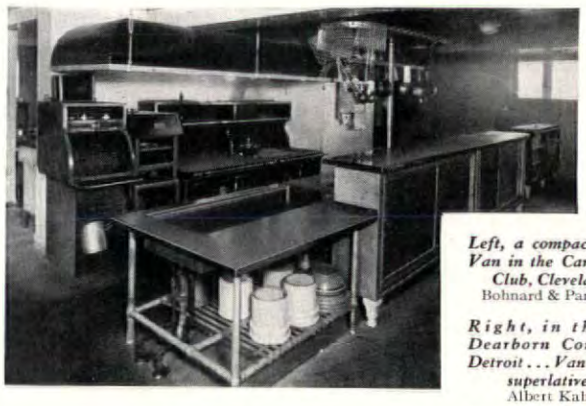
Illustrated here are some of the many clubs whose kitchens are Van-equipped. Country clubs, town clubs, athletic clubs and golf clubs are represented, in a wide range of size and type. There are hundreds more whose needs are met with satisfaction by Van Equipment.

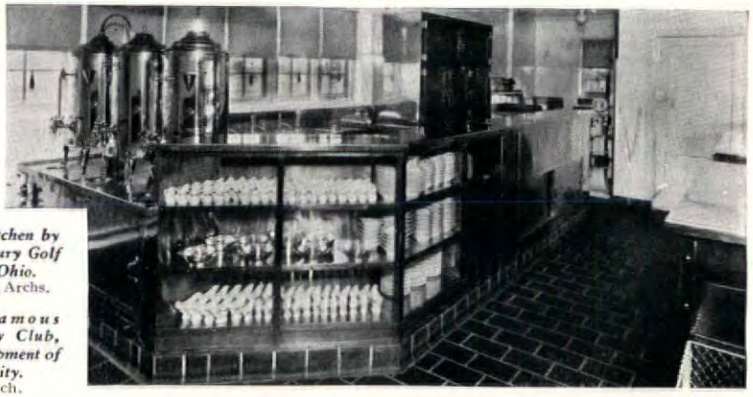


FREE

We invite you to send for this free Book

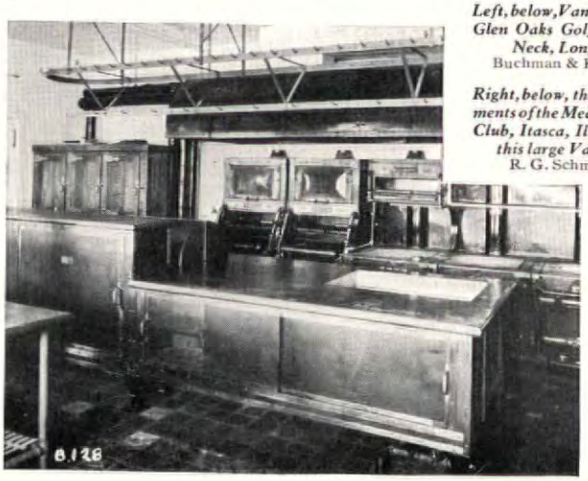
"Practical Planning for Club Food Service" covers the requirements of all types of clubs, citing precedents from all over the country. Floor plans, photographs and architectural data make this book a mine of information. *This is not a catalog!* It is an authoritative monograph sent free to Architects. A request on your letterhead will bring it . . . without obligation of any kind.





Left, a compact Kitchen by Van in the Canterbury Golf Club, Cleveland, Ohio.
Bohnard & Parsson, Archs.

Right, in the famous Dearborn Country Club, Detroit . . . Van equipment of superlative quality.
Albert Kahn, Arch.



Left, below, Van Kitchen of the Glen Oaks Golf Club, Great Neck, Long Island.
Buchman & Kahn, Arch.

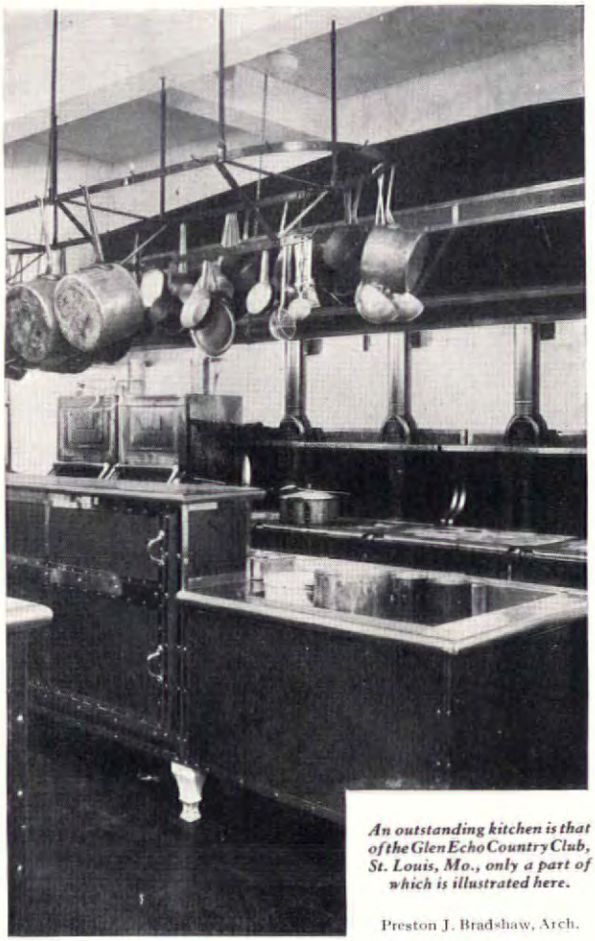
Right, below, the food requirements of the Medinah Country Club, Itasca, Ill., are met by this large Van Kitchen.
R. G. Schmid, Arch.

Be VAN Kitchens » » »

TO plan with Van Equipment is to assure your client of a low first cost—*and continued low cost of operation.* Van Equipment is not subject to costly, inconvenient replacements. In appearance, weight, quality and durability it is truly unexcelled.

We wish to make no extravagant claims for Van products. We do ask the privilege of consulting with you on the kitchen requirements of any project in which you are interested. We believe we have facts and figures that will be of interest and value to you and to your client.

An invitation to confer with you will be appreciated . . . and will be answered by our consulting engineers.



An outstanding kitchen is that of the Glen Echo Country Club, St. Louis, Mo., only a part of which is illustrated here.

Preston J. Bradshaw, Arch.

Below, at the Queen's Valley Golf Club, Jamaica, New York, a complete and compact Van Kitchen.
J. H. Phillips, Arch.

The John Van Range Co.

EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD

Cincinnati

DIVISION OF ALBERT PICK-BARTH COMPANY, INC.

BOSTON ATLANTA CLEVELAND
DALLAS WASHINGTON NEW ORLEANS

General Offices: Oakley, Cincinnati, Ohio

Chicago Sales Office — 1200 West 35th Street
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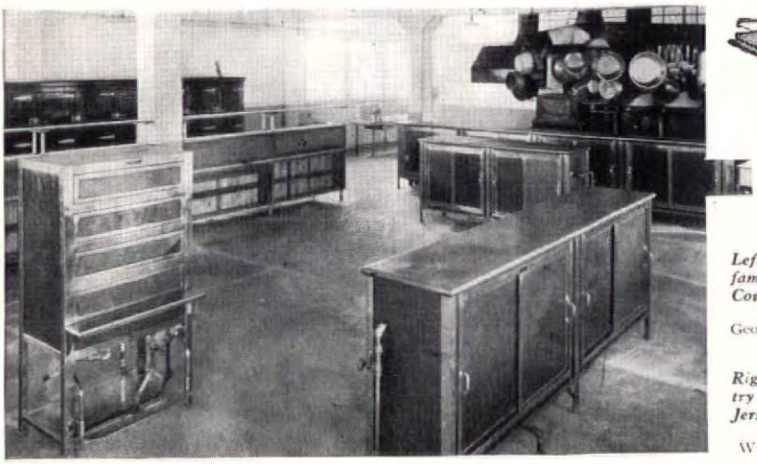
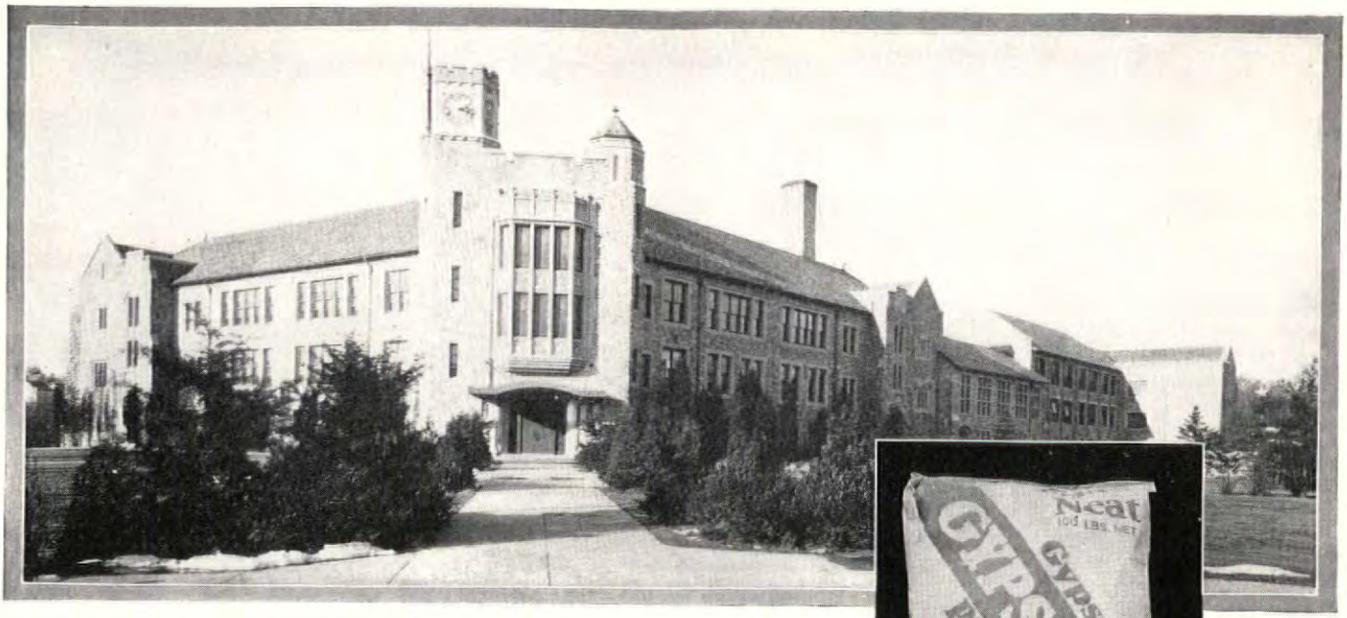


Left, Van Kitchen in the famous Olympia Fields Country Club, Chicago, Illinois.
George C. Nimmons, Arch.

Right, Green Brook Country Club, Caldwell, New Jersey . . . another Van user.
W. Leslie Walker, Arch.



Pelham Memorial High School, Pelham, N. Y.—Hart & Shape, New York City, Architects. William B. Ittner, Inc., St. Louis, Associate Architects. Gypsteel Neat Plaster Used Throughout.

Gypsteel Plasters
are as good as Gypsteel Partition Tile
—*the strongest endorsement they could have*

ARCHITECTS have given Gypsteel Partition Tile the strongest endorsement possible by using it exclusively in such great projects as the Chrysler Building, Hotel New Yorker, Hotel Governor Clinton, United Shoe Machinery Building at Boston, Tudor City units 9 to 13, Williamsburg Bank Building, and a host of others.

The reason is simple: Tests have repeatedly shown that Gypsteel Partition Tile averages 2½ times greater strength than the requirements of the Standard Specification of the American Society for Testing Materials.

Gypsteel Wall Plasters are likewise as superior in their qualities of strength and workability as you have already found Gypsteel Partition Tile to be in comparison with others.

This isn't strange, after all, because the tile and the plasters are made from the same gypsum. We make the gypsum in both by the patented "Gypsteel" process. This results in distinctive qualities of workability and strength not obtainable in any gypsum products other than those having the "Gypsteel" name.

Gypsteel Wall Plasters have been enthusiastically received by the architects, builders and plasterers who have had the opportunity of using them. They say the plaster slips easily under the tool, spreads well, and *makes stronger walls.*

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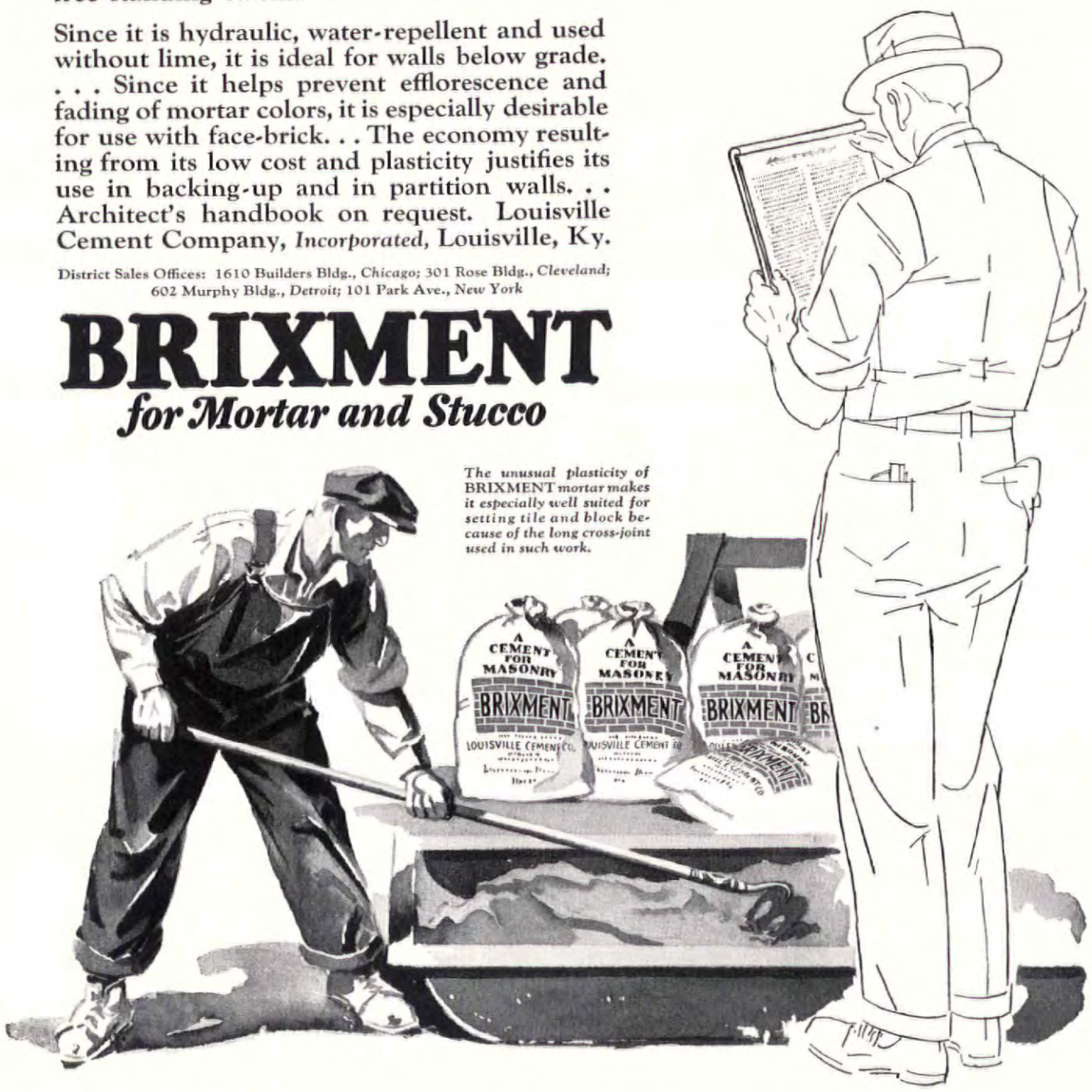

The unusual plasticity of BRIXMENT *mortar makes it especially well suited for setting tile and block because of the long cross-joint used in such work.*

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McKim, Mead & White, Architects
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THE New York Times photographer, when he took this striking photograph of part of New York's skyline, did not know that these six important buildings were all "Bryant Equipped". That was a random shot but there was no element of chance in the fact that *all of these buildings were "Bryant Equipped"*. Bryant products are in general use, not only in New York, but wherever civilization has penetrated. The Bryant Electric Company manufactures over twenty-five hundred different wiring devices, keeping abreast of all new applications of electricity and combining the most modern machinery, mass production, adequate financial resources and long experience in the manufacture of wiring devices of uniform excellence. Bryant policies, Bryant products, and the concrete evidence of thousands of BRYANT EQUIPPED installations have built and are keeping busy the largest exclusive wiring device factory in the world.

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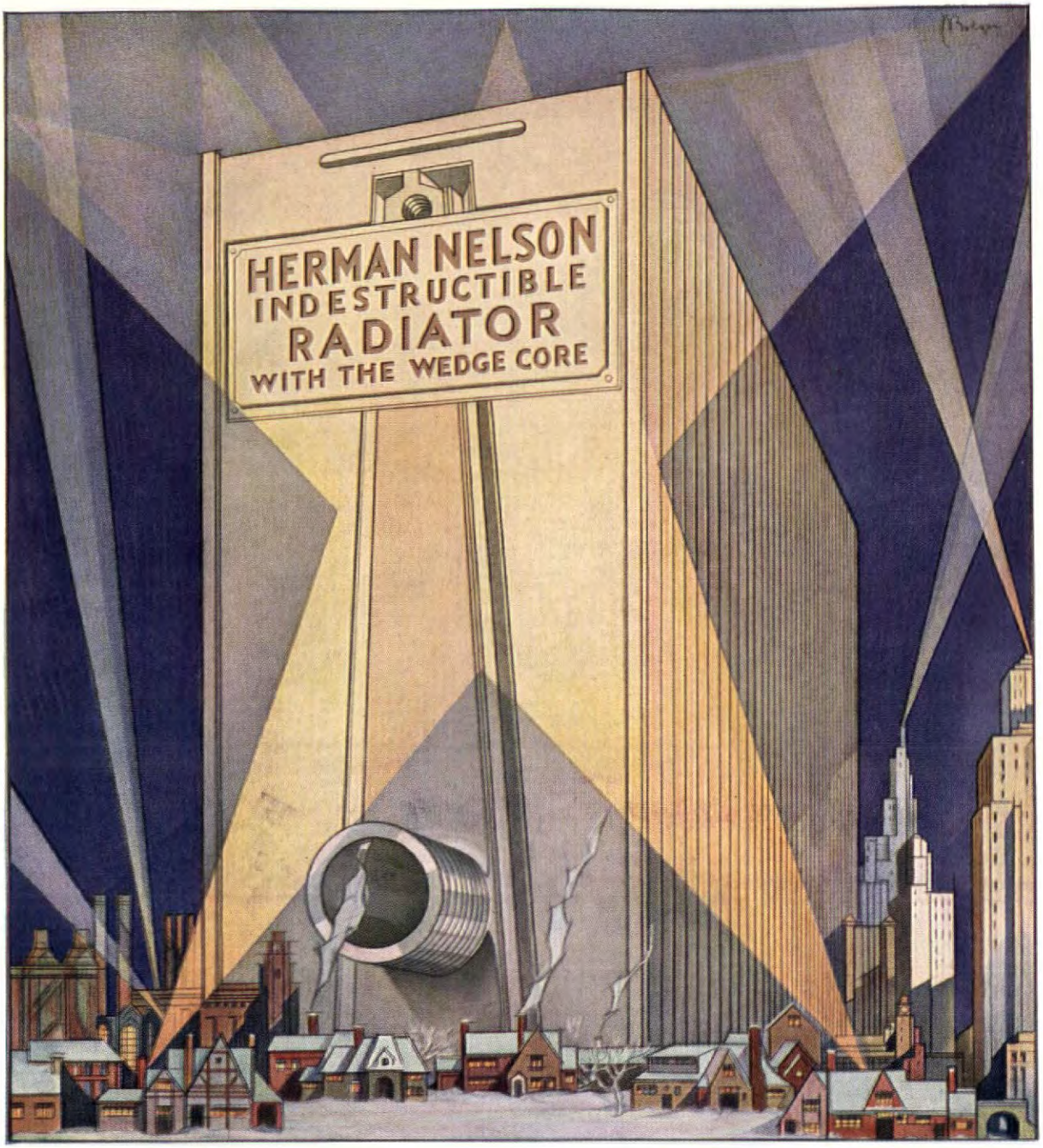

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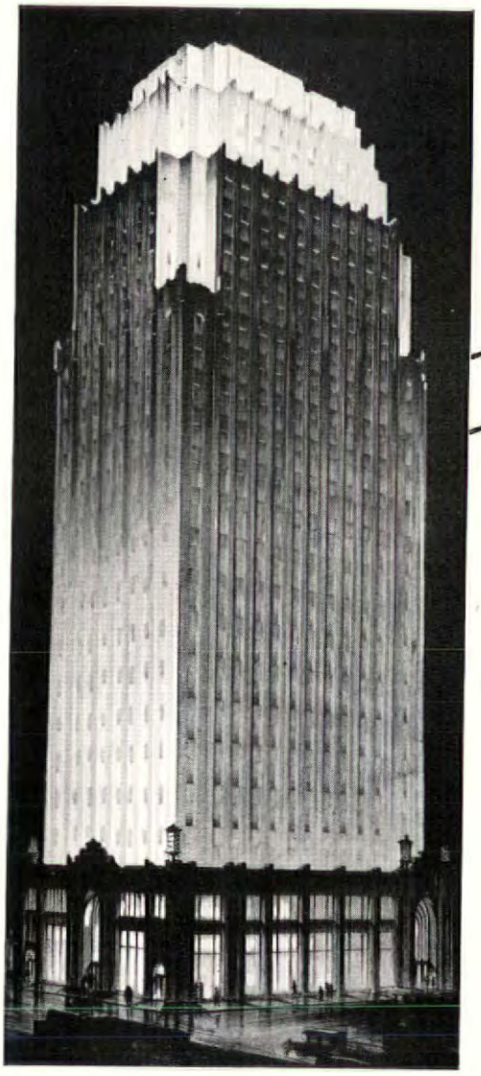

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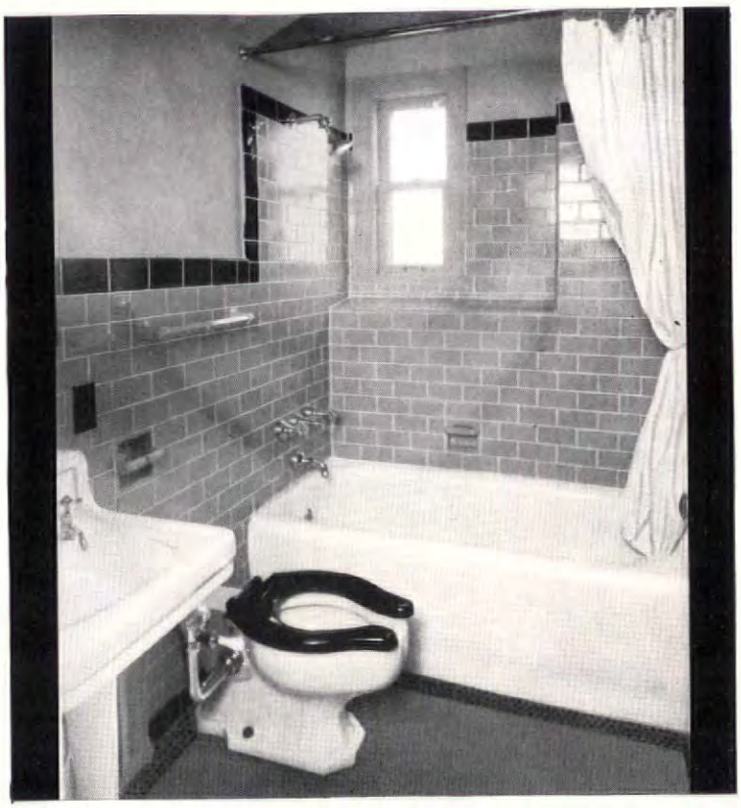


Typical guest bath at Cliff Towers. Equipped with Kohler WINTHROP *lavatory of vitreous china, Kohler* VICEROY *built-in tub, and Kohler* PENRYN *syphon jet closet.*

DALLAS has a new apartment hotel, one of the finest and most beautifully appointed anywhere . . . developed inside and out in the Italian style . . . with all the warmth and color of an old-world villa. . . . The charm of the soft rich tones in marble, stucco, tiling and furnishings is carried on by Kohler color ware in the bathrooms. Hundreds of Kohler units were used—built-in tubs, vitreous china lavatories and closets, and white enameled sinks. The reasons for selecting Kohler fixtures are well expressed by Mr. Charles A. Mangold, Vice-president and General Manager:

"When we began the building of Cliff Towers we decided to procure the best products to be found in the nation.

"In plumbing, we naturally turned to Kohler of Kohler. Others may be good, but Kohler qualities have set the pace for a number of years. We were confident that Kohler fixtures would render long service.

"Then there was the all-important question of beauty in the new type bathrooms. We decided upon colored fixtures, and the ready response from all who visit Cliff Towers, particularly from those who live there, has convinced us that our choice is a very wise one.

"We were influenced by the fact that we have used Kohler products in the past. We place our faith in the future upon our own most satisfactory experience."

High standards in plumbing are evidence of high ideals of service in other respects. Logically, Kohler fixtures are favored where hotel or home bathrooms must pass the most exacting requirements, both of beauty and efficiency. . . . Kohler Co. *Founded* 1873. Kohler, Wis.—*Shipping Point,* Sheboygan, Wis.—*Branches in principal cities.* . . . Look for the Kohler trade-mark on each fixture.

Cliff Towers, new apartment hotel in the Oak Cliff section of Dallas, Texas. Architects, Albert S. Hecht, Chicago, and Robert Williams, Dallas. Plumbing jobbers, Southland Supply Co. of Dallas. Plumbing contractors, C. Wallace Plumbing Co of Dallas.

KOHLER OF KOHLER

PLUMBING FIXTURES

BOOK DEPARTMENT

OUR CITIES TODAY AND TOMORROW

BY

THEODORA KIMBALL HUBBARD AND HENRY VINCENT HUBBARD

A REVIEW BY ROBERT STUYVESANT HOOKER

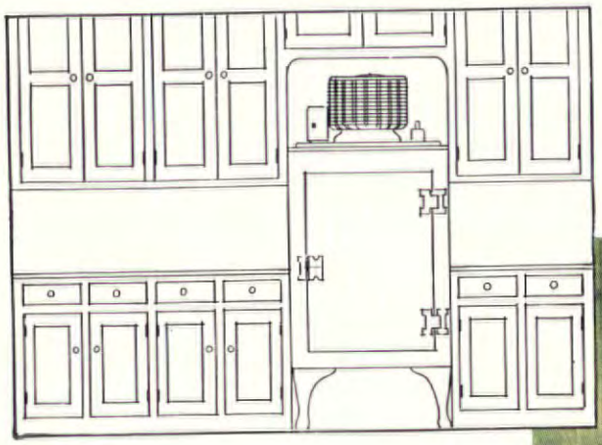
THE tendency of vast numbers of people to congregate in the metropolitan centers of the country, which is the natural creation of the modern industrial and commercial system, makes it imperative that the growth and improvement of urban districts should be carefully planned to provide suitable living conditions for the great populations of the present and the still greater populations of the future. Since the beginning of history, cities have been allowed to spring up in a more or less haphazard fashion, and while there are many examples of fine city planning notable from an artistic point of view as applied to civic centers and great avenues and boulevards, it is only recently that the work of city and regional planning has come to be practiced as a profession. The great immensity of the problems with which modern city planners are confronted demands that decisions be based on careful studies of conditions as they exist in the particular city and on a well grounded estimate of what the conditions are likely to be in the future, as well as on a careful observation of the methods employed in other cities. Those who are in charge of planning great cities no doubt have a full realization of the desirability of more careful planning, but it usually happens that they are called upon to render their decisions in such a limited time that there is no opportunity of going into the complicated considerations involved, and plans are allowed to be put in operation which, even if they do not result in actual confusion, are likely to fall far short of what might have been accomplished with a proper amount of study. That cities should be built and rebuilt in the old haphazard manner is entirely out of keeping with up-to-date American ideals. Our great industries have taught us to consider problems in their broader aspects and in the light of future as well as of present needs. Certainly there is no modern problem that presents a greater need of being studied in a comprehensive manner than does the planning for the growth and improvement of cities and the

unwise regulations in connection with the zoning laws or other ordinances affecting city planning may have a well nigh disastrous effect on the appearance of buildings which the architect is permitted to build. That the reverse is also true is proved by the popularity of the striking and pleasing set-back style which has resulted from adoption of the city zoning ordinances in New York. Although in this day of specialization it would be impossible for every architect to be an authority on the subject of city planning, it is often quite important for him to have at hand up-to-date information of the most authentic kind available. Being a new and a rapidly developing science, it is quite impossible that any very lengthy studies or investigations can be made, since by the time a great mass of material had been collected and compiled in usable form, the material would already be out of date. Several periodicals publish articles on the subject from time to time, and there are one or two publications devoted entirely to its interests.

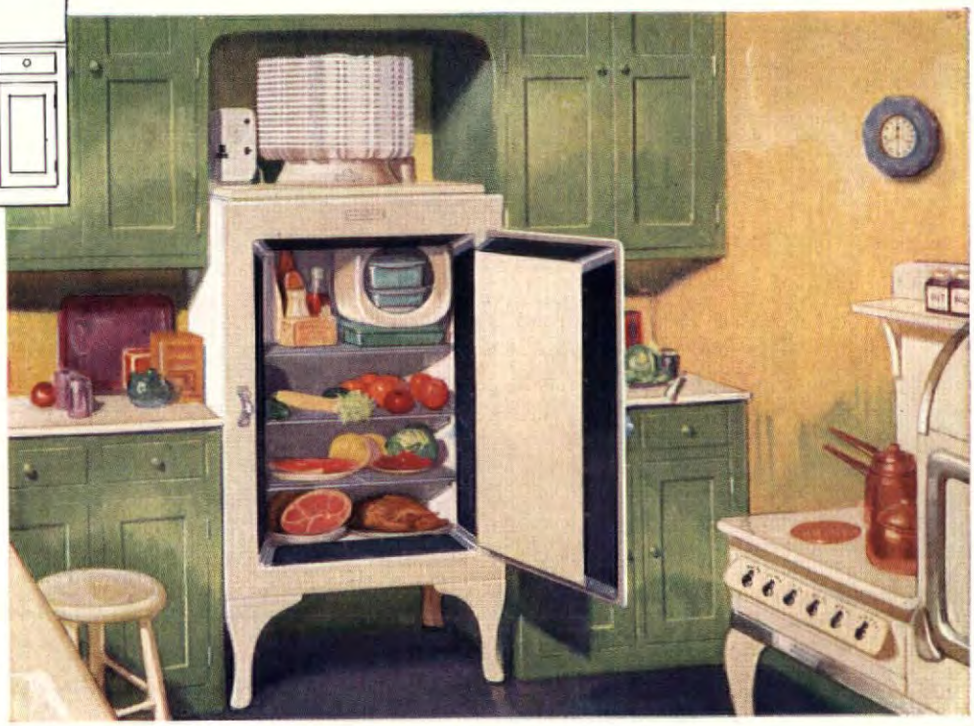
In order to ascertain to a greater extent just what has been accomplished in the field among the cities of the United States and to discover what conclusions and basic principles might be formulated from a study of the existing planning operations, Harvard University made a grant from the Milton Fund for Research to T. K. Hubbard and H. V. Hubbard for "a survey and analysis of city planning and zoning progress in the United States." It was obvious that if the field of study were to cover a sufficient number of cities and regions to be representative of the whole country, and if this number were to be studied contemporaneously, the result would have to be a birdseye view, merely scanning the surface of planning in the United States today to discover what fields are fertile and what barren, and where one may go for further study of promising methods. It was obvious, too, that the facts gathered during the field study must be quickly assorted and presented before changed conditions and situations should render them less valuable because of their being stale. As ammunition for the technical planner or the city official, the greatest usefulness of a rapid study appeared to be in the setting forth of these freshly accumulated facts primarily in their relation to one another and to the whole field now embraced by what is called "city and regional planning." In the five months allotted to the study of the assembled data, no attempt was made to study housing except as it is related to zoning, nor was a study made of examples of new towns such as have been already ably discussed by John Nolen and others. Other specialized fields, such as the comprehensive planning of utilities, especially of sewerage and water supply systems, which are essential to regional development, were also omitted, because of the limitations of time. The authors confined themselves to the elements of planning commonly dealt with today by the general practitioners of city planning.

This work, which is the result of the investigation, deals with zoning, control of land subdivision, major street systems, mass transportation, rail, water and air terminals, park and recreation areas, aspects of the city's appearance, with the legal and administrative means of effecting city and regional planning, and with the education of the public to support planning measures. Howard K. Menhinick (a graduate in city planning of the Harvard School of Landscape Architecture) was made field representative and visited about 120 cities and 15

Arrange for a GENERAL ELECTRIC REFRIGERATOR *in the kitchen*



. . . it will enhance the value of the property and make it easier to sell



THE General Electric Refrigerator shown in the plan is well suited to the average small home of six or seven rooms. This kitchen, while simple in arrangement, includes desired features of good routing and convenient working space.

We have prepared a helpful booklet describing this arrangement in detail, also many others for larger kitchens. The plans include complete first floor arrangements as well. We shall be glad to send you this booklet . . . simply address, Section QSA-3 Electric Refrigeration Department, General Electric Company, Hanna Building, Cleveland, Ohio.

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Their superiority is definitely established through this amazing record . . . of the hundreds of thousands of owners not one has paid a cent for service.

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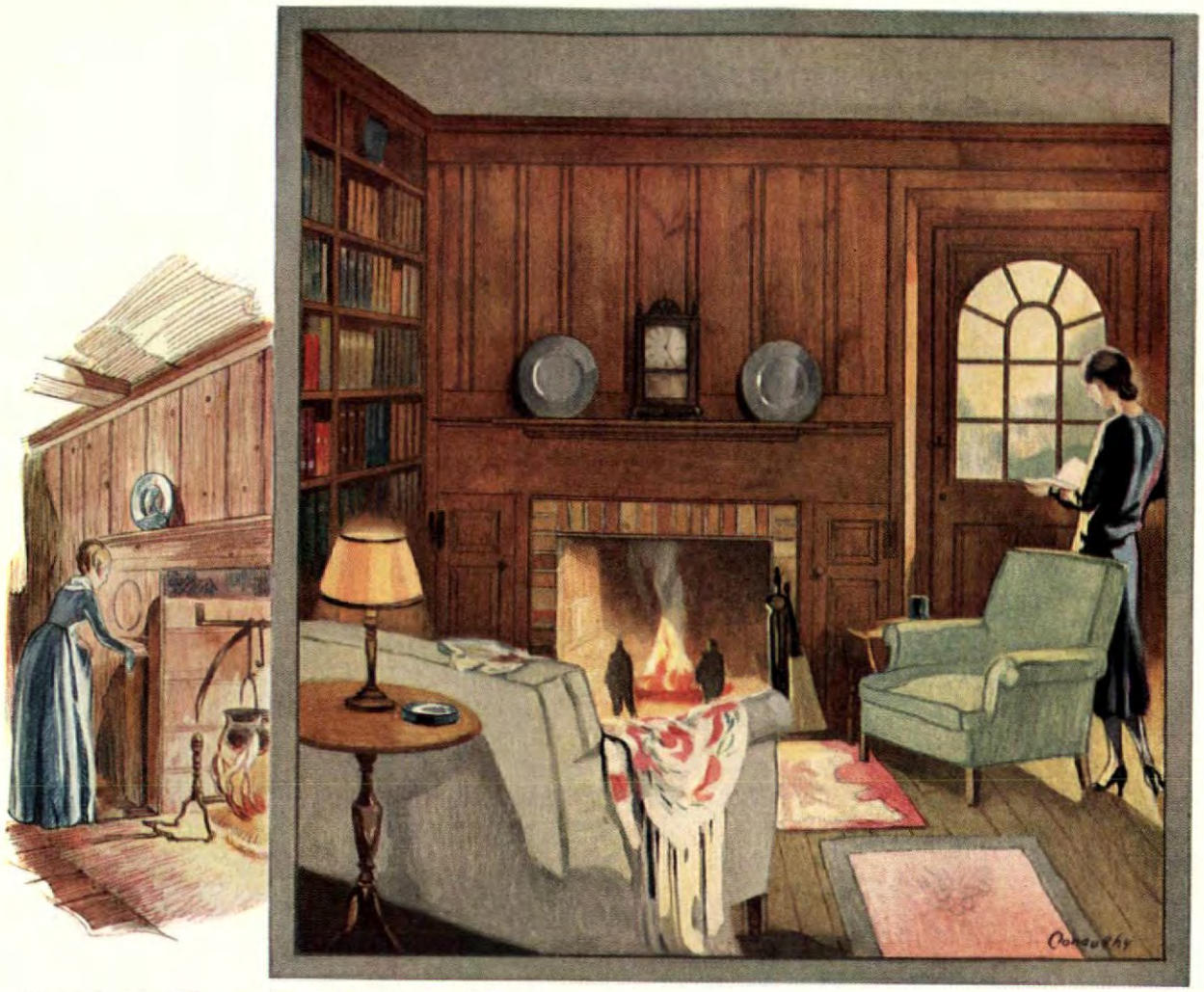
ALL-STEEL REFRIGERATOR



Connecticut furnishes two interesting pine rooms for architectural study—the early eighteenth century room in the Morris House at New Haven and the twentieth century library of the modern home at Greenwich designed by H. W. Rowe Associates. Here fireplace cupboards and built-in book shelves combine to create an unusually cozy setting.

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In designing pine-walled rooms architects take delight in built-in book nooks, odd cupboards and other quaint Colonial conceits. The inviting warmth of knotty pine walls is enhanced by the whimsical charm of fireplace cupboards and ample book shelves where bright bindings shine with friendly radiance.

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regions surrounding them. Many cities have already employed the services of those competent to deal with city and regional planning, but in most cases their growth and rate of change have been so rapid that time has not permitted the basing of plans on the proper amount of research in order to obtain the greatest possible amount of information immediately usable.

In the fight against congestion, against unbalanced distribution of urban population and unwholesome urban environment, it is essential to know what experiments are being made in the various cities of the United States and what results have come from specific lines of action in dealing with certain situations. In spite of all its handicaps, the science of city planning is advancing by leaps and bounds, and today there are over 650 cities having official planning commissions. The profession is very active, and its practitioners are organized under the American City Planning Institute. There is no state where some form of the movement to secure the benefits of planning and zoning does not exist. The introduction of state laws authorizing planning and means of financing plans, debates on the enactment of municipal ordinances creating plan commissions or adopting zoning regulations, the choice of members of planning bodies, and the submission to voters of bond issues for permanent plan improvements, are all subjects of widespread news value, featured in national as well as local press services and brought constantly to public attention in the daily papers. The phases of city and regional planning are subjects of vital discussion in the meetings of state and national municipal leagues, state and national associations of real estate boards, chambers of commerce, and local and national societies of civil engineers and architects and landscape architects. Other societies interested in the advancement of city and regional planning are also actively working toward the establishment of fundamental planning principles. At Harvard University there has long been a course of instruction in city planning which has now been expanded into the Graduate School of City Planning, with an extensive program of research. Many other universities or colleges also give brief courses or parts of courses dealing with the planning of cities.

Of all the groups of professional and business men who take an active interest in the city planning movement there is none which it concerns more vitally than it does the architectural profession. Wherever new city improvements are made, new buildings will be erected, and it is the business of the architect to see that these buildings conform in the highest possible degree to the principles of good architecture. It is almost a foregone conclusion that practically every city planning body includes in its personnel at least one architect, and often there are several. Architects are involved in city planing by the very fact that cities are composed of buildings and that it is the quality and character of these buildings and the manner in which they are disposed in relation to one another, that causes the city to be beautiful and a good place to live in or otherwise. By his training the architect is prepared to grasp the significance of the several features that go to make up a successful plan. He has been trained to see at a glance the advantages or disadvantages that lie in a given plan which would not be nearly so apparent to the untrained eye. Another reason for the architect's interest is that

counties and regions in all parts of the United States to secure first hand information from responsible officials and leaders in city planning movements as to local procedure and results. Some of the field notes taken by Mr. Menhinick on subjects of particular current interest will be found in the appendix. All the notes have served as the basis of the comments and conclusions embodied in the chapters of this book. There has been no attempt to present tabulated statistics of the questions answered. The series of local comments found worth while to include in the appendix and the many more worked into the fabric of the work itself are far more useful than a more complete series of mere statistical summaries of facts collected in the selected cities and counties would be.

In discussing the present status of the movement in the United States, a brief but interesting history of progress up to the present time is given together with outstanding points in present-day practice. The legal and administrative phases are discussed, and there are given descriptions of the wide variety of planning bodies and their various names and titles, including city, regional and state organizations of an official or semi-official character. In order to attain any measure of success, a movement such as the improvement of a city must have the whole-hearted support of the citizens who are to pay for it and who will have to live with the new improvements. Public education is therefore an important branch of city planning science, and methods of bringing a realization of the great advantages of a new plan for city improvement before all the people are discussed at considerable length. The technical procedure is, of course, a matter of the greatest practical importance to anyone interested in city or regional planning, and each of the various steps furnishes material for a chapter, as does also a discussion of financial programs. Architects who are readers will be more especially interested in the chapters on Control of Platting; Zoning; Street Plans; Transit and Mass Transportation; Rail, Water and Air Terminals; Parks and Recreation Areas; and the city's appearance. It is indeed hard to imagine an architectural organization that would not find some of the great mass of information contained in these pages of value in helping to solve some of the many problems with which it is constantly confronted. The work has already been called "The City Planning Baedeker," and although the authors do not profess to any such great degree of completeness, it would certainly be a difficult task to provide a more thorough work on such a complicated and rapidly changing subject.

Never in the history of the world have cities grown as rapidly as in America today. Changes which have come to Chicago and Detroit during the past few decades represent only the two most conspicuous examples of what is widespread growth. As has already been suggested, the impossibility of forecasting a city's growth creates a problem which is difficult indeed to solve. It is a problem which demands all the data which experience could provide and research present if it is to be solved.

OUR CITIES TODAY AND TOMORROW. By Theodora Kimball Hubbard and Henry Vincent Hubbard. 389 pp. 7 x 9½ ins. Price $5. Harvard University Press, Cambridge, Mass.

B'NAI B'RITH TEMPLE
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Consulting Architects: Allison & Allison
Engineer: Holmes & Sanborn
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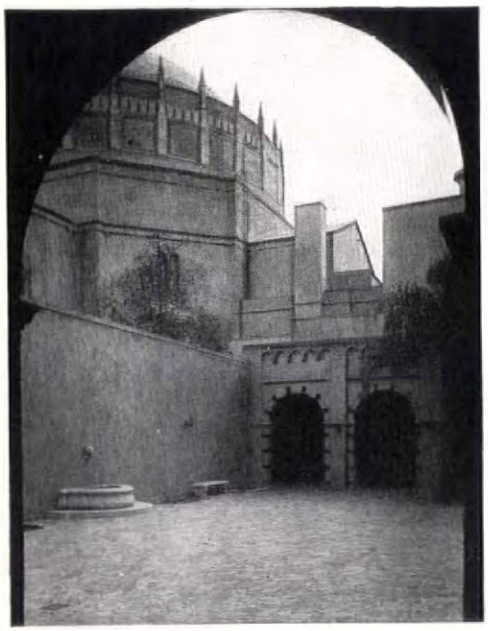

This view from the patio and the portion of the west wall shown above at the right illustrates how all the details of this beautiful building combine to make it a perfect structure.

WHEN the new B'NAI B'RITH TEMPLE was erected nothing but the best was allowed to go into the building. So naturally the specifications included three Ideal Gas Boilers, connected with an American Blower system of air conditioning to insure perfect comfort in every part of the temple without any attention, fuel storage or dirt.

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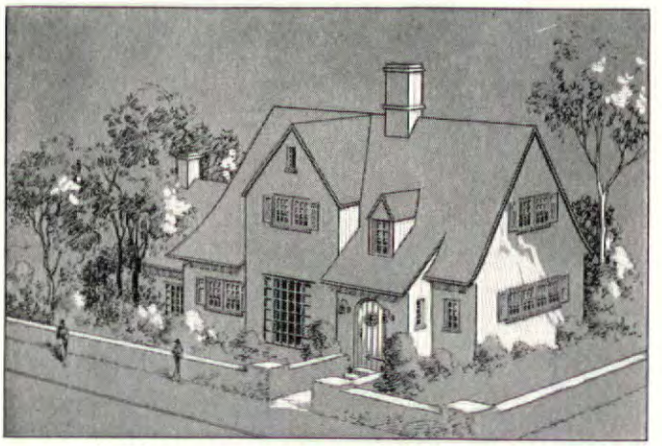
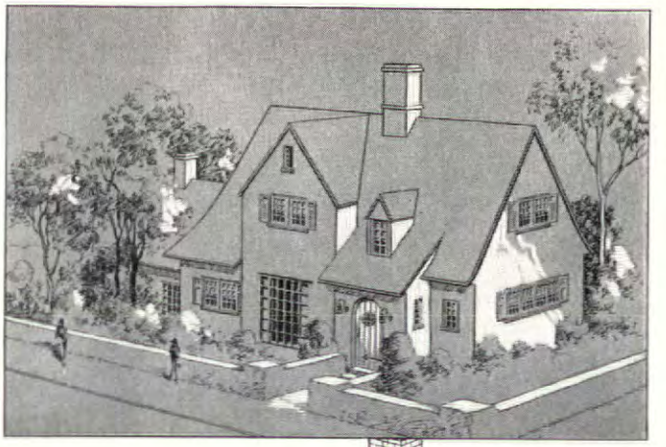


—— a look in the basement will tell



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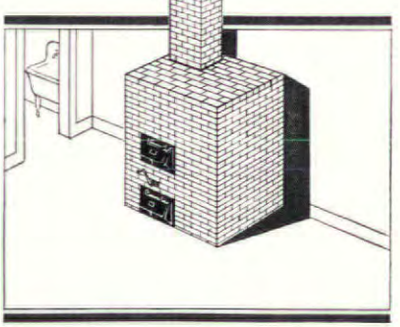

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THE
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VOL LII, No. III — MARCH, 1930

GOLF AND COUNTRY CLUB REFERENCE NUMBER

PART ONE—ARCHITECTURAL DESIGN

PART TWO—ARCHITECTURAL ENGINEERING AND BUSINESS

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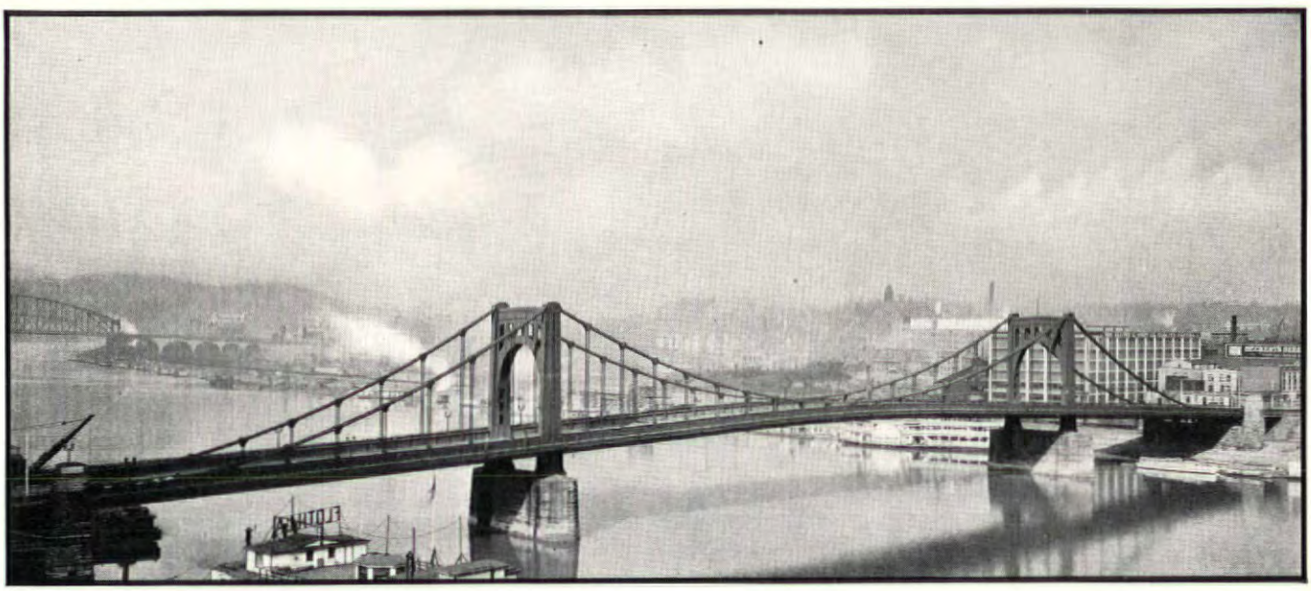

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The Architectural Forum

THE
ARCHITECTURAL
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VOLUME LII NUMBER THREE

MARCH 1930

THE CONSTRUCTION OF COUNTRY CLUBS

BY

JEROME PAUL JACKSON

OF THE OFFICE OF ROGER H. BULLARD, ARCHITECT

THE character and type of construction adopted for any particular project will depend on many factors. Prominent among them are the geographical location, type of site, size of club, amount of money available, and whether or not it is a temporary or permanent structure. But in any case, good foundations, a dry basement, substantial walls and floors and a weather-tight roof are essential. No amount of clever design or fine interior finish is of any lasting benefit if these features are lacking.

FOUNDATIONS. Poured concrete foundations are, without question, the most desirable in the majority of cases and the concrete should be dense, using the best of materials. It is also desirable that a well tested waterproofing compound be incorporated in the mixture. Next in desirability, if suitable local stone is available, is the good, old fashioned stone wall. Stone will require a greater thickness and mass than will concrete, and also the employment of skilled masons. To insure a good wall, great care must be exercised to see that the stones are all well bonded and that all joints and voids are well filled with mortar which should be rich in cement and waterproofed. After the wall is completed, it should be carefully pointed up on the *outside,* as well as on the inside, and the joints struck smooth. The outside is the more important. In cases where the stone itself shows any tendency to porosity, the entire outside should be well parged with cement mortar in addition to the pointing.

In some localities and under some conditions poured concrete or stone foundations are impractical or are of excessive cost. Where this is so, it is often possible to build good substantial foundations of concrete blocks. These do not require expensive forms, as does poured concrete, or especially skilled masons, as does good stone work. It is also built very rapidly. But good blocks must be used, and care must be taken to see that the joints are thoroughly filled and that they are well pointed, just as with stone work. If the blocks themselves are not waterproofed, or if the ground conditions are damp, it is also well to parge the entire outside with cement mortar, and in some cases even to fill the voids of the blocks solid. Whatever material is used, the foundations must always be made heavy enough to carry the superimposed loads, and, in addition, the horizontal thrust of retained earth must be considered. Many walls, sufficiently thick to support the vertical loads alone, fail from lack of sufficient thickness and mass inertia. Do not skimp in thickness of foundations; the saving in original cost is not great, and the consequences of skimping may be very costly.

DRAINAGE AND GROUND WATER. Careful study should be given to the site and the natural and finished grades and levels, to insure proper surface and sub-drainage. If there is any likelihood or possibility of there being ground water at or about the footing levels, footing drains should be provided around all excavated portions of the basement. These should be connected and extended by a tile drain to some lower point which will always insure adequate drainage.

MAIN WALLS. For the main walls, above grade, there are available all of the standard materials and methods of building, as well as com-

binations of them. The simplest, as well as the cheapest, is of course, wooden frame, using upright studs spaced 12 or 16 inches apart, and covered on the outside with boards and some form of weather-resisting material and lathed and plastered inside on the studs. Except in very small structures, and where the utmost economy is required, the studs should not be less than 2 inches by 6 inches and spaced preferably 12 inches on centers. It is strongly recommended too that all frame walls be insulated. A careful study of the various types of insulating materials now on the market should be made before choosing the one best suited for the particular project. The insulating materials vary in efficiency, method of application and in cost. There are flexible insulators placed between the studs, sprayed insulating material, various fiber boards, insulators in roll and in sheet form and those used as a filling between studs, joists or rafters. With brick or stone veneer, waterproof paper should be used over the entire exterior of the frame, with extra strips around all openings.

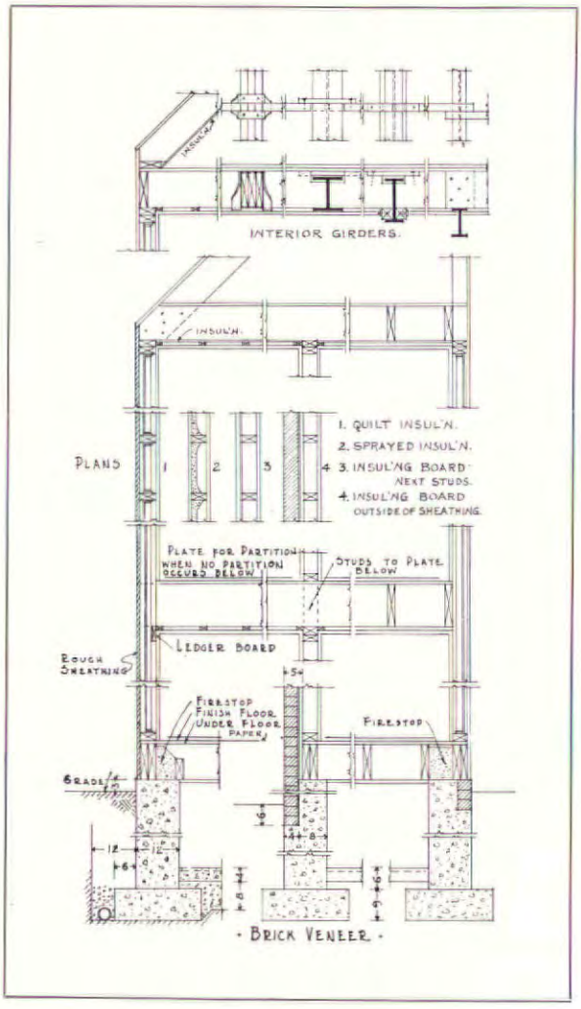


Diagram Showing Various Details of Frame and Brick Veneer Construction. Four Types of Interior Girders are Shown at the Top of the Diagram, Plans of the Girders above the Sections

In using brick or stone veneer on frame, there is no particular advantage in leaving an air space between the veneer and the supporting frame wall. Such an air space only serves to complicate and increase the cost of window construction and makes it more difficult to prevent wind and water entering between the frame and veneer. Only working space for the veneer is required.

Solid brick or stone walls are probably the most satisfactory and desirable in the long run. They are substantial, strong to carry floor and other superimposed loads, have mass and inertia to withstand shocks and thrusts, have reasonable coefficients of heat transmission, and, when well built, are weatherproof, with practically no upkeep cost. But to be satisfactory, they, too, like everything else going into a building, must be carefully designed in the first place and then carefully built; otherwise, they may prove a constant source of trouble. They must be of sufficient thickness, they must be properly bonded, and all joints must be thoroughly filled with good mortar and the pointing must be well done. The tendency is for careless mechanics to slight the cross joints and all joints in the interior of the wall. In face brickwork they sometimes simply butter the edges of the brick. This carelessness is the cause of much of the present-day criticism of masonry walls. All stone and brick should be thoroughly bedded and jointed full, and the walls should be *solid masonry*.

A good solid brick or stone wall may, with safety, except in unfavorable seashore locations, be lined with 4 inches of hollow brick or hollow tile and be plastered upon this hollow brick or tile. Or, in place of this lining, wooden strips may be fastened to the inside of the wall and metal or wooden lath nailed to them. Or again, if objection is raised to the wood furring strips, 1½-inch hollow split tile may be used as furring and as a plaster base. Any one of these methods is satisfactory under inland conditions. Where the climatic conditions are especially severe, however, such as those on Long Island and certain other parts of the coast, it is sometimes advisable to provide a larger air space back of the main wall, and an inner wall to support the plaster. In fireproof construction the use of a 3- or 4-inch air space and 3-inch hollow tile blocks is a good method. In non-fireproof construction a 2- to 4-

inch air space and 2-inch by 3-inch studs from floor to ceiling, to receive the lath, is good. Load bearing hollow tile of good quality can now be obtained in most localities. It comes in a great variety of shapes and sizes, some simple, some complicated. Usually the simpler forms are the best. The exterior may be covered with cement stucco or with shingles or clapboards, etc., and the inside plastered directly on the tile. The outside may be faced with brick, which can be easily bonded to the tile. In the writer's experience, the tile with air spaces running horizontally and made in two sizes, 5-inch by 4-inch by 12-inch, and 5-inch by 8-inch by 12-inch, with corresponding corners, are very satisfactory. In using tile, care must be taken to avoid excessive concentrated loads, such as might occur under girders or next to windows of wide opening. If such are necessary, provision must be made either by the use of solid brick, reinforced concrete or steel or lally columns. The precautions against damage from severe climatic conditions, which are advisable for brick walls, apply also to tile.

Well made concrete blocks make a substantial wall, a wall that serves as an ideal base for cement stucco finish. But on the inside, except in very dry localities, it is not desirable to plaster directly on the blocks. It is better to furr and lath. In other respects, cement blocks can be used much the same way as hollow tile.

Use of reinforced concrete for walls of club houses will seldom prove advisable as the form work required is so complicated that the cost is generally excessive.

FLOORS. No matter whether the club house be small or large,—frame, or masonry and wood,—it is very desirable that the main floor be fireproof because many fires originate in the basement. A fireproof floor will often confine, until it can be extinguished, a fire which otherwise might destroy the entire building. The additional cost over wood joist construction, with the joists protected by metal lath and plaster, need not be excessive. In addition, if the superstructure is frame, all woodwork will start on a solid uniform masonry bearing, eliminating uneven shrinkage.

In smaller buildings, and those with reasonable spans, the floor construction can generally be designed in wood, with little recourse to use of iron and steel, except for bolts and hangers and a few girders. But to do this economically and well demands that consideration be given to construction from the very outset. Main partitions should be kept as nearly as possible over one another, and heavy loads at the centers of spans should be avoided. In frame construction, the writer advocates the omission of the customary heavy wood wall sills under the first floor joists and recommends the "western" method. In this method the joists rest directly on the masonry walls, and double joists at right angles are spiked to them. Where parallel to the walls, they are also doubled, thus making a double row of joists all around the building. Then the rough floor boards are continued clear to the outside, and a light sill of 2-inch material, the width of the studding, is spiked on top of them. This is to receive the bottom of the wall studding. All interior partitions rest on similar 2-inch sills on top of the rough floor, so that there is always a uniform shrinkage everywhere. This construction assumes that the inner ends of the joists rest on either masonry or light steel beams. The

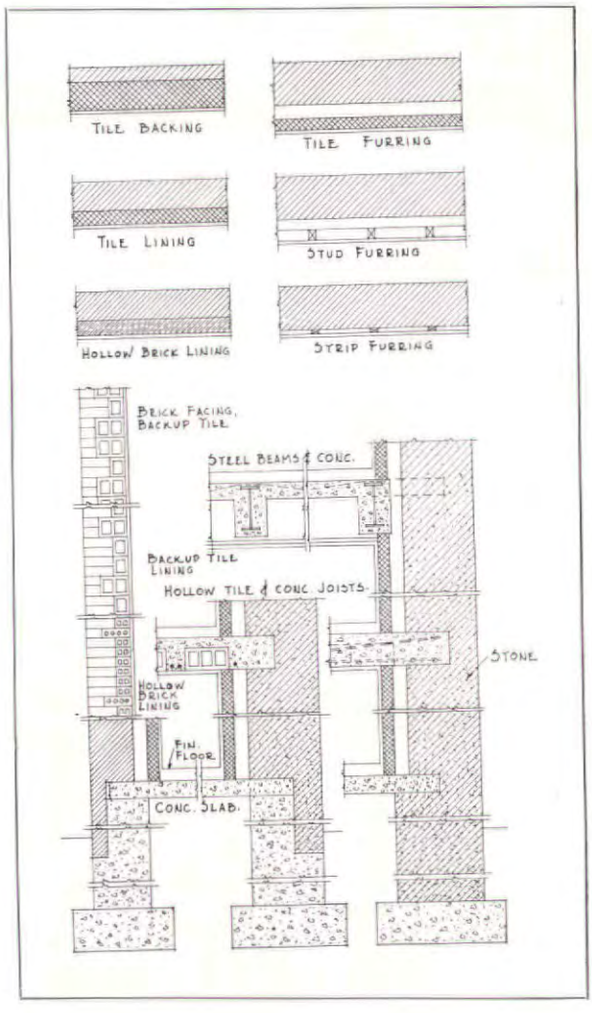


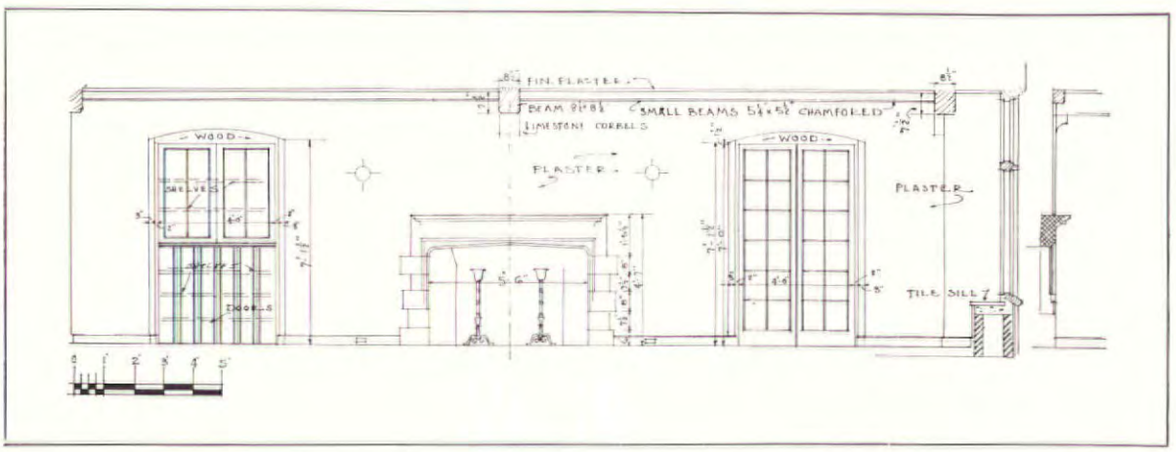
Diagram Showing Various Types of Masonry Wall Construction. Brick Facing is Shown with Various Types of Backing and Furring. Several Floor Types are Also Shown

Women's Dining Room, Oakland Golf Club, Bayside, Long Island, N. Y. Roger H. Bullard, Arch.

spaces between the joists over the foundation should be beam-filled with lean concrete or brick to act both as a fire stop and a protection against cold floors. Such a floor, with the addition of a layer of incombustible paper over the rough boards and a plastered ceiling below, furnishes a very efficient fire stop.

Do not skimp on sizes of floor beams. Using larger size beams or a closer spacing is often invaluable as a protection against cracked plaster, and the extra cost involved is small. Use plenty of good stout cross bridging, and tie or lap joists wherever possible.

In fireproof buildings, reinforced concrete, in some form, is probably the best material for floors. For the main floor this may well be of the all-reinforced concrete girder, beam and slab type. Sometimes, however, and especially on upper floors, it is simpler to employ steel for girders and beams and to confine the use of concrete to the slabs. Ease and speed in erection and limiting dimensions for beams will largely decide this, or it may be that a local preference for one type or another will have more weight. Some prefer thin, short span slabs, using a suspended ceiling below the beams. This gives space for running pipes, etc., but it requires closer spacing of beams than some others. The hollow tile and concrete joist method is well adapted to quite long spans and gives a flat surface on which to plaster. It is a more nearly soundproof floor than one with a suspended ceiling, but more troublesome as regards the handling of plumbing pipes. The so-called "tin pan" construction is practically like the tile and joist, but with the substitution of voids for tile. It requires a sus-



Working Drawing of Dining Room Shown at Top of Page

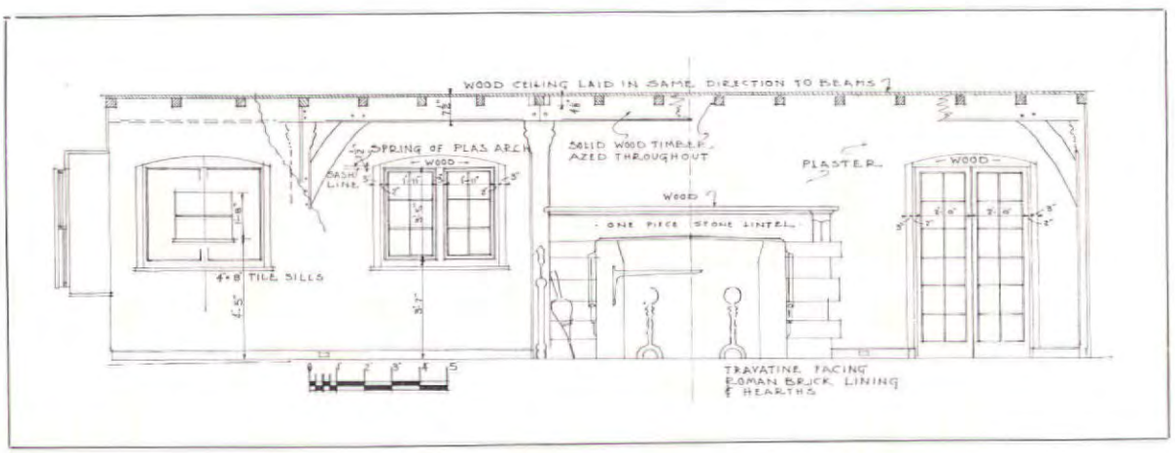
Corner of the Lounge, Oakland Golf Club, Bayside, Long Island, N.Y. Roger H. Bullard, Arch.

pended ceiling. There are on the market numerous light I-beams or skeleton trussed beams, which can be used with a fairly close spacing and a light reinforced slab above and a suspended ceiling below. Some of these are excellent.

For finishing fireproof floors with wood, old fashioned sleepers set in concrete are good. Clips for the sleepers may be set in the concrete also, with or without fill. Another satisfactory method is to cover the fireproof construction with 2 inches of nailing concrete and lay the finished wood floor upon it without sleepers.

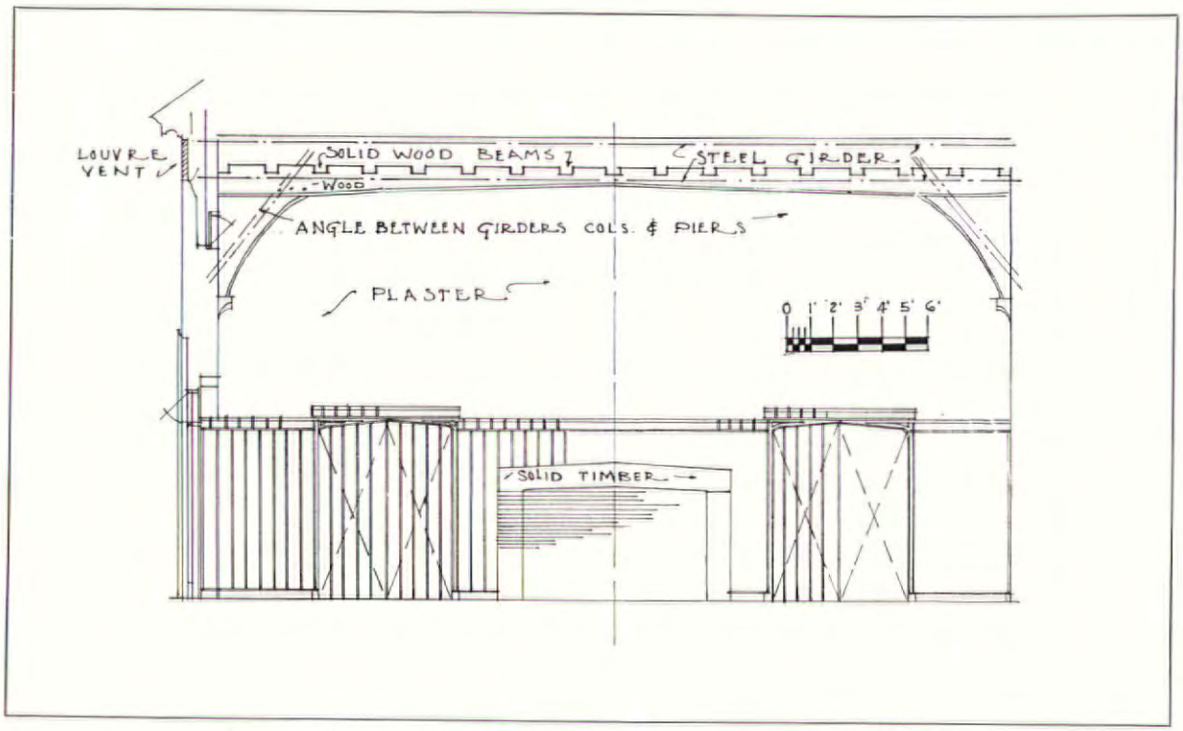
Where floors must span wide areas, without girders or beams projecting below the ceiling, building them is often quite a problem. If the thickness of the floor is sufficient, heavy steel girder beams may sometimes be used. But cases constantly arise where this is impossible, and it is seldom possible to use a beam or girder which projects above the floor. However, if the story above is cut up into smaller rooms, or especially if there is a corridor running down the center of the span, it is generally possible to arrange some sort of a truss or system of hangers to take care of the loads. For example, the cross partitions above can be spaced at suitable intervals, and trusses, either wood or steel, built into them. The lower chord will be within the thickness of the floor to be supported, and the upper chord in or just below the floor above. The web members will be so disposed as to allow for a central corridor or any communicating doors.

Cases may arise where a trussed partition in the story above will not allow the necessary doors or openings through it. In such instances it may be feasible to suspend flush girders by means of



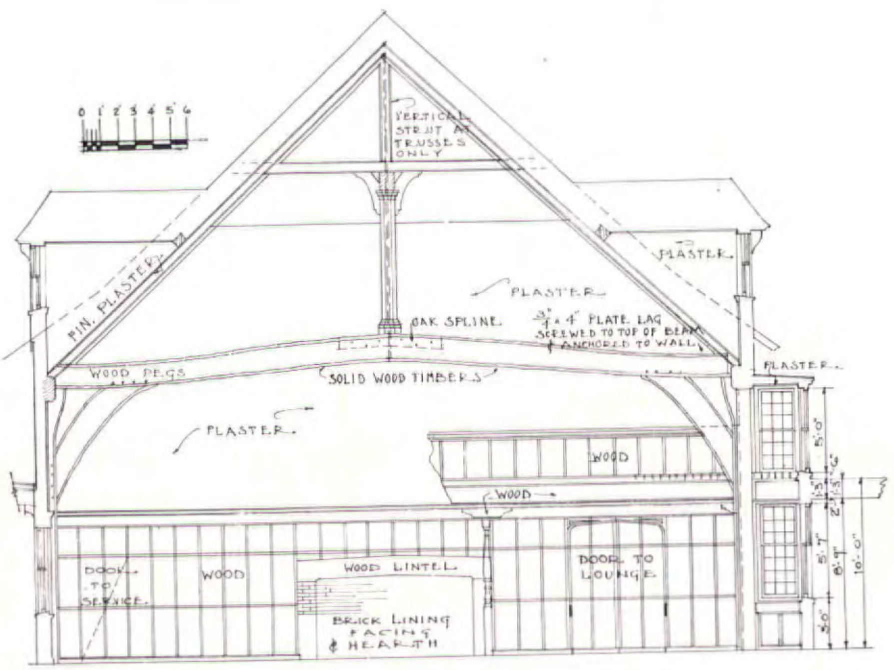
Working Drawing of Lounge Shown at Top of Page

Main Dining Room
Plainfield Country Club,
Plainfield, New Jersey.
Roger H. Bullard, Arch.



Working Drawing of the Main Dining Room, Plainfield Country Club

View of the Great Hall, The Maidstone Club, East Hampton, N. Y. Roger H. Bullard, Arch.



Working Drawing of the Great Hall, the Maidstone Club

steel rods from a truss or girder in the roof space or attic. These hangers, being vertical, will allow the maximum space for intercommunicating openings. Such devices as these, while of perfectly proper construction, are somewhat complicated and costly, and should not be resorted to unless absolutely necessary. They involve heavy concentrated loads, which must be provided for by piers, posts or columns.

ROOFS. Shingle, slate or tile are the roof coverings which seem most appropriate for a club house. Slate or tile should be used if possible. In the majority of cases the roof construction will be of wood. That being so, it is very desirable to insulate against heat and cold. Cover the tops of all rafters with ½-inch fiber insulating board before applying the roof boards, and whether the covering be of slate or of wood shingles, use tight boarding,—not shingle lath,—and roofing felt or good waterproof paper over this boarding. Do not be afraid that the shingles will rot out at once; they will not, and it will save many a leak and many a ton of coal. All flashings should be of non-corrosive metal.

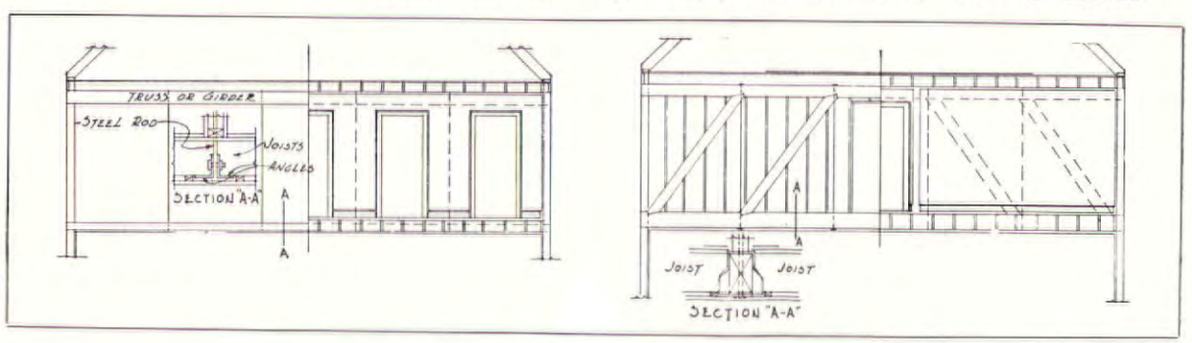
If a more fireproof roof is required, a very good arrangement is to use channel or I-beams as rafters, with light angle or T-purlins, spaced not over 4 feet apart. On these purlins lay a thin slab of nailing concrete reinforced with heavy rib lath. The under side of this slab should be plastered with cement mortar. Such a roof gives a good surface for applying slate or tile and is a fairly good insulator. Various forms of precast roofing slabs can be successfully used.

OPEN TIMBER ROOFS. Wherever possible, plan the construction of open timber roofs from the beginning so that they will be structural. Unless the roof must be fireproof, this can generally be done at a saving in cost and with better results. It seems absurd to build a good solid structural wooden roof and then afterwards hang up under it a purely imitation truss. Trusses for open roofs may be very simple or very elaborate. There are the "A" truss with its low tie beam, the scissors truss, the hammer-beam truss, etc., with all their variations. Some require one purlin, some many. They afford great opportunity for combining engineering skill and practical knowledge with artistic design.

INSULATION. The writer wishes to emphasize again the importance of using good insulation. In the northwestern states this is generally recognized and accepted. But the east is far behind in this respect and can well profit by the experience of others. There is no "best" insulation for all conditions, but there are many which are excellent for each problem. The different types all have their proper places and uses. Much discomfort can be avoided and an appreciable saving of fuel can certainly be effected by their judicious use. While perhaps not so important as keeping out cold in winter, good insulation will also keep out heat from the direct rays of the sun in summer. In addition, the use of sound insulation between rooms and between floors deserves careful consideration, as well as the deafening of plumbing pipes.

And, last of all, try to eliminate fire hazard. Look to the chimneys, and see that all flues and fireplaces have sufficient thicknesses of good brick work around them. This is especially necessary at the back of a fireplace and over the lintel at the front of the smoke chamber. Many a chimney has a good flue lining and plenty of masonry around it, but is dangerously thin at the smoke chamber, below where the lining starts. Keep all wood work away from chimneys. Fire stops are well worth considering and introducing at critical points. See that all stairs are strongly built and not too steep, and that there are no winders.

While the general planning of a club house, for convenience of arrangement and ease of operation, requires more or less specialized training and experience, the planning of its construction comes down to good common sense and substantial, practical building. The fact that it is a club house does not greatly alter the problem. There are generally several methods of solution; which will be adopted depends largely on location, personal preference and the state of finances.



Two Methods of Supporting a Second Story Over a Long Span

FINANCING THE GOLF CLUB

BY
INNES BROWN
MANAGING EDITOR, *THE AMERICAN GOLFER*

THE impression is rather commonly prevalent that golf clubs, generally speaking, are always in debt, and unfortunately there are good and sufficient grounds for such an impression, because golf, in its business aspect, still has some way to go before working itself clear of a haze of confusion and disorder in matters pertaining to club finances. All too frequently, the trouble originates in the basic plan of financing and suffers aggravation from mismanagement and ill-advised administration later on.

There are two general plans of providing the funds necessary for the organization and building up of golf clubs. The one, and by far the most common one, finds a kind of loosely knit alliance among a few individuals who set out on their venture with little or no definite conception of just what is going to be needed or of how the needs are to met. The other is a business-like procedure of working out in advance a general plan to cover all operations and the underwriting in some form of the entire proposition. Suppose we examine the two briefly.

The great development in golf in this country over the past ten or fifteen years has come largely in the development of what may be called community clubs; not in the sense that they are community owned, but rather that they aim at providing recreational and social facilities for people living, in large part, in the immediate community. The usual procedure is something like this. A small group of individuals, fired by enthusiasm for golf, conceive the idea that the city or town needs a golf course, or another course in case it already has one or more. They decide to conduct a quiet personal canvass among their friends in quest of other kindred spirits. Some encouragement is met with, and they decide to go ahead and organize a club. Suitable land sites are considered, and usually an option is taken on one or more. Announcement is then made public of the formation of the new club, and the gallant crew launches into the task ahead. Costs are figured roughly, after which a sliding scale of fees for club memberships is worked out, the costs advancing as successive goals in the campaign to secure members are reached. If the allotted number of new members can be secured in each successive stage on scheduled time, all goes well,—but that is an exceedingly large "if."

Grief encountered usually derives from the fact that the entire work is done in an amateur way from the start. Work is undertaken through organization of committees. The pioneers of the movement are as a rule business and professional men, active in their own spheres, which occupy their time rather fully,—so fully, in fact, that they do not have the time available for the club work, except at a considerable sacrifice of their own private interests. This club organization work is a business in itself, with the details of which they are unfamiliar. This unfamiliarity makes for waste and inefficiency, and costs mount up rapidly. Evidence of the failure of the enterprise to make the expected headway shakes the faith of prospective members, who warily decide that they will wait a while longer and see whether the venture is actually going to succeed before they come in. Failure to maintain the expected schedule of obtaining new members, and through them necessary additional funds, throws a wrench into the machinery, and the craft begins to ship water.

The most ready recourse in such circumstances is to plaster an assessment on the members already in, as an emergency measure labeled as the only remedy to save what has already been put in. In rare cases, there may be a few who are able and willing to save the situation by advancing the necessary funds on such security as the club and other members can guarantee. This is a happy solution, but hardly to be counted on generally. And even so, it does not permanently relieve a bad situation. The obligation still exists, and in the meantime the financial condition which has developed makes more difficult the already hard task of rounding up the necessary members to carry on.

The second method differs from the first in the main essential that it works from a different angle. Here the plan is to build a course and club house first, and then organize the club. In the first instance, the procedure was to organize a golf club and then build a course and club house, or at any rate to try to carry on the two operations simultaneously. There are at least two main advantages in the second method, for, with funds available to carry through all operations, it is much simpler to organize the work properly and to have it done on an economical basis. The construction of both course and club house is carried through in full in proper time, and not piecemeal, which would mean delay and extra costs. The second important advantage is that the prospective member is offered a complete

picture ready for his inspection and not a blank canvas on which the artists attempt to describe the picture they are going to paint. Not only can the prospect see exactly what the course and club house are, but there is the still further advantage that, if he joins, he has the facilities ready for his immediate enjoyment and will not have a wait of a year or more before him.

The case of the Druid Hills Golf Club, of Atlanta, aptly illustrates the point. Several years ago a real estate company in that city acquired a large amount of acreage in what is now known as the Druid Hills section. The late George Adair, one of the pioneers of golf in that section of the country, was a member of the firm. With a ready appreciation of what an asset a good golf club would prove, the first thing he did was to go out and build a fine course and a handsome club house. The entire expense was borne by the developing firm, and everything was in readiness for occupancy and play before any one was approached on the subject of taking a membership. Invitations were extended to a select list of golfers to become members, and the task of filling the membership list proved easy. Within something like two years the list was full, with others waiting to come in. A gradually increasing scale of prices prevailed, and, by the time the list was filled, sufficient funds were provided for financing a plan to take the property over in the name of the club. The full purchase price was not paid outright, but dues were fixed at a figure which allowed for the creation of a sinking fund, which in due time paid off the remaining obligations on the property. In the meantime the investment of each member was amply protected by the value of the property.

Numerous other instances might be cited of formation of clubs in the vicinities of the larger cities. However, thus far, practically all cases which have come to the attention of the writer have reflected the spirit or the vision of one or more individuals, who have had at least a sporting interest in golf as a game. At the same time, purely from a business standpoint, the matter of financing the organization of a golf club in a logical location is in fact entirely sound. Ownership of the land site affords ample security to individuals or corporations in financing the building of a club and course, since the operation constitutes improvement of the property quite as much as would the building of a residence, a store or a factory. And furthermore, the location of the club readily and promptly insures an increase in nearby land values.

Shortly after the war a prominent citizen of Nashville purchased a large tract of land southwest of the city, formerly a famous stock farm, and proposed to the Nashville Golf and Country Club, whose quarters were becoming cramped because of encroaching building operations, that he would give the club 150 acres of land, if the members would move out and build a new course and club house. The club accepted, and within a few years after the new club was built, a considerable number of handsome residences were built quite close by and, what is more, two modern apartment houses have also been built there.

Whether the necessary funds be secured by a form of underwriting or by the more laborious process of relying on the sale of new memberships, clubs which own or aim to own their property usually make the purchase of a share of stock in the property a condition for obtaining membership. As a rule, the purchase of such stock makes the member a joint owner in equal division with every other member of the club. In most states the corporation laws make it advisable to organize two corporations, the one a social club, the other a business corporation. Usually the board of governors of the one and the directors of the other are the same. The purpose of this procedure is to avoid court complications in amending or otherwise changing the regulations and by-laws of the social club.

Incidental to the problem of club financing, it may be remarked that the work of securing members in the club is most important, since it is the members in the final analysis who put up the money for the club. Volunteer campaigns are rarely successful. The work must be done in an organized manner, which can hardly be the case with a volunteer organization. Experience in raising funds for various charities, public services, college endowments and the like has demonstrated the business soundness of turning this kind of work over to specialists in this line. Thus far, within the writer's knowledge, there is no organization devoting its effort to the field of golf club work. However, other fields are well represented, and there should be no radical difference between them and golf club work. A commission basis is usually established with a maximum percentage allowed. In the case of a golf club the problem of eligibility would obviously enter.

Again, while a golf club is a social and recreational center in purpose, in its organization and administration it is a business enterprise. Its capital is the money paid in by its stockholders, and the nature of the business is such that it cannot operate in a small way. It is a matter of unit construction, and that construction depends on bringing in a requisite number of stockholders within a limited time. The plan which shortens the time necessary to sell the proposition to this requisite number will prove most economical in organizing and developing the club.

THE CORRELATION OF CLUB HOUSE AND GOLF COURSE

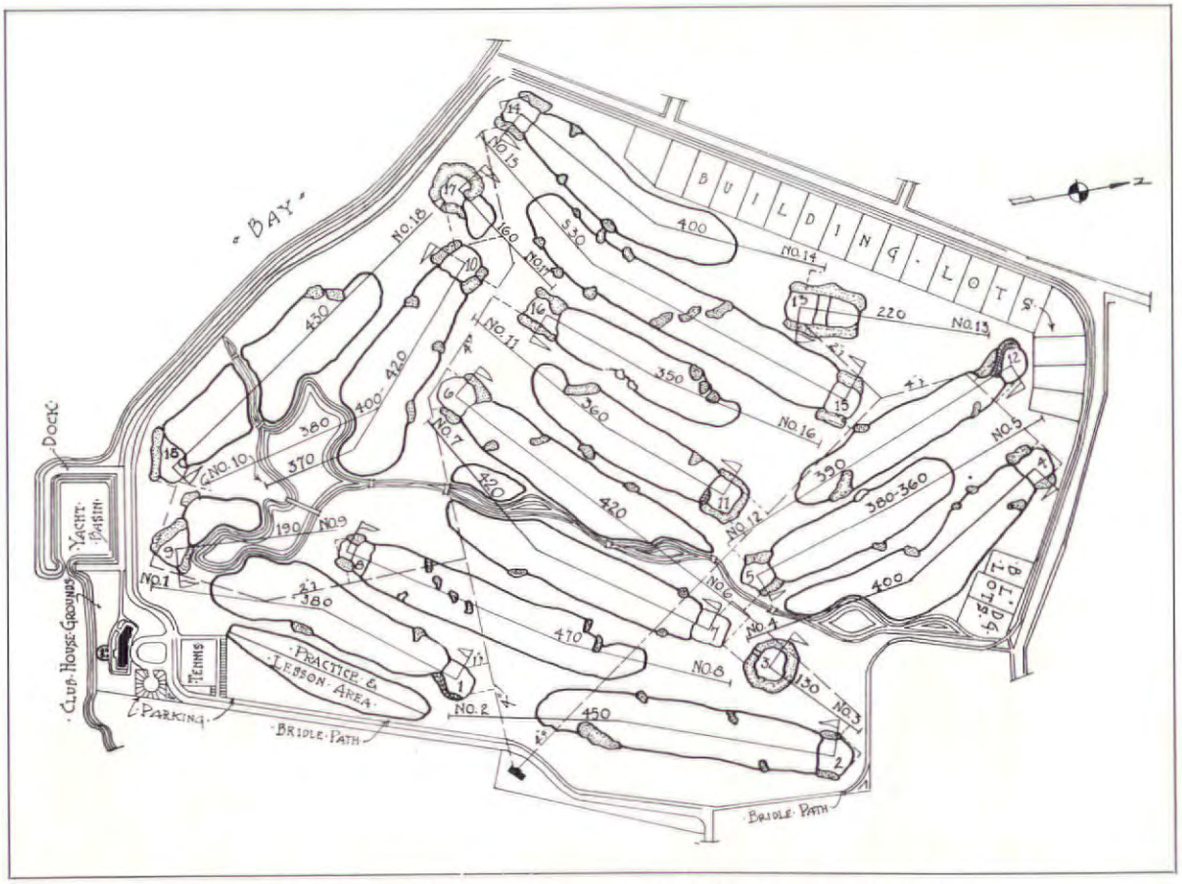
BY
CHARLES H. BANKS
GOLF ARCHITECT

DRAWING up plans for a country club involves so many different factors that any hasty or haphazard work on any one detail may lead to difficulties and embarrassments which it will be impossible to surmount. From the very outset there should be coöperation between the golf architect and the club house architect, and the different committees should work in close harmony with both these men in order to secure the best results. If a landscape architect is to be employed, he too should have a voice in the early conferences. Naturally, there will be differences of opinion, but the final results will certainly be better if these differences are ironed out before the work has proceeded to the point where changes will be costly or impossible.

To begin with, it may be assumed that the club house committee will wish to choose as outstanding a location as possible for the club house. Not infrequently this will be the highest point of land on the property. Sometimes it will be a corner or some other part of the property that is limited in access from the standpoint of golf layout. As a result of using arbitrary methods, the club house committee may leave the golf architect in a critical position from which it will be impossible for him to extricate himself. The golf architect will have no alternative but to make the best of a bad situation, and will thereby subject himself to unintelligent criticism from those who do not realize the limitations that have been placed upon him by others.

ESSENTIAL RELATIONS. The principal things which the golf architect must consider in the relation of golf layout to club house location are:

(1) The possibility of getting away conveniently from the club house to the tees of the first and tenth holes.



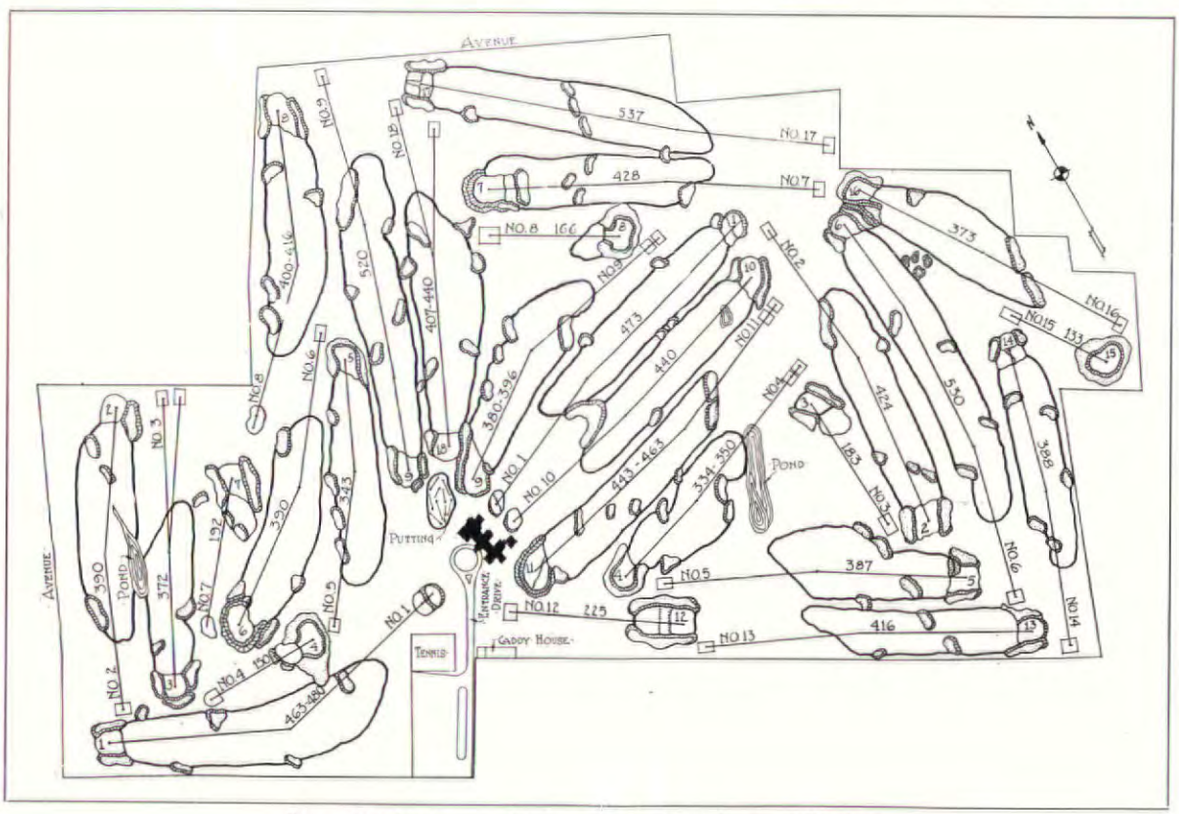
Plan of Golf Course, Westhampton Country Club, Westhampton Beach, N. Y.

(2) The possibility of getting back conveniently to the club house from the ninth and 18th holes.
(3) Avoiding steep grades, especially toward the end of the round.
(4) Provision for a practice fairway adjacent to the club house.

When one considers that in addition to this provision must be made for a suitable entrance road, parking space, caddie house and yard, and sometimes tennis courts, swimming pool and other features, it becomes clear that the location of the club house and the utilization of the surrounding land affect many things other than merely the view from the lounge windows, or some other feature which in itself may seem highly important, but which in some cases may be only a minor part of the picture. A good club house architect will, for example, endeavor to arrange the club house so that the first tee, and if possible the tenth also, will be near the locker room and professional's shop, and so that the lounge, grill, and porches will command suitable outlooks. But the club house architect has many problems to consider. All is not clear sailing for him. So the golf architect should endeavor as far as possible to assist in working out those problems which concern a well unified plan of club house and course layout combined.

CLUB HOUSE LOCATION. The entrance to the club premises must, of course, be given very careful thought. It should be planned with the idea of giving an effective approach, from the architect's standpoint, over an easy grade, with ample room to avoid danger, and with easy access to the parking space. But in some instances the topography surrounding the club house permits of only very special treatment, and it may be that considerable grading will be required to secure the desired results. The same is true of the parking space. In such instances it is better, of course, to take the bull by the horns and draw up a plan at the outset which will permit artistic and practical treatment of the problems, rather than resort to halfway measures which will later cause many a regret because of imperfections which it will be costly or impossible to correct. In all problems the golf architect must be given full consideration. For the sake of safety and "playability," ample room must be allowed for those holes which adjoin the club house.

There is nothing much more discouraging to a golf architect than to be handed a set plan which so limits his scope as to greatly weaken the effectiveness of his layout, when he realizes that had he been called in early enough to advise as to his own needs for the course, *all* problems might have been worked out satisfactorily. This sort of

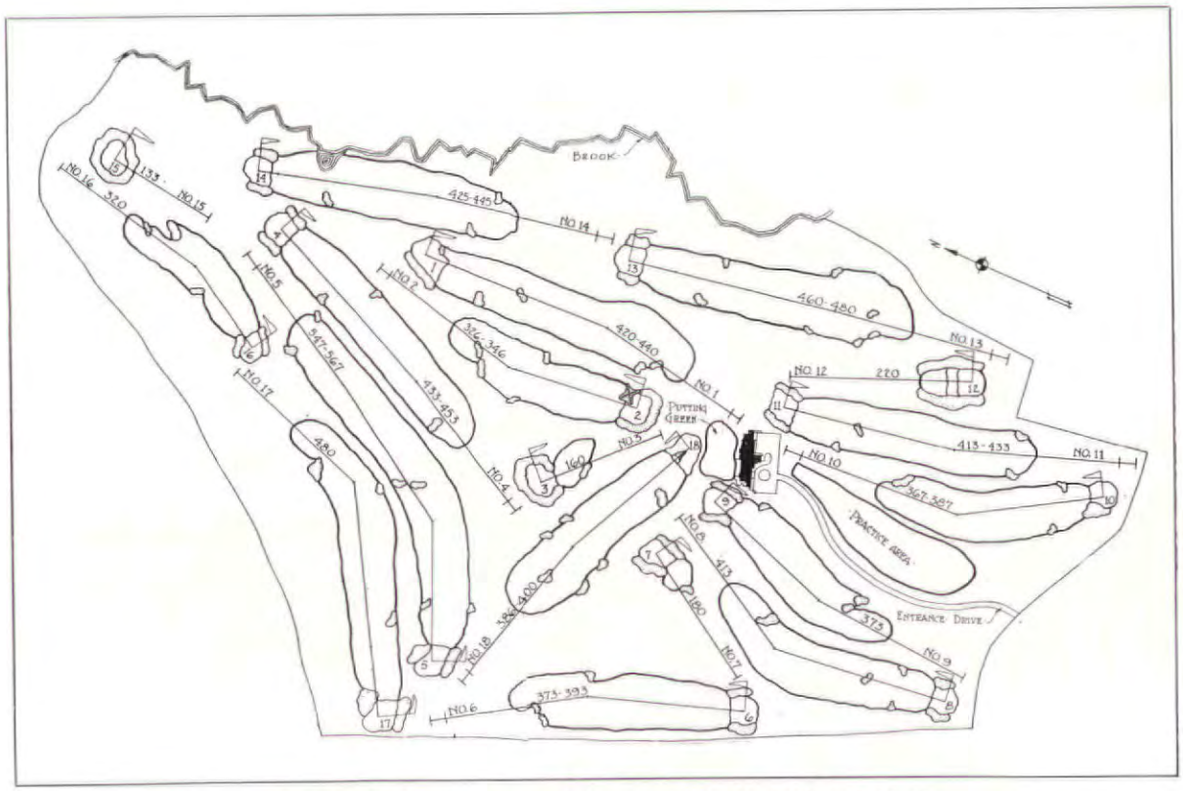


Plan of Golf Course, Hackensack Golf Club, Oradell, N. J.

dilemma faces the golf architect not infrequently in cases where real estate developments are involved. The writer has in several instances been handed topographical maps showing roads and plotting all carefully planned in advance of any study of the property for golf course purposes. Obviously, the best results can be secured only when all of the problems are considered in their relation to one another. Roads can be laid out more easily than golf holes because they require less room and less exacting conditions, and sometimes excellent golf holes can be built on land that is not suitable for building lots, thereby reclaiming poor land, and at the same time releasing an equal acreage for building purposes.

COMPARATIVE METHODS. One comparison will serve to illustrate the right and the wrong method. A few years ago a golf course was planned in connection with a real estate development. In this case it happened that the building of the course was to be financed by a hotel, and the property was furnished by an outside interest. A local golfer was asked to determine what was required for the golf course. Then a complete layout of roads and building lots was made, and the real estate company proceeded to build roads, lay water mains and make other improvements, and at the same time to make contracts for the sale of the property. Finally, when the golf architect was called in, he found that the property which had been allotted for golf course purposes was entirely inadequate, and it was only with the utmost difficulty and by persuading the real estate company to slice off many of its building lots, at the cost of much trouble and delay, that a reasonably good golf layout could be secured.

SUCCESSFUL COÖPERATION. How different this method is from that employed by a well known expert who has had great success in the promotion of high class real estate developments! This man employs a golf architect, a club house architect, a landscape architect, and a hydraulic engineer. All of these men first make a very careful study of their individual problems. Then they are called together in conference. After a give-and-take discussion they go back to the study of their particular problems in the light of facts brought out in the conference. This process is sometimes repeated many times, especially between the golf architect and the landscape architect, who has charge of the layout of roads and building lots, before a final, well unified plan is formed. When work is started, it proceeds in accordance with perfected plans which have been made with the utmost care and consideration of every possible contingency. The result of such coöperative methods will inevitably be as free from error as it is possible to make it.



Plan of Golf Course, Tamarack Country Club, Port Chester, N. Y.

The 16th Hole at the Whippoorwill Golf Club, Near Chappaqua, N. Y., Looking Back Toward the Tee, Which is Located on the Rise of Ground in the Distance. This Land Was so Swampy That Clearing Had to be Done While the Ground Was Frozen. Trees Were Pulled by Cables Run in from a Distance. The Land Was Too Uncertain to Risk Running Tractors on it. Later, an Artificial Pond Appeared Where This Swamp is

The 15th Green at the Whippoorwill Golf Club, Near Chappaqua, N. Y., Under Construction. This Illustration Shows the Condition of the Land After the Clearing of Trees Had Been Completed, a Large Amount of Ledge and Coarse Rock Removed and Drainage Lines Installed. An Open Ditch for One of the Drainage Lines Appears in the Foreground. Owing to the Rocky Condition, Most of the Soil for the Green Had to be Carted in. The Beginning of the 16th Hole Appears in the Background, the Tee Being Behind the Knoll. An Artificial Pond May Be Seen Behind the Truck on the Left

The 16th Hole at the Whippoorwill Golf Club, Near Chappaqua, N. Y., Looking Back Toward the Tee, Which Appears Under Construction on the Elevation. The Artificial Pond Replaces the Tangled Swamp Shown in the Accompanying View. The Material Taken from the Swamp Was Used for Fill Where the Good Land Appears Adjoining the Pond. This Land, Which a Year Ago Was Useless, Has Thus Been Reclaimed and Beautified and Put to a Useful Purpose

The 18th Hole at the Knollwood Golf Club, Near White Plains, N. Y., Taken from the 200-Yard Mark. The Fairway in the Foreground Was Swampy and Required an Extensive Drainage System. The Fairway Across the Pond, in Front of the Green, Was a Steep, Unplayable Slope Which Had to be Graded by Making a Cut on the Right and a Fill on the Left. The Green Itself is on a Location Formerly Occupied by a Rubbish Heap and an Old Greenhouse Foundation. The Construction Was Heavy, but the Hole Appears Natural

TYPICAL PLANS. The accompanying sketches of golf layouts will serve to illustrate some of the points mentioned here, but obviously each project has its own peculiarities and must be treated with reference to its individual problems. The plan of the new Hackensack Golf Club has as its club house location the highest point on the property. The plans called for a 27-hole layout, making it advisable, if possible, to have three starting tees and three finishing greens near the club house. The ground on the west of the club house slopes away very abruptly. The ground on the east also slopes away abruptly, but it flattens out quickly. The boundary line near the club house on the south, and the location of the entrance driveway, parking space, and caddy house eliminate this land from use for golf purposes. A deep ravine toward the east,—less than 300 yards distant from the club house,—eliminated quite a large plot of land in this section from use for first class starting and finishing holes. Therefore, the land available for the three starting tees and the three finishing greens was much curtailed. The plan, however, worked out very well, with no bad features, and with an additional tee (Number 12) adjoining the club house. In this case the property was too limited for a practice fairway, but this is not so bad, considering that there are 27 holes in the layout.

It may well be added here that having the ninth green and the tenth tee near the club house is sometimes undesirable and sometimes impossible. This feature of the layout should not be forced when the conditions are not favorable. Some of the finest golf courses in the world, such as the famous St. Andrews in Scotland and the magnificent Mid Ocean in Bermuda, do not include this feature. A course which the writer built in New Jersey in recent years has as a club house location a corner in a narrow strip of land between a lake and the boundary line. There was no denying the fact that this was the outstanding location for the club house, and so the golf architect set to work to make the best of the situation. By careful and persistent study he arranged to have the first tee and the 18th green adjoining the club house, and brought the eighth green back near the 18th tee, so that a nine-hole round may be completed at the club house by playing the first eight holes and Number 18. Instances of solving similar problems might be multiplied without number.

The plan of the Tamarack Country Club has a fairly central point,—not the highest point of land,—as its club house location. In this case, when the golf architect was called in for consultation with the club house committee, a point a considerable distance to the south of the final location had tentatively been selected by the committee. The club house architect also suggested for consideration a plot adjoining the highway. The golf architect, with his visualization of the problems and features of the layout as related to club house location, suggested the location as shown on the map. There were two main reasons for this: (1) It commands a striking view of almost the entire course, whereas the point originally selected by the committee was so far back from the break in the hill that from this point the view of the course would be very limited. (2) It permits of a far better utilization of the property for golf layout purposes, leaving between the club house and the highway an uninterrupted stretch of sufficient extent to permit of laying out some excellent holes and a practice fairway on the top of the hill.

The plan of the new course constructed in 1929 for the Westhampton Country Club shows as its club house location a corner of the property hemmed in by a pond. This pond, however, is small enough to act as an excellent hazard, and therefore does not introduce any difficult problems. It acts, rather, as an attractive feature. The land was largely marsh, and very extensive sand filling was necessary in order to make the land usable. In this case there was no topography. It is a *made* course from the water up, as one might say. Starting and finishing holes and practice fairway work out well in relation to the club house location, although the latter is in a corner and at the water's edge. Here there is an entrance road, approaching the club house from two directions, and provision has been made for parking space, tennis courts, and yachting features, with ample space left for additional parking facilities. The layout is ideal. The lagoon, built for drainage purposes, introduces interesting golf shots and an attractive landscape feature.

Owing to the more or less unique problems which must be considered, both in the planning of the club house itself and also in the proper coördination of the club house plans with the golf course plans, it is certainly advisable to employ an architect who has had experience in this particular branch of his profession. In addition to being thoroughly familiar with the numerous problems of his own particular work, he will readily grasp the problems which the golf course architect must face and will, therefore, be better equipped to coöperate in securing the best all-around results.

ROADWAYS AND PARKING SPACES

BY
A. F. BRINCKERHOFF
LANDSCAPE ARCHITECT

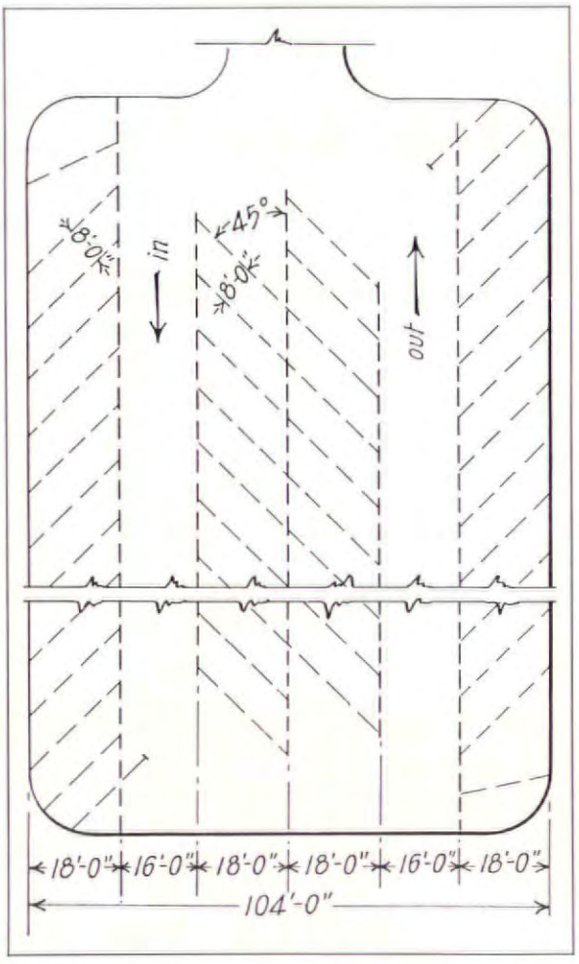
THE roadways on the grounds of the golf and country club have an important function in addition to providing a safe and convenient route for transportation,—they should be attractive and inviting. The impressions created by the approach to a place do have an appreciable influence on the subsequent experiences and emotions. Perhaps the importance of an attractive approach to a club house is not fully appreciated, being dwarfed by other and more conspicuous elements of the ensemble. Nothing, however, can be entirely satisfactory if the subtle and indefinable sources of pleasurable emotions are wanting. These sources must comprehend the element of beauty.

The relative importance and true conception of the various factors that constitute a golf or country club cannot be appraised and attained except by the joint consideration of the building and grounds committee and the building, golf course and landscape architects. These three contribute to and control the physical appearance of the grounds, and it is only the best correlation of their functions that produces the closest possible approach to perfection. Even if the initial funds available for the development of the project are not sufficient for the completion of the landscape features concurrently with the others, complete landscape designs should be made in the first instance and the planning completed as far as possible. If this precaution is neglected, a satisfactory landscape development cannot be had.

The reconstruction of the grounds, and in some instances of the club houses, of a large number of fairly old clubs at this time demonstrates the wisdom of having *complete* plans made before the development begins. The conditions imposed on these architects,—building, golf course and landscape,—in connection with these projects are most difficult, and the approach to perfection is too frequently handicapped by the lack of foresight in the initial undertaking.

ROADWAYS are primarily routes for transportation through the grounds to the club house. They must be safe and convenient. The factors involved are capacity, location, width, gradient, curves, road construction and drainage.

Location. Topography is the controlling factor in locating the roadway. On fairly level ground the most direct route between the entrance to the grounds and the club house is the least costly to construct, and the amount of the roadway budget item will be the limiting condition in departures therefrom. If the topography of the ground is broken by steep elevations, it may be less costly to locate the road in an indirect route, so as to avoid expensive and unsightly cuts and fills and to avoid also an excessive gradient. The indirect route will reach its objective by maintaining the desired gradient by following the natural contour of the ground. The indirect route is often the more attractive, because it is susceptible of a better and more natural disposal of trees and shrubs and it affords possibilities of creating interesting vistas. The direct route can be made attractive and interesting by skillful planting and adornment by small constructions, such as wall fountains and niches, permanent stone seats, or statuary. Such a road tends to be



Parking Space. Continuous Traffic, with Head-on and Back-out Placement of Vehicles

more formal than the indirect route. Deep cuts and fills are always unsightly, because they are a violation of the natural contour of the ground. The high fill is always a potential danger to traffic. The most important factor in locating the club house is to secure its proper relation to the golf course, and the roadways are the secondary consideration, but both must be considered jointly in locating the best route for the roadways.

Width. The width of roadways is determined by traffic requirements. Ample width for opposite lines of traffic must be provided in order to reduce or eliminate the element of danger. Increased width, carefully designed easements, banking of the roadbed and long radii must be provided at curves. Also, clear visibility of approaching traffic from the opposite direction must be maintained both day and night. The volume of traffic on golf and country club roadways is not constant, but it is subject to very heavy peak loads, and the safe road is the road that is built for the maximum peak load of traffic. There is a constant tendency toward building wider roads as the result of increased experience with motor vehicle transportation. Width, however, has a direct relation to the cost of construction. This phase of the designing must be given very careful study, because width is one of the most important elements of safe traffic.

Gradient. The safe gradient is determined largely by the kind of roadbed construction and the character of its surface and by the climate, the presence of ice and snow. The comparatively straight road can be used safely, even with quite a steep gradient, but the curve and its approaches require a more nearly level roadbed. In climates free from ice and snow, the coefficient of tractional resistance of the various kinds of roadbed surfaces has a direct influence on the allowable maximum gradient. The presence of ice and snow reduces the permissible gradient regardless of the character of the roadbed surface. Standard gradients cannot be set up because of the great diversity of contributing factors. They are correctly determined as a result of observation, research and experience.

Curves are the most dangerous sections of roadways and the most difficult to design. The relation between topography and direction of route is extremely variable, except on flat grounds. Topography generally controls the direction of the route as noted in the discussion of location. The elimination of danger is the first consideration, and to attain this entails an expense that cannot be avoided. Liberal allowances must be made for constructing curves having the radius required for motor vehicles, so that reasonably rapid locomotion is free from disturbing sensations and danger to those who use them.

Long easements on both approaches to the curve lead into a very materially widened roadway, so as to provide ample clearance between the vehicles moving in opposite directions. Cut-out patterns of motor vehicles, drawn to scale, placed on the map, will permit the necessary clearances to be measured, to which very liberal additions must be made to allow for the momentum of the vehicles and the idiosyncracies of the drivers. The approaches to the curve must be banked on the outer portions, increasing in pitch as they approach the curve, where the pitch or banking is increased materially with maximum pitch at the center line of the curve. The safe curve will vary with the gradient of the roadway, the minimum radius of the curve, the allowable speed of traffic, the type of roadbed construction, and the climate. For this reason it is inexpedient to establish standards of design.

ROAD CONSTRUCTION. It is generally desirable to use local materials for road construction, as they are more economical in cost and more suitable for the purpose. The roadbed consists of three parts: first, the foundation, made usually of coarse broken stone or gravel; second, a layer of finer material, placed over the foundation, the interstices of which are filled with some form of asphalt product to serve as a binder and prevent the infiltration of water; and, finally, a thin top dressing of fine material, which is rolled into the material below. The top dressing is sometimes selected for its color, and in every case it should provide a non-skidding surface suitable for motor vehicle traffic. Concrete, suitably reinforced, is sometimes placed directly on the foundation. Concrete roads, however, are not considered desirable for roadways of a semi-private kind, such as the approaches to a club house, as they appear to be rigidly inflexible and do not harmonize particularly well with the adjoining planting and turf. Roads of other materials can be made less conspicuous and in pleasing harmony with the surroundings.

Climatic conditions must be considered in designing the roadbed. In cold climates frost action is very destructive to the roadways, and this is best counteracted by using a deep foundation of loose stone or gravel, which has a certain flexibility that permits it to adjust itself to the earth movement induced by frost without disrupting the upper part of the roadbed. In non-freezing climates, such precautions are not required, and the roadbed need only be strong enough to support the weight and impact of the traffic. Observation and experience have shown that the design of the successful roadbed varies with every section of the country because of the variation in available materials, the nature of the

soil, and cost of construction. Local customs of competent engineers are the best guides.

Drainage is of two kinds,—sub-surface and surface. The soil that supports the roadbed must be kept dry enough to be non-plastic and offer sufficient resistance to the traffic loads. This drainage is secured usually by preventing the absorption or infiltration of surface water by means of gutters built alongside the roadbed at a lower level. In some locations lines of drainage tile are laid under the roadway to remove the water and keep the ground comparatively dry.

Surface drainage is secured by slightly crowning the roadbed so that the water flows rapidly to the gutters on either side, except on the curves, where the water flows to the inner side of the curve. The gutters for these roads are made usually of large cobble stones laid in cement mortar on a deep bed of crushed stone or gravel similar to that under the roadbed. In comparatively flat roadways catch basins are built in the gutters at intervals, from which the water is conducted through drains to some suitable outlet.

The primary object of drainage is to effect the rapid and complete removal of water. Nothing is more destructive to roadways than water, which in times of excessive rainfall destroys the top surface by erosion, causes washouts and saturates the subsoil. Drainage entails considerable expense, but it is essential to permanent roadways,—as important as the foundations of a building.

It is often necessary to pass water under the roadway through culverts. Culverts should be of ample or even excess capacity, so as to prevent flood waters from flowing over and across the roadbed. Excess culvert capacity increases the initial cost, but it saves the reconstruction of the damaged roadbed. Culverts should be made strong and permanent, and their water courses should be kept free from deposits and debris.

The roadway immediately adjacent to the club house entrance should be as spacious as possible to facilitate the rapid arrival and departure of motor vehicles. While this space should never be used for parking purposes, it may be so used when the capacity of regular parking space is insufficient. Naturally, such usage of the space at the entrance causes serious congestion.

PARKING SPACES must have a capacity sufficient for the usual peak load of club attendance. It is not customary to provide for overflow events, when temporary parking is permitted in the roadways and approaches to the club house. Continuous one-way traffic is essential to convenient parking and is conducive to safety and prevention of damage to vehicles. Maximum utilization of area is secured by parking the vehicles at an angle of 45 degrees to the road. In parking, the vehicles should drive into and back out from their spaces. This arrangement facilitates traffic and reduces the danger of collisions.

Rapid removal of surface water should be effected by pitching the surface of the parking area to suitable outlets into drains or gutters. Concrete paving, suitably reinforced with steel, is the most satisfactory for parking areas, for obvious reasons. The construction, however, must be thoroughly protected against the destructive action of frost in the sub-soil and injury to the top surface. The expense of concrete pavements for parking areas may prevent their use, and cause paving similar to that used in the roadways to be substituted. The traffic loads and impacts on these areas are not comparable to those on the roadways, and a less heavy form of construction can be used. The same means for surface and sub-surface drainage must be provided to prevent water damage to the construction.

Parking spaces are unsightly and detract from the attractiveness of club grounds. They should be removed as far from the club house as convenience will allow and should be effectively screened from view by trees and shrubbery best suited to the purpose. Coniferous trees provide an all-year screen, but they may be undesirable in the scheme.

Bel-Air Country Club, Bel-Air, Cal. Carleton Monroe Winslow, Architect

PLANNING THE COUNTRY CLUB GROUNDS

BY
CHARLES DOWNING LAY
LANDSCAPE ARCHITECT

THE modern country club affords a good example of a communal enterprise organized to provide each member with amusements and luxuries too expensive for him to obtain alone, but it cannot stop with furnishing the physical equipment for games and sports. It must furnish companionship and congenial people to play with. In order to attract and hold its clientele, which is equal in importance to its golf courses and tennis courts and club house, it must go beyond the necessary equipment for sport and provide the luxurious environment and the pleasing scenes which attract the indolent and hold the vigorous player after the game is done. It is obvious that the more pleasing the club is, the more people will come and stay, and the easier it will be for the officers to manage. It is difficult to maintain the popularity of a club when it is handicapped by inconvenient arrangements around the club house and uninteresting surroundings. The country club is fast becoming the social center of every suburban community.

The time and expense devoted by the building committee to perfecting the layout of the grounds should give a handsome return to all club members and insure the success of the venture, but it is a problem which is always complicated by a number of conflicting demands. It is necessary that the outlook from the club house be pleasing, and it is also necessary that the house be easy to reach and conveniently near all the facilities for sport which the club affords. This causes the first of the many conflicts between utility and beauty, which can be adjusted only by a determination to make the necessary useful things as good to look at as possible. The problem from its nature requires great care in the proper coördination and balancing of all claims to predominance, and yet the problem is seldom carefully considered because the committee is often at first unaware of its difficulty and of the importance of having all claims presented to some judge or court of final appeal where each may be given its proper adjustment as a portion of the whole scheme. There is also the common reluctance of business men to spending money for intangibles, such as a critical expert study of a scheme.

Those who come to a country club may, for the purpose of this discussion, be divided into three classes: members; employes of members (chauffeurs, grooms, etc.); employes of the club, together with those concerned with service and supplies. For each class there are services to be performed or facilities to be offered which must not be allowed to interfere with one another or with the pleasant outlook from the club house, or with easy access to the playing fields. All facilities or services must be figured at the maximum for holidays, such as the Fourth of July and Labor Day.

SERVICE TO MEMBERS. The club must furnish to the members easy access from the highway to the front door, parking space in pleasant and quiet surroundings, and an agreeable outlook from the club house. It must furnish also easy access from the club house to the various play fields, and as much in the way of lawns, shrubbery, gardens and terraces as possible.

SERVICE TO CHAUFFEURS, ETC. Chauffeurs and other employes of members must be given a convenient parking space for their employers' cars, where the chauffeurs will not be in a position to see their employers at play. They must have a dining room and sitting room with toilet facilities. Grooms, of course, must have similar accommodations, which will be near the stables.

SERVICE TO EMPLOYES, TRADESMEN AND SERVANTS. Tradesmen and servants must have a convenient parking space in the service court, and their going and coming in trucks, delivery wagons or buses must be separate from the areas and driveways of the members. Caddies, tennis court attendants, professionals of whatever kind, must have separate quarters near their work.

THE LOCATION OF THE CLUB HOUSE. The placing of the building may sometimes be determined by an unusual feature of the property, such as a fine view, a breezy hilltop, a stream or a lake, and in this case all the facilities for sport and all consideration of entrances and drives must be made secondary and the resulting inconveniences accepted as part of the conditions of the site. If the site can be chosen from among many, it would naturally be well drained so that sewage disposal will be easy; it would be the nearest convenient spot to the highway to save expensive road building; it would be possible to have a separate service entrance, and the surrounding land would be easy to develop for different games or sports. If the perfect building site is found on the property, it will then be necessary to consult the architect and to have sketches made for the proposed club house. The landscape architect must be asked about entrance drives, terraces, planting, tennis courts, swimming pools, etc., and if these two experts agree, the golf architect must be persuaded that the course can be laid out with the first tee

and the 18th green placed in convenient locations.

ENTRANCE DRIVE. It is essential that the entrance drive be as short and straight as possible. It should enter at right angles to the highway, on a level stretch, and it should itself be on only a slight grade for some distance. The entrance should be as readily seen as possible in order to make accidents rare. A double entrance drive, each permanently a one-way drive, will add to the safety and ease of using it, and a formal planting of hedges and rows of trees will make the purely utilitarian drive an imposing approach. There must be an easy turn before the door,—a roadway of 24 feet if possible, the outside diameter to be 100 feet, which leaves a central grass plot 52 feet in diameter. Parking in this turnaround must be prohibited. After leaving the front door the chauffeur will drive the car to a special parking space for chauffeur-driven cars, near the service court if possible, and if he is not to park and can leave the grounds with the empty car by a separate roadway, it will be better.

The owner-driver after leaving a passenger or his golf bag at the front door will drive on the outbound roadway or on one parallel to it, where he will park his car and walk back to the club house. This walk should not be long, and it must be level and shaded. It is better also if the car can be left in the shade. When the owner-driver leaves the club he must walk to the car, back it into the road, and be then headed out. If it is necessary to go to the club house again, he can take a crossroad to the entrance drive and go in and out again. Many of the member-drivers will be women, so it is necessary to have this parking space clean, orderly and in every way agreeable.

THE SERVICE ENTRANCE should nowhere connect with the main drive but should be as short and direct as posible from highway to back door. There must be ample area for parking cars, since ordinary deliveries take some time and there may be cars of various repairmen and mechanics parked all day. It is not unlikely that some of the employes will have their cars parked during working hours, and they should be in the service court, not with the chauffeurs or member-drivers. It would be convenient to have a shed for all-day cars in the service court.

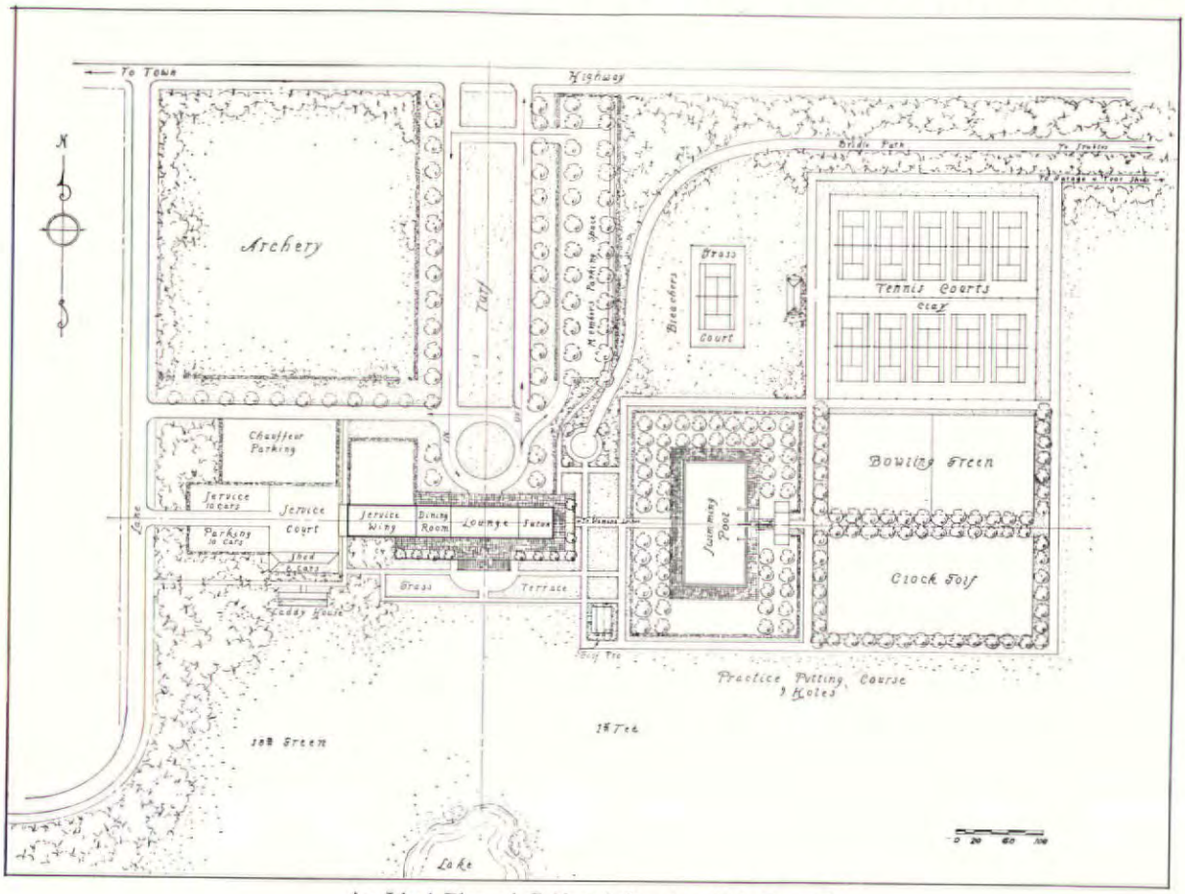
ROUTE TO THE LOCKER ROOM AND OUT. From the front door the members of either sex should have a direct and separate route to the locker rooms, and through the locker rooms, without returning, to the sport field for which he or she has dressed. It is better, therefore, to have the locker rooms on a level with a door to the outside, without many steps. If members enter the building on the north side on the first floor level, they should go out on the east, south or west on the basement level.

GOLF. The first tee should be as near as other considerations allow to the locker room, and the caddy house must be reasonably near the first tee, but not so near the club house that an occasional rumpus among the boys will annoy the members. A good place would be near the service court. The 18th green must also be as near the house as conditions permit, so that the walk is not too far to the 19th, wherever that may be. The golf course should have the long side of the building to itself in order to avoid interference with other activities, and to give all possible room for crowds on days when there are many players or important matches. If the situation is such that the golf course can be on the south of the building, a terrace on the first floor level, and possibly over the locker rooms, might give a view of the whole course and especially of the first tee and the 18th green. The golf professional's office must be near the first tee.

SWIMMING POOL. If there is no natural swimming nearby, a swimming pool is a great attraction, and even if there be natural swimming, a club pool is often more fun and well worth what it costs. The route from the locker room to the pool should be direct, away from the entrance, and out of the route of the golfers. If the golf course begins and ends on the south, it might be that the swimming pool could be nearby on the east, and that the women's locker room could be on the east near the pool, giving the women the shorter route to the pool. The pool will thus have a side toward the building, and it will be seen from an easterly terrace. The swimming pool must be considered a part of the social facilities of the club. It is not a bare "swimming hole" but a gathering place of the most attractive kind, complete in every detail. The swimming master must have his office near the pool.

TENNIS COURTS must, of course, run north and south, and they must be in the open and away from all trees which might cast their shadows across the courts in the late afternoon. It would be well to have one court of turf for exhibition games, and it should be separate from the clay courts and have room enough around it for a crowd of spectators. Because of the glare and the forest of back nets, it is not well to have the tennis courts too near the club house. Tennis players are the most active class in any club, so that it is only just to give them the longest distance to walk before beginning to play. The tennis professional's house should be close by.

SKATING, CURLING, HOCKEY. If there should be a pond, or a place for a pond, not too far from the club house on the south side and between the first tee and the 18th green, or somewhere on the north side, it would be a lucky arrangement, for an artificial pond is expensive to



An Ideal Plan of Golf and Country Club Grounds

make, and flooding a level area is always difficult and expensive except in a very cold climate. Good skating will do much to increase the winter attendance and make it possible to have exhibitions and carnivals.

HORSEBACK RIDING. There should be a separate court for grooms to wait with saddle horses near the locker rooms. The bridle path will lead from this court to the stables, polo field and jumps, and to the other bridle paths.

OTHER GAMES. Clock golf and small practice putting courses should be near the first tee, so that members waiting to play may have a little fun. A bowling green is pleasant to look at and might afford amusement. Archery and any other sport that seems attractive should be encouraged if the use seems to justify the expense of upkeep. Coasting and tobogganing are possible in some places, and the expense is small.

STABLES should be northeast of the club house and as far away as possible. Barns or sheds for motors, lawn mowers and tools should be in a central location, but near a highway if possible. All walks about the club house should be wide enough for a motor truck in order that the work of caring for lawns, trees and shrubbery may be as easy as possible without disfiguring the lawns.

LAWNS AND PLANTING. The necessary cost of keeping a golf course and other much used facilities in perfect condition is so great that it is always hard to get money for the planting and decoration of the grounds. The planting, therefore, must be simple, and it might be formal, which gives a greater effect for less cost than informal work.

THE IDEAL PLAN. The accompanying diagram illustrates an attempt to show the arrangement of club house grounds in an ideal way, as I have suggested here. It will perhaps never be possible to do the work on such a scale or in such a well knit way, but illustrating the ideal scheme may be the means of preventing many grave mistakes. A scheme somewhat similar but adapted to real conditions can be built slowly, and little work will have to be undone. If the work goes ahead without study, nothing is ever right, and every improvement necessitates the doing over of something done before. The view from too many club houses is spoiled by parked motors, and it happens often that the club house has been so arranged that no good place is left for swimming pool or tennis courts. A club house on an island in a sea of motors which must be crossed is not intelligently planned or arranged.

GOLF CLUB LOCKER ROOMS

BY
FRANK A. MOORE
ARCHITECT

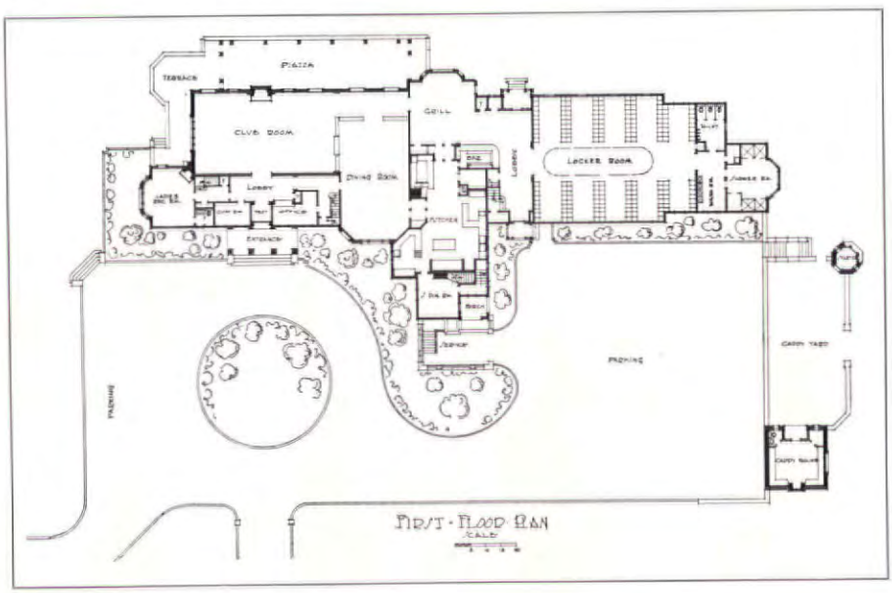
BACK in the early nineties, when that forceful architect, Richard M. Hunt, was presiding at a meeting of architects who were considering the manner in which the architecture of the World's Columbian Exposition, Chicago, was to be handled, Charles F. McKim held forth at some length in a more or less hesitating manner while expressing his views upon the subject. Finally, Mr. Hunt, who was of a nervous temperament, could stand it no longer, and giving vent to his feeling said: "Dammit, McKim, leave out the preambles and get down to business." With this "introductory writing" which is what Webster defines as a "preamble," and to avoid, if possible, the "dammits" of those who may read this article, let us get to the business of the locker room and its equipment.

To begin with, while the locker room is almost the starting point in designing a golf club house, it may be said that there are a number of other important features which should have careful consideration, not only in their development individually but in the location and relative position each has with respect to the others. Many varied conditions, such as available area, orientation, approaches, natural lay of the land, valuable trees to be preserved, etc., may decide the location of the locker room and call for a carefully studied arrangement of the general layout.

A properly planned locker room is the most important feature in the modern golf club house, and it should provide not only proper locker accommodations, but be so accessible that a belated arrival on a Saturday morning may make a hurried change to golf clothes and be on the first tee in order that his four-ball match may not be kept waiting. An ideal locker room should provide such a cheerful and restful retreat that after the four-ball match has holed out on the 18th, and when the players have returned to the club house, they will find close to their lockers comfortable chairs (with backs), tables (with glass tops), shakers (with ice) and, in short, a place so inviting and comfortable that the losers are pleased to pay, and the winners willing to give odds for the afternoon game.

It may be said that there are two general types of locker rooms,—one that has everything on one floor, and another that occupies more than one floor. In the type of locker room that has the lockers on one floor, an oblong plan will provide space perhaps for 150 lockers without extending the area of the locker room to ungainly proportions. If more than 150 lockers are required in a one-story locker room, the plan should be in the shape of a cross or of one main room with wings. So arranged, this one-story plan can be kept so as not to have the too-high roof that a large square area will demand.

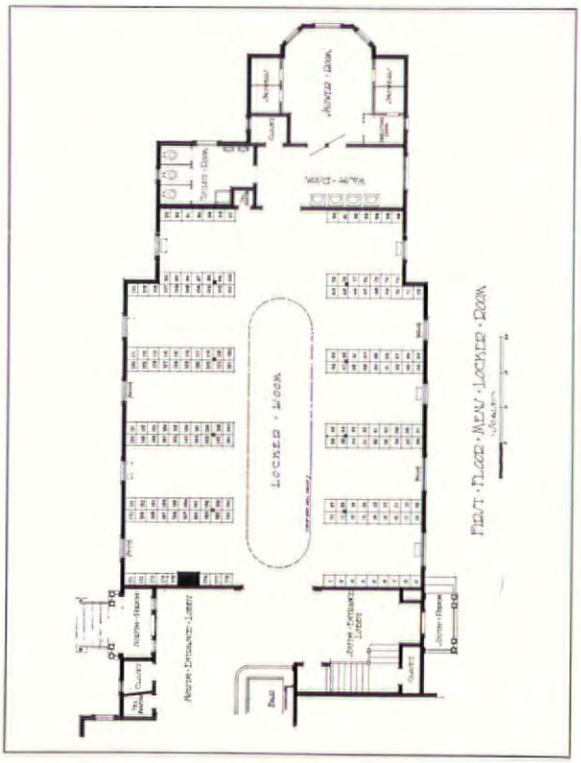
Most golf clubs have memberships that call for from 300 to 400 lockers, and with that number without doubt a two-story locker room is the best solution. Of the various architectural treatments that have been worked out to meet these requirements, it seems that the best result is obtained by a locker room wing with an open well



First Floor Plan of the Tamarack Country Club, Inc., Greenwich, Conn. Frank A. Moore, Arch.

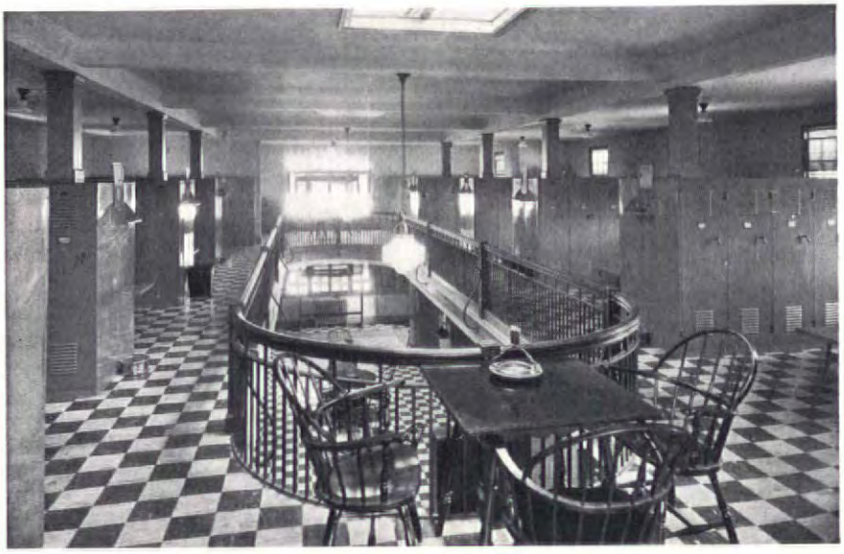
View of the First Floor of the Locker Room of the Tamarack Country Club. Frank A. Moore, Architect

at the center and the second floor treated as a sort of gallery above the first floor. The plan and development of such accommodations are shown in the illustrations. It will be noted that the second floor is supported on steel beams resting on small steel columns which are spaced so as to set back from the center well opening. The columns are very small and are boxed out to appear larger, as will be seen in the illustration; steel beams cantilever from the steel columns a distance of nearly 5 feet and support the steel framing of the open well, which has a balcony guard rail with cast iron newels and iron balusters, the construction permitting proper bolting and stiffening of the railing, which, of course, is most necessary and important. The detail of this iron railing is worked out with a hardwood handrail, and at the floor level a raised lip is made to prevent golf balls which may have been dropped on the second floor from rolling over and down on the head of some golfer on the first floor who may be explaining at such a time why a putt on the last green was not made. With this two-story treatment not only double capacity of the locker room may be attained but a larger area may be covered to better advantage than with a one-story building or wing, as a deck roof can be introduced, which in a two-story building is easily camouflaged, while it is not so easily done in a one-story structure, and we all know that a large deck roof is an ugly feature except, perhaps, when the entire building has such a treatment. With the steel framing recommended in the two-story locker room and illustrated here, it is a simple matter to introduce in the construction trussed metal floor joists or steel lumber, which need not be large, as the spans between the steel beams do not exceed 12 feet; this construction renders unnecessary the use of all wood, and, what is equally important, prevents all settling and shrinkage.



First Floor Plan of the Locker Room, Tamarack Country Club, Greenwich, Conn.

Describing further the two-story locker room, the proper treatment gives top light over the center well, which may be made attractive by dome light sash set flush with the second floor ceiling and hiding the ventilated skylights above; also, with this treatment, the lockers are arranged in bays that are not too deep to get light and air from the window that is at the end of each bay.

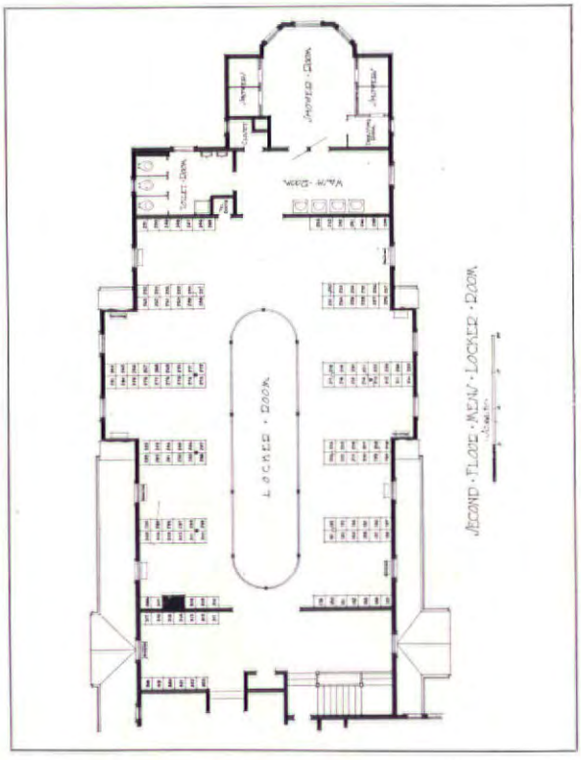


View of the Second Floor of the Locker Room of the Tamarack Country Club. Frank A. Moore, Architect

Crowding by too large a number of members in one place is avoided, and plenty of light, air and freedom of movement is obtained. With the open center well, 9 or 10 feet wide, the club members on the second or gallery floor are at all times in such close touch with those on the first floor, 9 feet below, that conversation and fellowship are convenient. "Sweet Adeline" may be sung in close harmony by a glee club partly on one level and partly on the other, and all enjoy it.

In the one-story locker room there will be, of course, plumbing for showers, toilets and lavatories combined in one unit sufficiently commodious for 300 or 400 lockers, making a large meeting place that at times causes more or less congestion of members coming and going, those with lockers close to the showers having less privacy, being in a sense in a congested district and suggesting at times the need of traffic regulations. In the two-story locker room, with each floor having half as much plumbing and half the number of members using each unit, the congestion is eliminated. A large one-story locker room requires a high ceiling on account of its area, while in a two-story locker room 9 feet is ample for each story, but the height effect is that of the two stories combined, the open well extending 20 feet or more above the first floor level.

Regarding locker room equipment, steel lockers are, of course, the only lockers that are considered in any modern golf club house, and they are made in various sizes, some with double doors and some with single doors, and in such heights as may be desired. A very satisfactory locker, and one which is recommended, measures 18 x 21 inches and is 60 inches high in addition to a 4-inch closed base at the floor. This allows for a top shelf with edge raised to retain loose golf balls, also for hooks and a rod for a coat hanger. Some lockers are provided with small mirrors, over comb and brush pockets fastened to the insides of the doors and some have separate compartments with Yale locks. The stereotyped color is olive green, but other colors may be had. The lockers in the Tamarack Country Club, illustrated here, are of a light gray-blue. The locker room walls should, of course, be painted to harmonize with any color selected. Lockers arranged in open alcoves should not be higher than 5 feet,



Second Floor Plan of the Locker Room, Tamarack Country Club, Greenwich, Conn.

Two-Story Locker Room, Huntingdon Valley Country Club. Tilden, Register & Pepper, Archs.

4 inches from the floor, or else the open aspect of the room is destroyed.

Under the heading of equipment may be considered the kind of floors or floor coverings that should be adopted. Many well known clubs have cement floors with or without rubber or fiber runners in their locker rooms. Some clubs have wood floors. The best floor without doubt is a good rubber tile floor properly laid. Spiked shoes do not injure such a floor, nor does one slip on a rubber floor: it is easily taken care of, wears well, and when properly designed, it adds greatly to the appearance of the locker room.

Among other items in locker rooms that should have attention there are the windows; they should not be too large and should not be too high above the floors. Properly arranged windows will permit one to look out, but with the proper kind of curtains and screens, persons on the outside have much difficulty in looking in. Windows should be glazed with clear glass, and use of ground or semi-translucent glass avoided. The proper kind of curtains, generally called "glass curtains," are made of a French marquisette covering the entire window opening, installed on ⅜-inch brass rodding with a hem and heading at the top, having a double hem at the sides and bottom, and with lead weights at the lower corners. Such curtains will permit free ventilation when windows are open and will prevent anyone on the outside from looking in and viewing the revelry that sometimes takes place in a locker room.

The furniture equipment in the locker alcoves, should include strong benches that are quite low (14 inches is a good height) with a width of 16 inches; also two light small chairs, easily moved, are desirable in each of the alcoves, and if well made and of the right design they will stand the hard usage they are likely to receive. There should be floor space near all lockers where tables and chairs can be placed, since the players of four-ball matches have much bookkeeping and other work to do before and after they take their showers. Fortunately, all golf matches do not finish at the same time, so one group may be ready to vacate a favorite table in time for another group to be accommodated at the same table when they may desire it. Small wall serving tables with open spaces below double rows of drawers where glasses, etc., are kept should be placed conveniently, to provide what may be needed for the various locker room tables. Telephone booths should be placed in locker rooms in convenient locations, not forgetting the shower room. Call bells are rather obsolete and are not necessary, as there should be a locker room attendant generally within call of a member in distress.

THE WOMEN'S LOCKER ROOM is necessarily much smaller than the men's and should be arranged so that it may be used in conjunction with the women's reception room. Lockers may be smaller and fewer in number than required for the men's locker room. However, if the greens committee is likely at any time to restrict the time that women may have the use of the links, it is suggested that the locker room should be flexible enough to permit of the addition of some extra lockers. Lockers 15 x 18 inches, 48 inches high are a convenient size for women and can be placed in double tiers, since this size permits easy access to the upper tier of lockers. In most cases many women as well as men prefer to keep their clubs in the racks provided for that purpose in the professional's work room. The windows in the women's locker room should have a different treatment from those of the men's room, and over-draperies at the windows in addition to the glass curtains, as called for in the men's room, should be introduced; also, cretonne-covered wicker chairs are more in keeping, and any benches that may be used are frequently covered with cushions to harmonize with the chair coverings. Dressing tables and mirrors should be properly arranged and adequate in number.

The showers in connection with the women's quarters should be arranged in cubicles so that each shower has a small dressing room, which may not be much larger than the shower itself; cubicles with bath tubs are also necessary in the women's quarters. Telephone booths should be located conveniently, and a maid's serving room is a desirable feature; this will afford a place where ice and soft drinks may be obtained without sending to the main source of supply, which is generally some distance away from the lockers.

POLICY AND OPINION

ABOUT BUILDING NOW

ARCHITECTS are in a position to influence the amount of building to be undertaken in the immediate future. Building is one of the basic industries, and one which is vital to national prosperity. In the final analysis, national prosperity is the sum total of local prosperity, and building activity is a large factor in local prosperity. Only by each architect's doing his part in increasing the building activity in his community can the desired result be brought about.

It seems essential that each architect do his utmost at this time to encourage clients and prospects to undertake their building operations immediately. This does not mean that there should be any artificial stimulation of building, but that a serious effort should be made to urge the undertaking of all legitimate building enterprises as soon as possible. All such enterprises should be carefully analyzed by the architect as to their economic soundness, for it is extremely unwise to advocate the erection of buildings which cannot be made to pay. There is a need in practically every community of new buildings of some types, and certainly there is the opportunity for remodeling of existing structures in order to make them more profitable. It is within the architect's power to advocate the immediate undertaking of such work. If the supply of buildings of a certain class is adequate in a community, the architect should direct his attention to the types for which there is a real need. A survey of the demands and possibilities should be undertaken by the architect at this time. Such a survey may indicate that there is an excess of buildings of certain types in the community, but it will also usually reveal that there is the need and the opportunity for certain other types of buildings,—or for remodeling. The need for schools, churches, hospitals, municipal and other institutional buildings should be carefully considered.

Conditions are now very favorable for building this spring. Capital is more readily available for such purposes than it has been for some time; material prices, with but few exceptions, are lower or at the same level as last year; and there is an abundant supply of willing labor. It is obvious that when labor is plentiful a building will be better built than in times of greatest activity when the contractor cannot choose the most efficient and skillful workmen. Each architect can do his part by pointing out to his clients and prospects the advisability of building now. *K. K. S.*

LETTING THE WORLD KNOW

IT seems probable that in the near future an extensive and comprehensive campaign of advertising the architect and the value of architectural services will be undertaken by our contemporary, *Pencil Points*. The question "to advertise or not to advertise" has been discussed for years, and it has seemed unethical for reputable architects to advertise as firms or as individuals. In many communities advertising is not considered unethical unless it becomes blatant, and many firms regularly have their business cards, so to speak, in the newspapers and local periodicals of various kinds. Several architectural societies have carried on local campaigns which advertised the profession and gave publicity to the services rendered by architects without mention of specific firms. A notable campaign of this kind was that described by Mr. Nirdlinger in THE ARCHITECTURAL FORUM of October, 1928.

Advertising on a larger scale has been considered by the American Institute of Architects, but until this time no comprehensive campaign has been inaugurated. One of the deterrents has been that architects have been satisfied to follow the lead of members of architecture's sister professions of medicine and law, and as these professions have not seen fit to advertise, architects have not undertaken to do so. Old prejudices, however, are now giving way, and the conditions of present-day competition in the building industry seem to make it imperative that architects inform the public of their value and of their services if they are to "hold their own." For this reason, *Pencil Points* is undertaking to promote an effective and comprehensive advertising campaign for the benefit of the architectural profession. We feel sure that such a campaign properly conceived and executed will meet with the hearty approval of the profession. Those who are inaugurating this constructive step deserve the coöperation of all those interested in furthering the interests of architecture.

Architects have always regretted that the general public has not been informed of the value of the architect's service and that erroneous impressions exist as to the nature of his work and the charges for his service. The informatory documents published heretofore have not been given sufficiently wide distribution. Nation-wide advertising will undoubtedly do much to bring architects and the public closer together, which will be to the advantage of both. *K. K. S.*

WATER SUPPLY AND DISTRIBUTION

BY
H. J. REEVES
CONSULTING ENGINEER

THE comparatively isolated locations of country and golf clubs make them usually inaccessible to municipal or public service water supplies, and it is generally necessary to find and develop sources of water supply upon or contiguous to the property of the club. The necessity for having an adequate supply of water should have a certain influence upon the selection of the property and must be given consideration commensurate with its relative importance in the complete conception of the undertaking. Water supply and its distribution involve a considerable item of expense which must be provided for in the budget for the enterprise, and this expense is best estimated by competent engineers whose advice and counsel are necessary from the inception of the planning.

SOURCES OF SUPPLY. The sources of water supply are municipal systems, rivers, lakes, ponds, wells, and springs. If the supply is furnished by municipalities or public service corporations, arrangements should be made to have them furnish sufficient volume and pressure for all requirements, especially during dry periods when the demand is sometimes so great that clubs have been notified to curtail their consumption and to use no water for irrigation purposes, thus causing considerable inconvenience and expense to secure other sources to draw from.

Rivers, lakes and ponds usually afford sufficient volume for the club house and grounds, but it is essential that a thorough examination and tests be made of all water sheds, streams and springs feeding such sources to ascertain if they will be sufficient to meet the requirements, especially if an artificial pond is to impound the necessary supply, which can be considerably reduced by loss through evaporation. It might also be necessary to install filter beds or mechanical filters in order to remove any contamination and make the system acceptable to the health authorities. Purification of water necessitates an expenditure for plant and operation that is of considerable importance, but this cost can be reduced by installing mechanical filters for water used for domestic and drinking purposes.

Wells are probably the principal sources of privately owned water supply. There have been developed types of wells and of pumps and other apparatus suitable for almost every local condition. Naturally, the cost of well drilling and equipment varies to a considerable degree, depending upon the depth to water-bearing strata and the nature of the ground penetrated. The volume of water is generally adequate, and the purity of deep well water is usually acceptable, although these wells may become contaminated by sewage disposal systems or from other causes. The water may, infrequently, be impregnated with sulphur or other chemical substances that make it unpalatable, or the water may be of such a degree of hardness that it will require softening for boiler, laundry or bathing purposes.

WATER PRESSURE. Several methods are used to circulate the water through the distributing system with the required pressure at the outlets, the pressure being produced by water towers, elevated tanks, reservoirs or compression tanks. The water is pumped into the towers or tanks through a direct line from the pumps or through the distributing system. The location of the tower or elevated tank is determined by the topography of the ground. If the ground available is sufficiently elevated above the club house and the golf course, a comparatively low water tower can be used. Elevated tanks and water towers are commonly considered unsightly, but this objection can be overcome by selecting a suitable location, which will reduce their visibility from the club house and grounds. If woodland of sufficient elevation is available, a tank or tower can be effectively concealed from observation among the trees,—at least during the foliated season. Water pressure from whatever source is an absolute necessity. Elevated tanks and towers can be enclosed in stone or brick masonry of attractive architectural design. Such construction, however, is very often too expensive for the budget, as it serves a purely æsthetic purpose.

Storage reservoirs on elevated ground will provide the necessary water pressure and may be used in connection with a gravity system of distribution. Such reservoirs, however, are seldom used because of the expense of the large yardage of costly excavation and the impervious lining which is necessary to prevent wasteful seepage of water.

Underground storage reservoirs have a number of advantages over the elevated tank or tower. The elevated steel tank or tower has to be painted at intervals to prevent corrosion, and the riser pipe must be properly protected from freezing. Pressure storage tanks are frequently used, because they may be concealed underground and placed close to the pumps, or they may be located in or near the club house. These tanks are cylindrical in shape, made of steel plates, riveted or welded together, and placed horizontally.

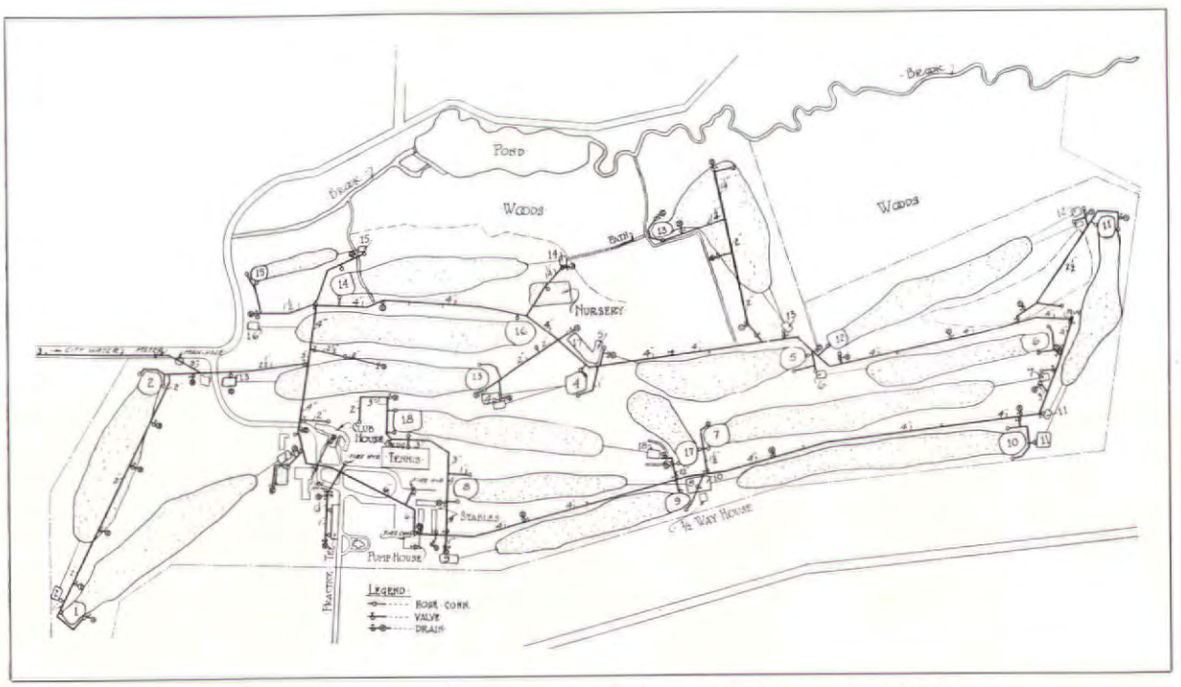
PUMPING EQUIPMENT. When pumping from rivers, lakes or ponds, the pumping plant consists of triplex or centrifugal pumps, operated either by an electric motor or a gasolene engine, or both. For deep wells, two types of pumps can be secured, one having the drop pipe, rods and cylinder placed in the well to the proper depth. The centrifugal type of pump has the impellers or pumping parts placed in the well and the shafting extended to the surface, either electric motors or a gasolene engine being used to operate the pumps. In connection with the pumping unit, air-charging devices are used or a separate air compressor is installed to maintain the air pressure in the tanks; also, automatic starting and stopping switchboards are installed to control the pumping unit, so that the tanks or reservoirs can be kept filled without the necessity of having an engineer in constant attendance.

USES OF WATER. Water is used in country and golf clubs for domestic and sanitary purposes, for irrigation of the grounds, and for interior and exterior fire protection. Domestic and sanitary water supply requires water of a degree of purity that conforms to board of health standards. Irrigation and fire protection water can be impure in quality, and this differentiation of quality will permit the use of untreated water drawn from lakes, ponds and rivers. In some instances, country and golf clubs resort to two or more sources of water supply, as determined by the available amounts of water, cost of service, topographical conditions and other economic factors. The water drawn from lakes, ponds and rivers is considered to be the best for irrigation purposes, because of the entrained vegetable and soil matter contained therein.

DISTRIBUTION SYSTEM. The distribution system originates at the source of supply and extends first of all to either the pressure storage tanks, water tower or elevated water tank. When the water tower or elevated water tank is used to provide pressure, it is directly connected to the pump with a pipe line, from which the distributing lines can receive their water content by direct connection rather than through a separate line from the tower or tank.

Distributing systems are of two kinds, one of which forms a continuous loop, and the other consisting of two or more lines having dead ends. The continuous loop system, while more expensive, provides a better and more uniform flow of water. From the main lines, laterals are run to the desired locations. The primary purpose of irrigation water lines is to provide water for the greens, at which two hose connection outlets should be provided, one on each side of the green. One flush hydrant of a similar type is sometimes placed near each tee. In some systems, such as that employed at the Hollywood Golf Club, Deal, N. J., the water mains run parallel to and between the fairways. Flush hydrants are placed in these mains to provide water for irrigating the fairways.

Control valves are placed at all branch connections, so that the laterals can be cut out when



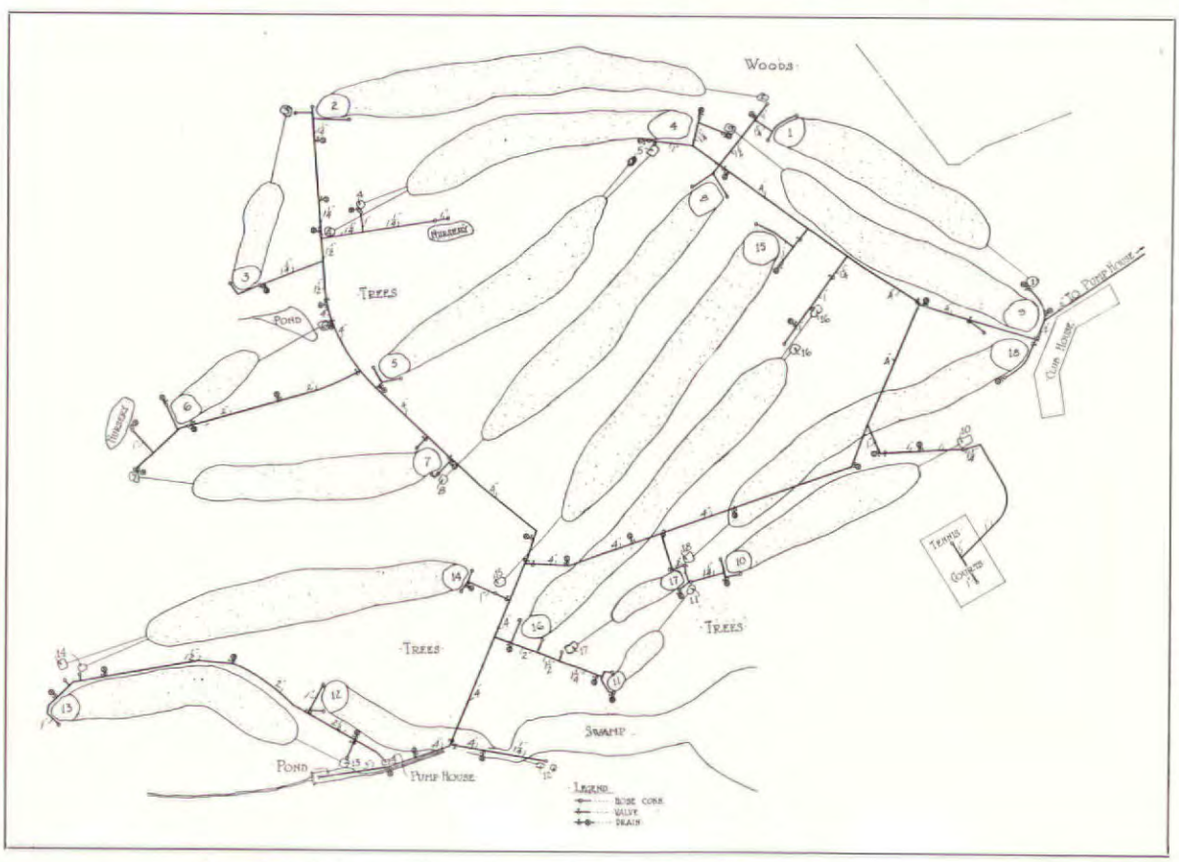
Plan of Golf Course Water System, Hollywood Golf Club, Deal, N. J.

necessary. Drain valves are placed at low points to divert the water into sumps when the system is drained for the winter season. Fire hydrants are placed about the buildings for exterior fire protection. The average daily water consumption in dry weather is from 15,000 to 20,000 gallons for the grounds and from 8,000 to 10,000 gallons for the club house.

HOLLYWOOD GOLF CLUB. The distributing system at the Hollywood Golf Club, Deal, N. J., is of the loop type. A 4-inch, galvanized, wrought iron water main extends from the pump house around the golf course, making a complete loop. Branch laterals are taken off from this main to supply the flush hydrants at the greens, tees and buildings. Water is procured from a 14-inch well, 1,200 feet deep, which has a capacity of 450 gallons per minute. The deep well pump has a capacity of 200 gallons per minute. The four underground pressure tanks, 8 feet in diameter and 40 feet long, have a storage capacity of 60,000 gallons. The water pressure varies from 50 to 85 pounds per square inch. A 3-inch connection is made to the city water system for emergency use.

ROUND HILL GOLF CLUB. The water distribution system at the Round Hill Golf Club, Greenwich, Conn., is of the dead-end type. The mains are of 4-inch cast iron pipe, and the laterals of galvanized wrought iron pipe. The mains supply two principal branches extending along three sides of the grounds. The water for irrigation is secured from an artificial pond, made by damming up a creek, which has a capacity of 100,000 gallons. The pump has a capacity of 100 gallons per minute, and discharges into two pressure tanks, 8 feet in diameter and 40 feet long, providing a storage capacity of 30,000 gallons. The house water service is supplied from a well and pump house located about 500 feet from the club house. This service is also connected to the irrigation system for emergency use. A 4-inch connection is also made to the city water service. Thus there are three sources of water supply.

It will be observed that several features are common to all water systems, but they and the many other correlated factors must be adjusted for each project in order to secure the most effective and most economical layout. Water supply and distribution constitute a special feature that is best designed with the close coöperation of the engineer of water supply and the golf architect with the architect of the club house.



Plan of Golf Course Water System, Round Hill Golf Club. Greenwich, Conn.

OUTDOOR SWIMMING POOLS FOR CLUBS

BY
M. F. HASBROUCK
SWIMMING POOL ENGINEER

DURING the past few years there has been an increasing demand for the swimming pool in connection with country clubs and beach clubs. The reason for this is obvious, as the swimming pool, wherever installed, has proved itself a valuable asset to club life, as both a social and a financial factor. Socially, it has stimulated interest for a great many members who, as non-golf players, have joined the club wholly for the associations it will give them, making use of it only upon featured occasions. For such, the pool has created a new center of daily interest and added activity during the summer season, attracting swimmers and spectators alike.

Economically, the introduction of the pool with its added daily activity and its drawing attraction for members has in turn increased the revenue of the club from the standpoint of the managers of the dining room, the grill and all other departments from which revenue is to be derived. There are numerous examples where the pool has proved a great financial asset to the country club. In one particular case, the club in question provided for tennis, baseball and bowling, but had no golf course. Other clubs in the immediate vicinity were developed. Members of the old club were resigning to associate themselves with the new clubs, which resulted in a very embarrassing position financially. This was met by the construction of a pool, which helped in building up the membership to a point where there is a long waiting list. It has been the experience that due to the increased activities where pools have been installed, the club finds itself running to a surplus instead of a deficit. A swimming pool has also been helpful financially to a club which adopts a plan of offering an associate membership. Such membership does not allow golf privileges, but it does include tennis and other activities which are not over-crowded. Associate membership is in great demand, for there are a great many people who do not care to go to the expense of full club membership but who would join if the club afforded something which the family as a whole could enjoy daily through the entire season, such as the swimming pool.

Photo. Gillies

A Terrace Overlooking a Pool is Doubly Attractive
Metropolis Country Club, White Plains, New York
M. F. Hasbrouck, Swimming Pool Engineer

Swimming Pool, Manhasset Yacht Club, Manhasset, L. I.
Th. Engelhardt, Architect — M. F. Hasbrouck, Swimming Pool Engineer

THE PROBLEM OF WATER SUPPLY is in many instances vital. The country club may not be located near a municipal water system and may have to depend largely upon its own supply, which is often taken from wells. The pool idea has consequently been abandoned frequently, because of the scarcity of water. This is not as serious a question as might be supposed, for if a club has a supply which will give enough water for the sprinkling of the greens during the drought period, the pool instead of decreasing the supply would add materially to the water system's resources, as in this case it would act as a reservoir or retaining basin. The greens can thus be watered and the pool replenished without additional expense.

THE LOCATION of the pool in reference to the club house is very important. The pool is a

Swimming Pool, Nassau Country Club, Glen Cove, L. I.
William Lawrence Bottomley, Architect — M. F. Hasbrouck, Swimming Pool Engineer

Terrace Overlooks the Pool, Racquet and Swimming Club, Ardsley, N. Y.
Arthur Loomis Harmon, Architect — M. F. Hasbrouck, Swimming Pool Engineer

great source of entertainment for those who do not indulge in activities such as golf, tennis, etc. Many people come to the club as on-lookers, to meet their friends and enjoy the activities and the sociability. From the social point of view, the pool should be placed close to the club house so that service can be had and enjoyed. Another reason for placing it near the club house is so that the golfer or the tennis player who has exercised will go for a plunge and enjoy the reaction that only swimming can give.

SHAPE AND SIZE OF POOL. In most instances, the rectangular pool will be desirable, as it is best adapted to water sports, and incidentally because it is the easiest to construct. The pool should be at least 60 feet in length, which is the minimum length as sanctioned by the A. A. U., and of a minimum of 20 feet in width. A pool

Photos, Gillies

View of Pool and Bay, Manhasset Yacht Club, Manhasset, L. I.
Th. Engelhardt, Architect — M. F. Hasbrouck, Swimming Pool Engineer

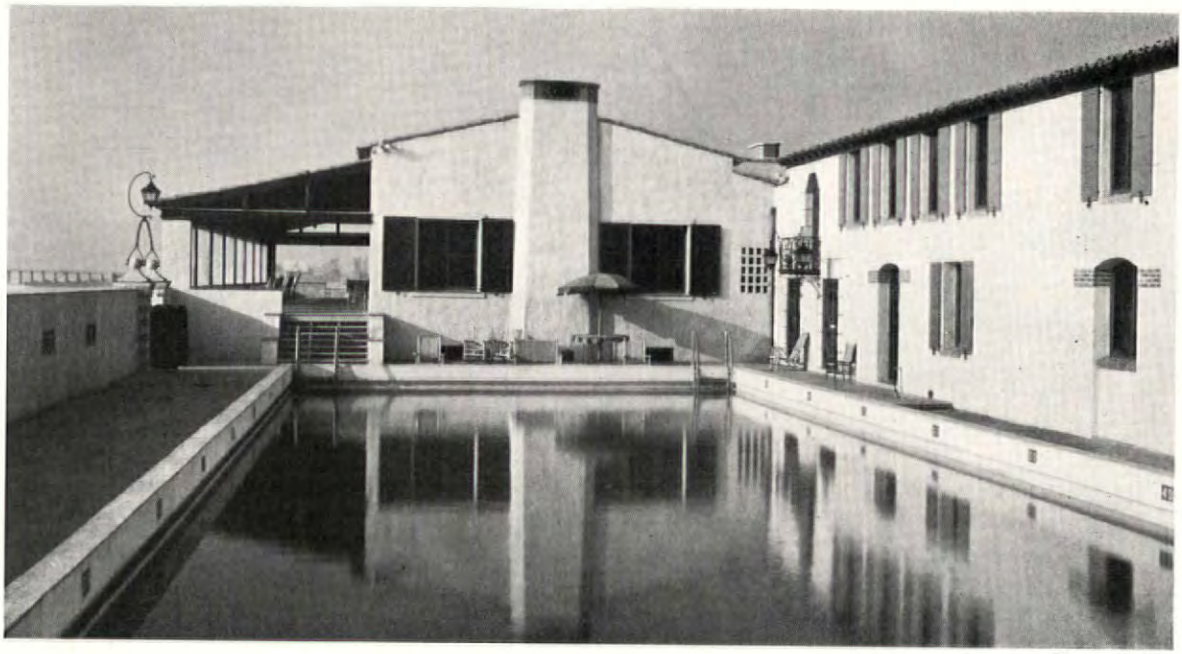
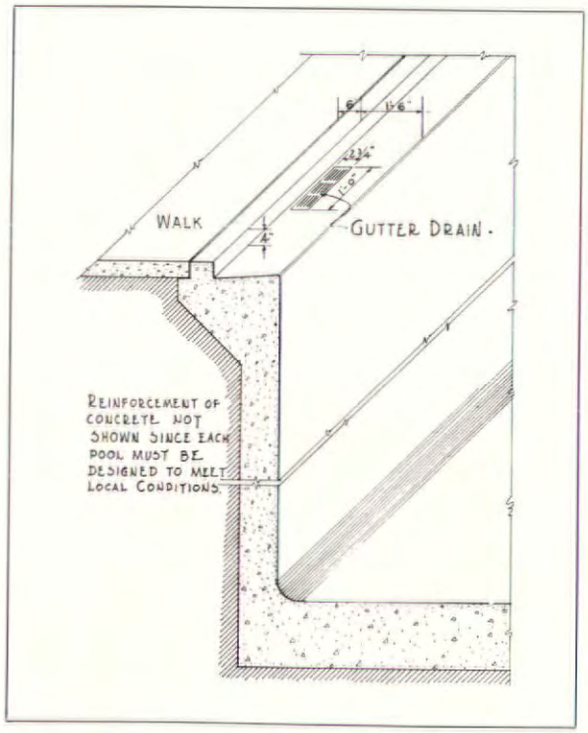


Photo. Padilla

Pool of the Westport Beach Club
Palisades Del Rey, Cal.
Stephen Goosson, Architect

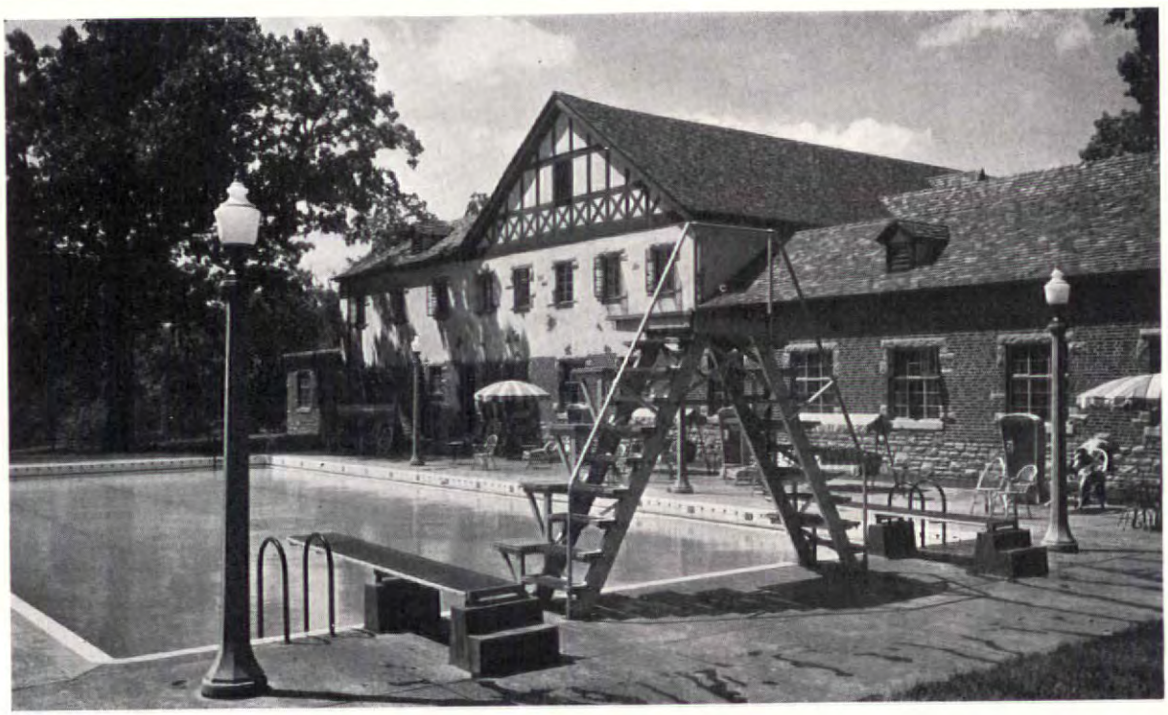


Isometric Drawing of the Flat Type Gutter for Outdoor Swimming Pools

75 feet long is better adapted for racing, inasmuch as it is 25 yards, and 4 lengths of the pool make the 100-yard distance. It is well, if possible, to have the width of the pool in multiples of 5 feet, as the minimum racing lane is 5 feet wide. The depth of the usual pool varies from 3 feet at the shallow end to 9 feet, 6 inches at a point about 18 feet from the spring board end, which is the deepest point. The accepted shape of the bottom of the pool allows approximately two fifths of the length of the pool as shallow area, varying from 3 to 5 feet in depth.

THE POOL STRUCTURE. The usual material for outdoor pools is reinforced concrete. A thorough survey of the conditions at the site should be made and the structure designed for these conditions. The calculations for the pool structure must take into account the stresses under two conditions: first, when the pool is empty and acts as a retaining wall for the earth or sand; and second, when the pool is full of water and hydrostatic pressure is exerted in the opposite direction. The size and spacing of the reinforcement constitute the main structural design problems for the engineer to solve. A well drained base is necessary, and under no conditions should a pool be placed on filled ground unless satisfactory supporting walls are carried down to a firm base. The possibility of injury to the pool by frost and by temperature changes must be eliminated by the engineer through careful design and close supervision of the construction.

GUTTERS. The open type of gutter illustrated in the isometric drawing is the preferred type



Swimming Pool, Glen Echo Country Club
Normandy, Mo.
Preston J. Bradshaw, Architect

for outdoor pools. The recessed type, which has been usual in indoor pools, is not as satisfactory from the point of view of maintenance, or as desirable from the swimmer's point of view, besides being more expensive to construct and being more susceptible to damage from frosts. The open type of gutter is preferred by swimmers because of the ease with which one may get out of the pool and may sit along the edges. The flat type gutter should be made of a non-slip material, and great care must be exercised in the supervision and the laying of this material so that it will not be split off by frosts. It is desirable to carry this non-slip material or tile down just a foot or so below the surface of the water, the remainder of the pool being finished in cement.

POOL FINISH. A most satisfactory and permanent result may be obtained by having the concrete forms built of flooring in continuous panels, such forms being sanded, well oiled, and with all rough surfaces removed. The forms should be erected without the use of any tie wires, spreaders or bolts in the form area, and the walls should be poured continuously and thoroughly spaded. There has been developed in the last few years a paint which stands up satisfactorily under weather and submersion conditions. The flat type scum gutter is usually 1 foot, 6 inches in width and has a pitch of 1 inch from the pool.

WALKS OR RUNWAYS. A most satisfactory material for the walk around the pool is bluestone

Pool and Diving Platform
San Clemente Beach Club, Cal.
Virgil Westbrook, Architect

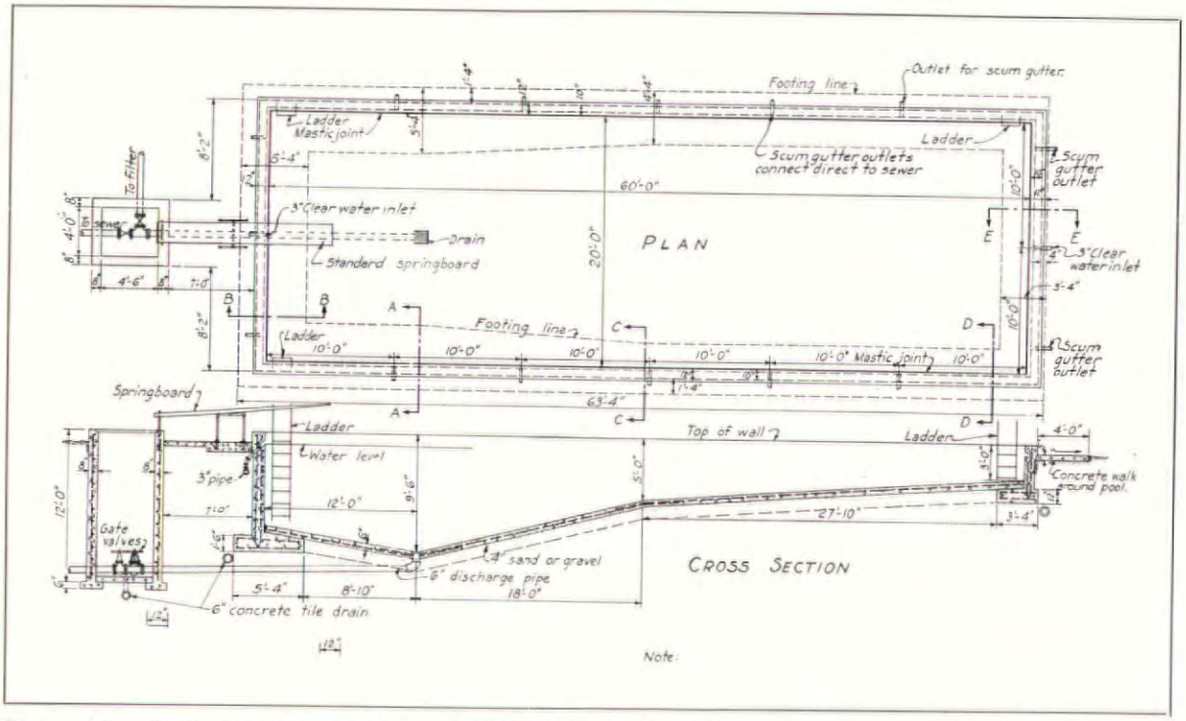
and practical. Cement in various colors and designs can also be made very pleasing. Wood slat walks, if properly designed and constructed, are satisfactory, but are less orderly in appearance and less permanent.

WATER SUPPLY. The water problem must be solved with reference to the local conditions in each particular case. Thorough research and an analysis of the water will determine whether or not a filtration plant will be necessary. Many water supplies, especially well water, may have a large algæ content which, when pumped from the ground and subjected to the sun, will discolor both pool and water. The algæ growth may be eliminated by the use of copper sulphate, the treatment depending entirely upon the type and amount of algæ present. If a re-circulating system is to be employed, the pool should have a water turnover at least twice every 24 hours, and in some cases three complete turnovers every 24 hours will give more satisfactory results. Probably the most satisfactory sterilizing agent for the water is chlorine, which not only sterilizes the water but in some cases prevents the growth of algæ. The chlorination apparatus must be chosen as to size for the particular pool.

The length of time which the pool may be used without being emptied and cleaned depends again on local conditions. Some pools are emptied laid on a cement base. This is both attractive once a week, others once a month, and in some cases a pool may be used almost an entire season without being emptied. The use of pumps, filters, sterilization and a high ratio of circulation tends to keep the pool clean. In the cleaning of the pool, a vacuum or suction type cleaner may be used and is sanitary. Such a cleaner may be operated by the circulation pump. A broom of special design can also be used very satisfactorily.

PIPING AND PLUMBING systems require expert engineering service, as the piping system must be designed for the lowest possible friction losses. A common fault is to make the pipe capacities entirely too small. The location of the inlets and outlets is also an important factor, and there are several forms of practice which give satisfactory results. Naturally, all fittings which are incorporated in the pool structure should be of non-corrosive material.

CHILDREN'S POOL. A pool for children is an asset to the club, and if possible it should not be in direct communication with the main pool, although it is well to have it close by. The children's pool should be not more than 14 inches in depth at its brim and should pitch to a low point which is not more than 2 feet in depth. It is well to have this pool surrounded by a fairly large area of sand, but care must be taken that the sand does not find its way into the pipes, which in turn will cause stoppage.



Plan and Longitudinal Section of a Pool as Developed by the Portland Cement Association. Each Pool, However, Must be Designed for Its Particular Requirements and Conditions by a Competent Expert. The Open Flat Gutter is Better Than That Shown in the Diagram

CLUB SANITATION AND SHOWERS

BY
OTTO E. GOLDSCHMIDT
CONSULTING ENGINEER

WITH all the progress made in American building construction, nothing has added more to our comfort and convenience as modern bathing and toilet facilities. These are of particular importance in the design and construction of the modern country club house.

DRAINAGE. When the sewage disposal system has been definitely planned,—whether it be a public sewage disposal system, a private sewage disposal, a cesspool, or something else,—it is necessary that the proper house drainage be provided. For the house sewer, soil and waste lines extra heavy cast iron soil pipe with joints properly calked should be provided. Fittings should be extra heavy cast iron of the recess type. All of this pipe should be installed with a pitch at least ⅛ inch to the foot. The venting of these lines is also very important so as to avoid the siphonage of traps, causing sewer gas to escape into the building. Most towns and cities have plumbing regulations which must be followed, but, where the club house is built in an outlying district not under the control of town or city regulation, particular care should be taken to have the work installed in accordance with the best practice and to see that proper tests of the piping system are made before the building is occupied. Particular attention must also be given to kitchen drainage, and grease traps should be provided on drain lines from kitchen sinks where a considerable amount of greasy waste may be discharged. The number of floor drains, in kitchens, etc., should be kept to a minimum because the water in the trap seal evaporates rapidly where little water is discharged to replace it and permits the escape of sewer gas and odors into the room. A study should also be made of the disposition of the rain water from the roofs, and where inside leaders are provided they should be properly trapped before they connect into the house sewer. These leaders are also frequently discharged into dry wells, or into ravines.

PLUMBING FIXTURES. For the toilets, water closets should be selected which are quiet in operation. These can be flushed, however, with the low down tank or with flush valves. Flush valves should not be used unless ample water pressure is available. For the men's toilets urinals should be provided, and where these are of the stall type they should be spaced so as to leave 3 or 4 inches between the fixtures in order that these spaces can be kept clean without difficulty. Slop sinks should be provided where possible in a separate closet conveniently located on each floor.

Lavatories are available in a number of different forms, and a selection of the type to be used should be carefully made. The vitreous china lavatories are the most desirable to use, as they are not porous. Enameled iron lavatories are also available and will serve the purpose where low cost is the first consideration. Liquid soap dispensers are sometimes desirable, and these come as individual dispensers mounted on or over each lavatory. Where lavatories are installed in groups, a small elevated tank containing liquid soap and located in an adjoining closet may be provided with small piping connections and a dispensing valve at each lavatory.

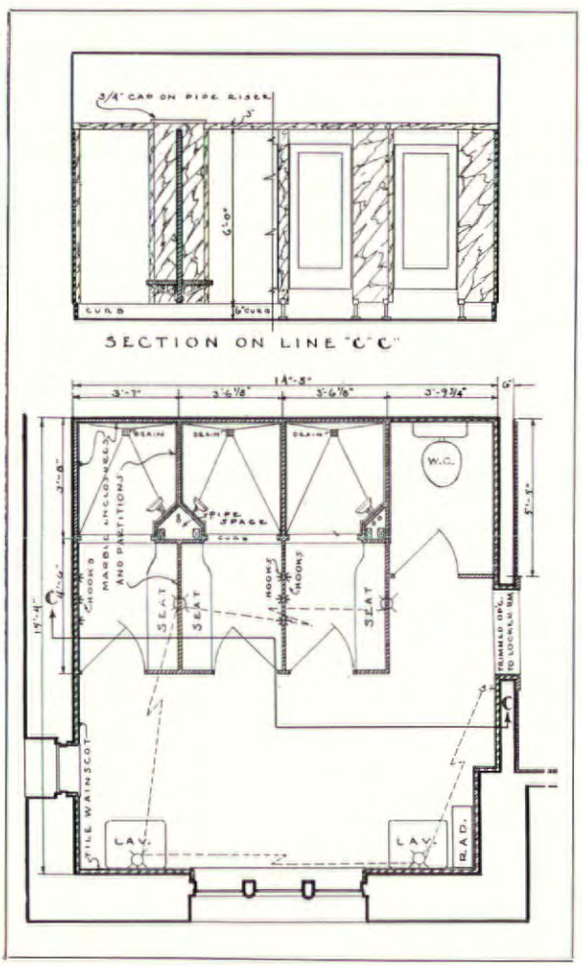
Bathtubs of enameled iron are usually furnished in private rooms and can be obtained so that they are acid- and stain-proof. Waste and supply fittings are now so constructed that trap doors for access to them are unnecessary. These tubs should be of the "built-in" recess or corner type. It is desirable to provide showers with suitable shower curtains over tubs in private rooms.

SHOWER ROOMS AND SHOWERS. There is no room in a club house that requires more careful thought and study than the shower room, because, due to the water and vapor conditions, some finishes and materials depreciate very rapidly. Long experience has emphasized the necessity for very careful selection of materials and very thoughtful detailing. Wood should be eliminated as far as possible because of its swelling and warping. Windows and window frames of shower rooms should be of non-corrosive, non-rusting materials, without exception. The door to the room should be of non-corrosive, hollow metal. The lath should not be of the ordinary type but should be heavily galvanized after fabrication, otherwise moisture will rust out the lath and the plaster will fall. Most paints will peel under shower room conditions. Color can be introduced by pigments in the finish plaster coat, and Portland cement plaster should be used. Glazed brick or tile give a permanent finish to the walls. Shower stalls should have a non-slip flooring to avoid accident. Non-slip tile 1 x 2 inches may be had in various colors and forms an excellent surface over a cement base. Under the shower stall base should be a 6-pound lead sheeting pan. The shower drain should be placed at the back of the shower stall in order that the water and soap may not collect where a person steps, and the shower control should be located so that one does not have to reach through the shower stream to op-

erate the control valves. The water supply pipe should be large so that there will be adequate pressure even when all showers are being used.

For the shower rooms an adequate number of showers should be provided, and these should be so equipped as to give a generous flow of water. Anti-scalding valves are desirable, but they add to the expense. Some provision at any rate should be made to obviate the possibility of scalding, as it is a very real danger. Thermostatic control at the hot water tank is possible and should be considered.

One of the new developments in plumbing fixtures is the production of fixtures in various colors, which enables the architect to design bathrooms in different color schemes. However, a certain amount of care is necessary to insure perfect harmony in the shades of the different fixtures to be placed in the same bathroom, since the manufacturers have some difficulty in reproducing the colors exactly in the firing of the fixtures. Another decided advance is in the elimination of types of plating which corrode or discolor readily. The new chromium plate, which is quite permanent, needs practically no polishing and adds very little to the cost, is therefore recommended.



Detail of Women's Shower Room, Upper Montclair Country Club, Clifton, N. J., Peabody, Wilson & Brown, Architects. This Detail Shows the Dressing Rooms in Connection with the Showers, and Also an Ingenious Arrangement of the Shower Stalls with Pipe Spaces in the Corners. Such Pipe Spaces Can be Made Accessible and Eliminate the Necessity of an Aisle Pipe Space in Back of the Shower Stalls

WATER PIPING. Nothing can lead to a greater repair expense after a comparatively short period of service than improper water supply piping. This applies both to the size of the piping and the materials used. Most water has some chemical effect on galvanized pipe, and this effect is considerably increased when the water is heated. Galvanized wrought iron, or galvanized steel or brass pipe, is usually used for water supply piping. No definite rule can be laid down as to the most desirable pipe to be utilized. The character of the water supply should be carefully studied and the water analyzed before making a decision as to the pipe to be used. The proportioning of water supply lines is also an important factor so that an ample flow of water will be provided at the various fixtures even when others are in use. This is of particular importance in connection with the showers, where, if the cold water supply suddenly fails, serious scalding may result to the bathers. To prevent this, thermostatic valves are available which may be installed individually or for groups of showers. These do not permit the passage to the shower of water of a higher temperature than that for which they are set.

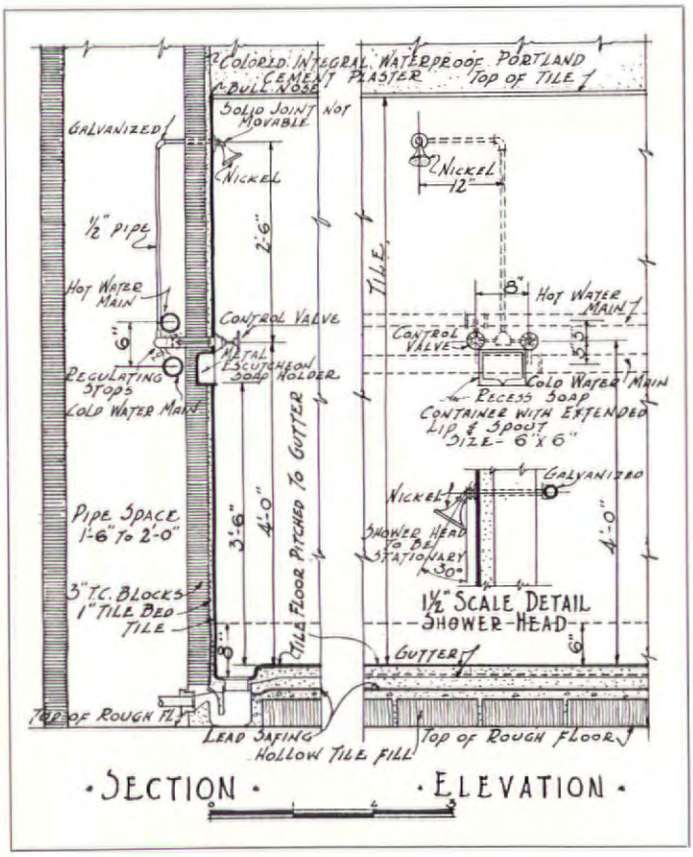
HOT WATER HEATERS. One of the important items for the showers and kitchens is an ample supply of hot water at all times. In order to accomplish this it is customary to provide generous storage capacity in the form of hot water tanks so that a large volume of water may be constantly available. The water supply may be heated in several different ways. Where the steam boiler equipment has been made sufficiently large to take care of the hot water supply requirements, storage tanks should be provided containing a nest of copper steam coils mounted in a head and made removable. The steam supply for these coils should be automatically controlled by the temperature of the water in the tank. This equipment may be augmented by the installation of coal- or oil-fired heaters with circulating lines connected directly into the storage tank shell. This permits the steam boilers to supply steam for hot water during the heating season, and the direct-fired heater can be used during the summer when no steam heat is required. This equipment, of course, lends itself to various modifications, depending upon the demands and size of the club house. In many cases it may be desirable to have the hot water heaters copper-lined so as to avoid the dis-

coloration which sometimes results where hot water comes in direct contact with steel or iron. This lining is also a protection against "pitting" of the steel shell of the heater.

FILTERS, PUMPS, ETC. Where the water supply is such that it contains sediment or impurities, it is frequently desirable to provide suitable sand filters. These should be of generous capacity and should be flushed or cleaned by reversing the flow of water at frequent intervals. Chemical tanks for the precipitation of suspended matter held in the water should be furnished with the filter. Care should be taken that the quantity of a chemical discharged into the water is only sufficient to give the required results. An electric sump pump for draining a basement which is below the sewer level is sometimes necessary, and this should be mounted in a suitable catch basin and the discharge connected into the house drain. Where it is desired to install plumbing fixtures in the basement of a building and this happens to be below the level of the sewer, it is necessary to provide sewage ejectors. These can be obtained in different forms, are electrically operated, and should usually be installed in duplicate.

CLOTHES DRYERS. Every club should be equipped with suitable clothes dryers. These should be located somewhere adjacent to the locker rooms and are desirable for use when an ardent golfer has been caught in a shower and comes in with his clothes "soaking wet." These dryers should be heated either by steam coils or coils from the hot water heaters so that they may be in service throughout the year. The capacity of these dryers is of course dependent upon the size of the club.

SPRINKLER SYSTEM. In the past very few country club houses have been built of fireproof construction, and as a result there have been many unfortunate fires. The introduction of a sprinkler system into a country club house very materially lessens the fire hazard, and as a result the insurance rate is considerably reduced. The sprinkler heads must be installed throughout the building in accordance with the regulations of the National Board of Fire Underwriters. The piping for supplying the sprinkler heads is usually concealed in the furred ceilings, and the installation is so made that only the sprinkler heads are visible. It is necessary for the operation of the sprinkler system to provide any two of these sources of water supply; a proper connection to the street mains where the water pressure is adequate; a pressure tank of required capacity; a gravity tank of required capacity and set on a required elevation; or a fire pump properly connected.



Section and Elevation of Typical Shower Detail Developed and Adopted by the Architectural Bureau of the National Council of the Y. M. C. A. Section Shows the Pipe Space Behind the Row of Showers. These Details Show the Results of Years of Experience in Y. M. C. A. Buildings. The Conditions in Country Clubs are Such That More Elaborate Equipment May be Used, as Showers Are Not Subject to as Hard Usage and Abuse as They Receive in Y. M. C. A. Buildings

COUNTRY CLUB SEWAGE DISPOSAL

BY
BENJAMIN F. PEASE
CONSULTING ENGINEER

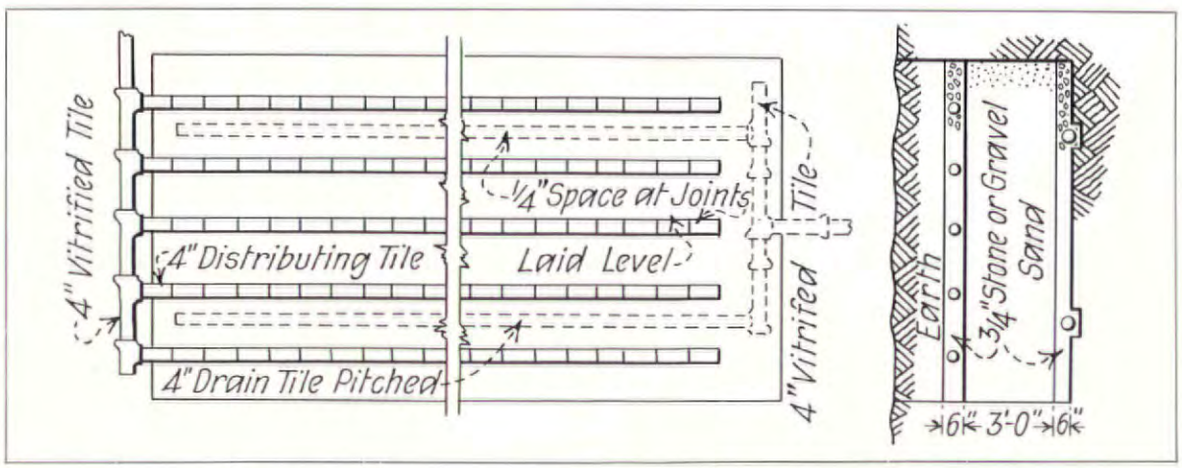
WHEN the golf or country club has access to a publicly owned or established sewerage system, the problem of sewage disposal is solved very easily. This condition of accessibility to an established sewerage system is very unusual, however, and the only method of sewage disposal generally available is one by which the sewerage system is confined within the limits of the club property. Sewage disposal is of such great importance in public welfare that it is controlled by the regulations of, and approved by, the state health department in many states. It should be considered from the inception of the club project along with the selection of the site, club buildings, golf course, landscape architecture, and water supply and distribution.

The relative importance of these components of the well planned club may vary with the conditions, and it is demonstrated by experience that a satisfactory sewerage system results only from its proper consideration coincident with that of all the other components. From the aspect of public welfare, sewage disposal and pure water supply are the two essential elements of club designing. It is obvious that the sanitary engineer should be consulted along with the building, golf and landscape architects and the water supply engineer. Unless the sewerage system is laid out in the beginning, even approximately, it is not unusual to find that suitable areas are not available because of interference by other club facilities. Under these conditions, the construction of an adequate sewage disposal system is made, if at all, at an increased cost, which might have been avoided by proper procedure.

PRELIMINARY SURVEY. It is essential that a preliminary study be made of the topography of the grounds, character of the soil, area available for the sewerage system, and the estimated volume of sewage. The topography of the grounds practically fixes the location for the disposal of the effluent from the septic tank, the area being dependent on the volume of sewage, and consideration must also be given to the location of the source of water supply. The relation of topography to water supply may be misleading. An instance is recorded where the well is located on a plateau at the base of some high hills. The sewerage system is located on the low ground sloping toward a stream. An unsuspected geological fault in the ground conducted the effluent into the underground water reservoir which supplied the well and polluted the water. This condition is very unusual, but the character of the topography must control the location of the system.

Explorations must be made to determine the character of the soil, and the area established for the disposal of the effluent. The character of the soil determines the method of disposal to be used, and the volume of sewage depends upon the number of people to be served.

CONTROLLING CONDITIONS. With these data it is possible to design an adequate and satisfactory sewerage system, the elements of which consist of a method of reducing the entrained solids so as to leave a liquid effluent and to purify and dispose of the effluent in a sanitary and unobjectionable manner. In several states it is illegal to waste raw sewage or unpurified effluent into any pond, lake or waterway, but it is permissible,



Subsurface Sand Filters are Built When the Ground is to be Planted for Use. Dimensions Proportioned to the Volume of Effluent to be Filtered

under some conditions, to waste the purified effluent into such places. The reduction and purification by mechanical or chemical means involve an expensive method which can be undertaken only by comparatively large communities, and isolated golf and country clubs must resort to the least expensive of efficient methods. The nature of the soil and the available ground area are the determining factors in selecting the method of disposal.

SEWAGE REDUCTION. The usual means for sewage reduction is the septic tank. The septic tank most suitable for golf and country clubs is usually a closed receptacle placed in the ground and covered with earth. At times there is practically no flow of sewage from the club house, while at certain periods of the day the flow is heavy, and unless the tank is of ample capacity these "peak load" flows will unduly agitate the contents of the tank and cause undigested solids to be washed into the disposal fields. Experience has shown that preferably the tank should be rectangular in shape and have a water depth of at least 4 feet and be of a width so proportioned to the length that the flow of velocity of the sewage will be so slow that the contents of the tank are not unduly disturbed.

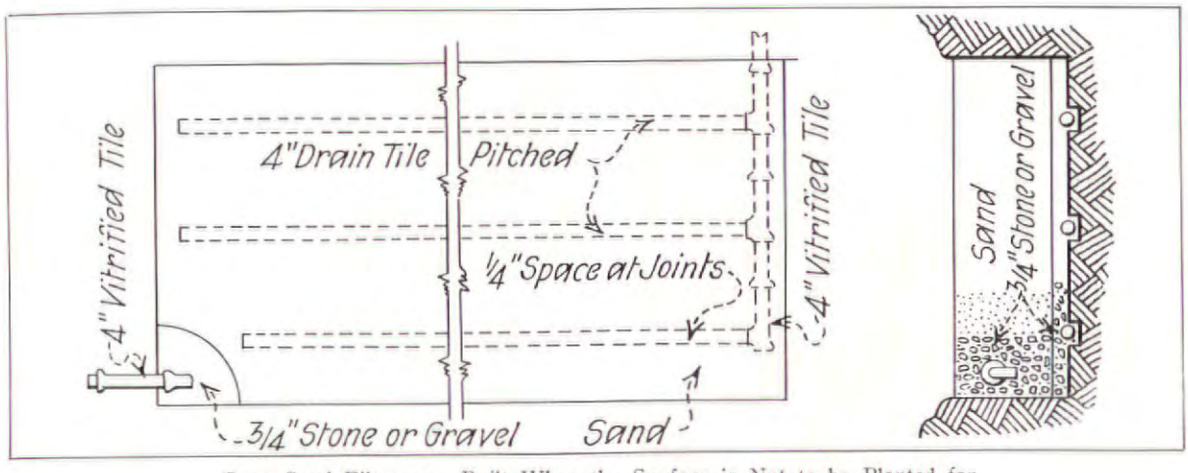
The correctly designed tank should have sufficient capacity to retain a 24-hour flow of sewage, allowing 35 gallons per attending member. Above the water level sufficient space must be provided for the accumulation of certain matter that rises to and floats on the surface of the water and is retained in the tank by baffle plates. The solid content of the sewage settles to the bottom of the tank and is digested and destroyed by bacterial action after a sufficient exposure thereto. The vegetable and animal matter is destroyed by the bacteria, and a finely divided mineral substance is deposited on the bottom of the tank. This grayish sediment must be removed when the accumulation is of a certain depth. Contrary to popular belief, the septic tank treatment does not purify the effluent nor destroy disease germs.

The effluent overflows from the septic tank into a siphon chamber. This chamber is attached to the septic tank and discharges its accumulated contents by siphonic action at intervals into the disposal system. There are no moving parts in connection with the siphon chamber.

For golf and country clubs, the septic tanks and siphon chambers are specially designed for the required service and are generally built in position. They are made of concrete suitably reinforced to prevent cracking from any of several common causes, or of brick, burnt clay tile, or stone. All tanks must be made impervious to seepage. Access to the tanks and siphon chambers is provided by manholes made of cast iron frames and covers. Sometimes ready-made tanks are connected in series to provide sufficient capacity. This is not good practice, and in many cases it causes trouble because the sewage is not evenly distributed throughout the tanks and clogs up the first few units.

Successful septic and siphon tanks are not designed by any rule-of-thumb calculations. They are designed each for a particular project, with allowances made for every related condition. Correct designing results from experience and observation and challenges the best ability and knowledge of the sanitary engineer.

SEWAGE DISPOSAL. The discharged effluent, as it leaves the siphon chamber, is putrefactive because it has not been exposed to oxygen. Oxygen is necessary for converting sewage into a non-putrefactive state and for destroying the entrained disease germs. The latter, however, may be destroyed by chlorination or other chemical process.



Open Sand Filters are Built When the Surface is Not to be Planted for Use. Dimensions Proportioned to the Volume of Effluent to be Filtered

The common method of disposal is to pass the discharged effluent through an underground, open-jointed, agricultural drain tile line leading to a diverting box which acts as a two-way valve. Two drains pass from the diverting box, each of which divides into a series of parallel drains of sufficient number and length. After a sufficient amount of effluent has been discharged into one series of disposal lines, the effluent is diverted into the other system, while the first system absorbs and purifies the effluent and becomes ready to receive another discharge. The drain tiles are laid in trenches from 12 to 18 inches wide and 24 inches deep. The tile is surrounded with gravel or broken stone and the trench filled in with earth to the ground level. In some soils the effluent can be discharged into leaching wells or large trenches without using a siphon chamber. The absorption of the effluent in the ground exposes it to oxygen which destroys the putrefactive content and the disease germs. The fluid then becomes purified and seeks its way into natural waterways or is evaporated from the surface of the ground.

When the soil is non-absorbent, or where high level ground waters prevail, or a shallow top soil is underlaid with rock or impervious hardpan, it is necessary to employ some kind of treatment for the tank effluent. Generally a sub-surface or open type of sand filter is used. The open type is preferable, as a more stable and better purified effluent is secured than is possible with the sub-surface type of sand filter. After proper filtration the effluent can be piped to a stream of water, if such is available. In case no stream is available, an area of waste land must be acquired upon which the filtered water can be spread. In every case, extreme care must be exercised in both the designing and construction of such systems.

PLOT PLAN AND SERVICE DIRECTIONS. A carefully prepared plan of the entire system should be furnished to the owner and architect in order that any part of the system can be located when necessary. Directions for servicing the system should be provided for the use of the custodian in charge.

SUCCESSFUL OPERATION. Successful operation of a sewage disposal system can be effected only with an adequate and properly designed plant. Such plants cannot be constructed without considerable cost, and their purchase should not be made on a purely competitive price basis. The reasonableness and adequacy of the plan and the reputation of the sanitary engineer for successful performance should be the controlling factors in the awarding of the contract.

To reconstruct an inadequate and non-operating plant usually entails an expense which, added to the initial cost of the plant, far exceeds the amount of the original proposal for a properly designed system,—and the plant can never be first class in every particular. The cost of the sewage disposal plant should be represented by a liberal item in the golf and country club construction cost budget. The preliminary consideration of the system should be thorough and directed by a competent sanitary engineer. Installing a successful sewage disposal system is a necessity that cannot be avoided.

Below. Laying the Lines of Drain Tile in the Sand Filter

Left. Building the Walls of the Reinforced Concrete Septic Tank and Siphon Chamber

COUNTRY CLUB FOOD SERVICE

BY
VINCENT R. BLISS
OF TAYLOR, ROGERS & BLISS, INC., CONSULTANTS

THE important question in connection with country club food service involves common sense judgment more than technical skill. It is the problem of reconciling the desire for good cooking and excellent service with the equally urgent demand for economy under very difficult operating conditions. A club would not be a club without an excellent cuisine. Club managers and hard working house committees say in an injured tone that members are exacting and critical and that there is no quicker way to provoke a storm of protest than to permit any let-down in the character of the dining room service,—yet this is just what should be expected. The man who joins a country club knows that he could arrange to play golf or tennis at a far smaller expense by other means, and he makes the investment in a club membership only because of the desire to pursue his athletic activities under circumstances which are socially more pleasing to him. Therefore, the dining room service must be conducted upon a high level, and the demands of members must be fully met.

OPERATING CONDITIONS. But there is another side to the problem which cannot be avoided. The country club restaurant faces operating conditions which make economy and efficiency impossible, at least when judged by commercial standards. The fluctuation of club restaurant patronage is of the most extreme character. In summer it will be heavy; in winter it may be practically nil. On week ends and holidays the dining room facilities may be swamped, while on week days the demand may drop to only 10 per cent of the capacity. Even within the course of a single day, fluctuation from meal to meal will be extreme. And finally, to make the situation even more difficult, one encounters the element of unpredictability, for on one hand inclement weather may completely upset the normal expectation of heavy patronage on holidays, while on the other the sudden decision of a member to entertain a large number of guests may place an unexpected tax upon the facilities.

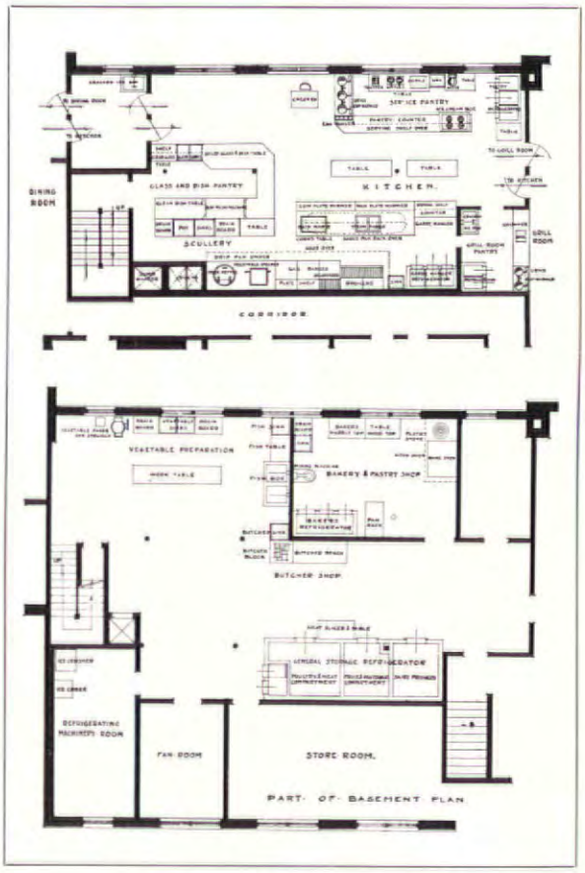
It does not follow, however, that nothing can be done to alleviate the situation. Through a succession of experiences it has been found that foresight in the planning of the club building and in the handling of kitchen equipment problems will minimize the difficulties of food service operation, and under reasonably favorable conditions they are even successful in reducing operating losses to a nominal figure. The method by which this is accomplished is to plan both the dining rooms and kitchen so that they may be extremely flexible in their capacity and in the number of employes required for their operation.

ANALYSIS OF REQUIREMENTS. Before making any attempt to arrive at the sizes and number of dining rooms for a country club, a real effort should be made to analyze the individual local conditions under which the restaurant will operate. This may sound like a very elementary statement, but because of its very obviousness this preliminary analysis is very frequently ignored, which may be the cause of many faults or extravagances. Between two clubs of exactly the same sized membership there may be a world of difference in the food service requirements, due to such factors as location with respect to the community from which the membership is drawn, transportation facilities, wealth and social characteristics of the members, the clubs' programs of social activities, the policy toward tournaments or group entertainment, and even climatic conditions. It is true that most new club projects are conceived before the precise characteristics of membership can be determined, and it may be rather irksome for the architect to attempt analysis of local conditions and peculiarities because of the indefiniteness of the factors which need to be considered. Nevertheless, this should be done.

It will be logical to expect that any club having a considerable amount of purely entertainment activity or one which admits a group of non-golfing members will make more extensive use of the dining rooms than one which is made up of a membership primarily interested in playing the game. In the former case, the necessity of compensating for extreme fluctuations in patronage will be less, and consequently the dining room and kitchen planning can be carried out more nearly in accordance with the ordinary principles which hold true in hotels and restaurants.

NUMBER AND SIZES OF DINING ROOMS. The first move in the planning of food service facilities is the determination of seating capacity of the dining rooms, which in turn depends upon the volume of service. In no case would there be any inclination deliberately to provide for the peak load but rather to arrive at a compromise which will more nearly approximate the average normal requirement. In the golf club, however, to arrive at such a compromise figure rather reminds one of attempting to find an average between the sizes of a mouse and an elephant, for holiday patronage may run as high as 500 or 600 meals, while ordinary week days will drop per-

Men's Grill Room, Glen Oaks Golf Club, Great Neck, Long Island, N. Y., Showing the Buffet Service Counter



Kitchen Plans, Glen Oaks Golf Club
Buchman & Kahn, Architects

haps to 50 or 60 or even lower. A compromise between two such extremes would fit neither; what is needed is flexibility. Thus the most successful policy has been to provide dining rooms of a medium capacity but to arrange them in such a manner that they can be expanded by additional tables being placed upon verandas or terraces or in the lounge or club room. In this manner service can be restricted to the actual dining rooms during the slack periods, while in holiday time or for special occasions a very large portion of the club building can be temporarily converted into supplementary restaurant space. In accordance with this it will be found that the typical golf club of about 300 members will be well served by dining rooms having a normal seating capacity of about 100 and a maximum or expanded capacity that may run anywhere from 50 to 100 seats more.

It is quite common to find clubs with a very large membership, and of these establishments the 36-hole club with a membership of about 600 is probably most popular. A club of this size offers many advantages, not the least of which is the fact that the club building can be more economically built and operated per member than with smaller establishments. In a club of this size the dining room will not need to be increased in direct proportion to the larger membership, and it will usually be found that a normal dining room seating capacity of about 175 should serve the purpose, provided, of course, that the need for emergency expansion can be met effectively. As to the number of dining rooms, it will be found that there are good reasons for splitting the total seating capacity into at least two units. A need for

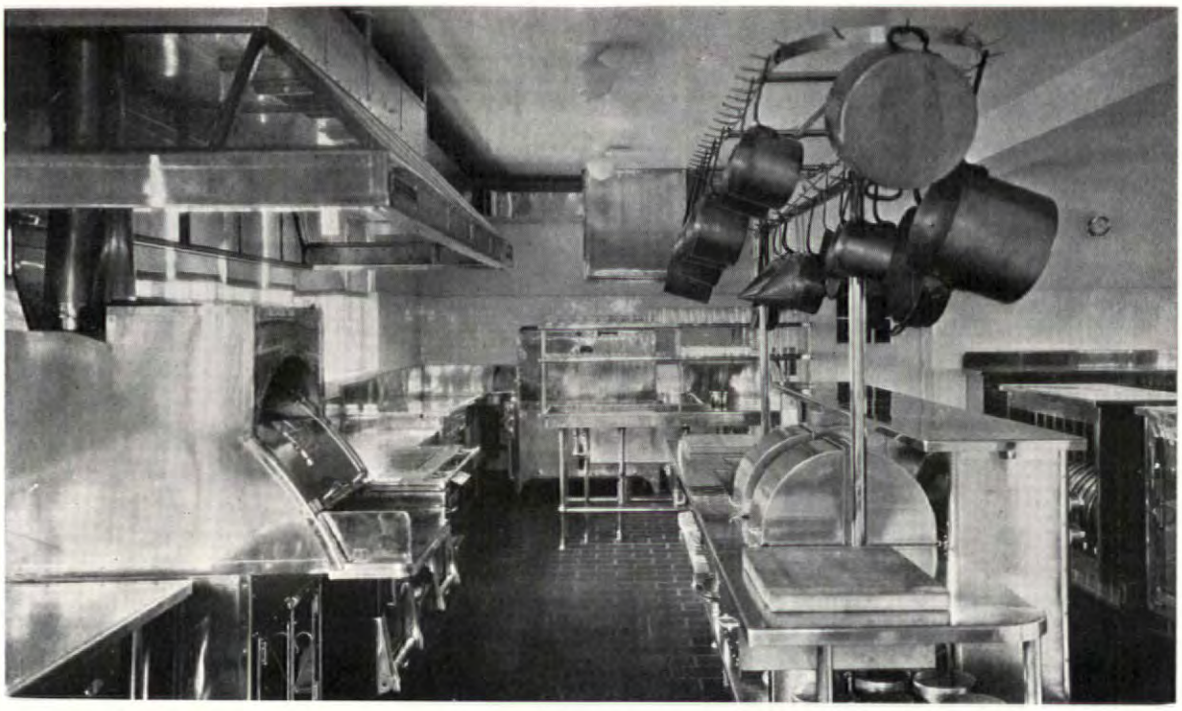
The Kitchen, Glen Oaks Golf Club
Buchman & Kahn, Architects

providing a grill room for the use of the men is quite obvious, but it is equally wise to remember that by having two dining rooms the flexibility of operation is aided, due to the fact that one of them can be shut down during dull times, a policy which can be applied either to days in the week or to hours in the day. The area which should be calculated for these dining rooms may be figured upon the usual basis of 12 to 16 square feet per seat. It will be found best to be fairly liberal in this respect, since the objectionable features of crowding should be tolerated only where severe conditions make it unavoidable.

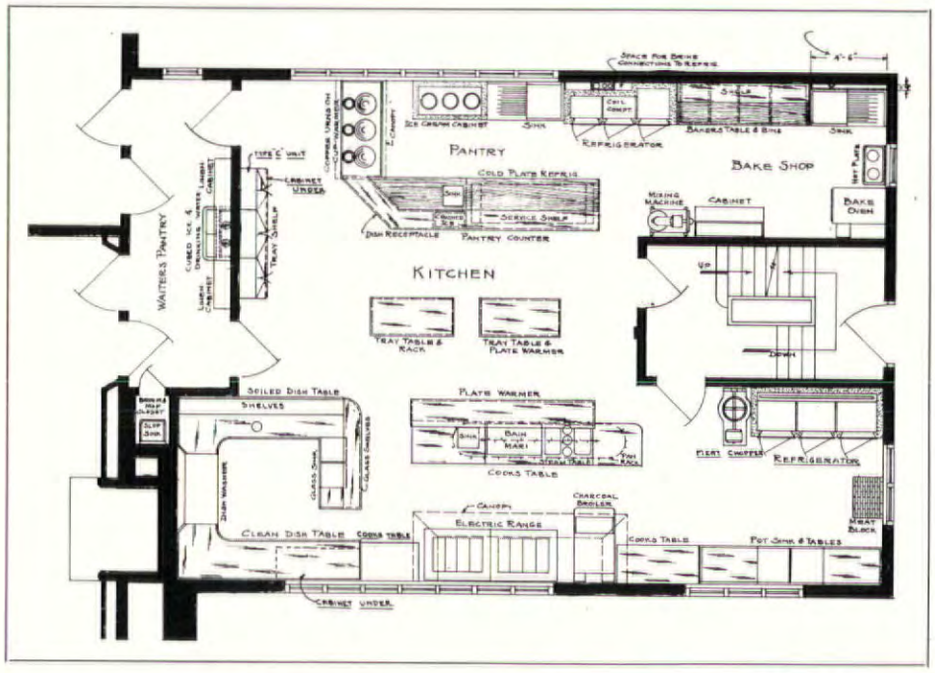
LOCATION OF DINING ROOMS. While the room arrangement in the club building is never expected to be stereotyped, there are advantages which can be obtained through following certain ideas of relative locations that have proved their value through experience. The men's grill, for example, will be most satisfactory if placed quite close to the men's locker room entrance and detached as much as possible from the club foyer and lounge. This permits the men to make full use of the grill room while still in their golfing clothes, and allows them to enter it either from the locker room or through the men's entrance without disturbing the other parts of the club. There is an added advantage in the fact that by this arrangement it is possible to arrange for refreshment or even meal service to the locker rooms from the main kitchen by way of the grill. The main dining room, on the contrary, should appropriately form part of the group of social rooms, usually adjoining the club lounge, and if possible the verandas as well. The openings between these rooms should be large so that when extra tables are placed in the clubroom or on the veranda, the waiters can serve them without having to pass through narrow doorways.

The most important factor in the location of dining rooms, however, is the kitchen. This should directly adjoin the rooms it serves. While it is possible to locate the kitchen in the basement beneath the dining room, this is seldom necessary in a club, and it is not conducive to the best operation. It is practical, however, to segregate some of the kitchen facilities, such as store rooms and certain preparation departments, in basement space, as for instance was done in the Dearborn Country Club, the plans of which are shown.

SIZE OF KITCHEN. The proportion of kitchen area to dining room space for country club restaurants differs radically from the ordinary practice followed in connection with hotels and restaurants because of the flexible character of the dining room capacity. If one were to base the size of the club kitchen upon the normal seating capacity of the dining rooms, it can be easily understood that the kitchen would be unable to handle holiday crowds. This is one case which requires peak load planning, and the kitchen area should be determined by calculating the area of the *expanded* dining rooms and then applying the



View of the Sparkling Main Kitchen of the Dearborn Country Club, Dearborn, Mich. Albert Kahn, Arch.



Plan of the Kitchen of the Dearborn Country Club, Showing the Arrangement of the Equipment. Other Departments of the Kitchen are in the Basement

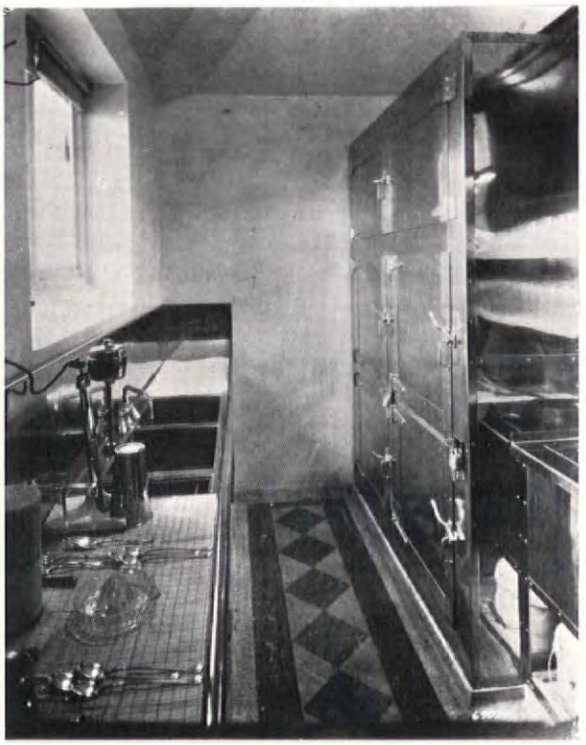
usual proportion (33 1/3 to 50 per cent exclusive of store rooms). For example, one well planned country club has a dining room area of 1,935 square feet to which, when necessary, 1,840 square feet of veranda space can be added, making a total expanded area of 3,775 square feet. Its kitchen occupies 1,260 square feet, which is 33 1/3 per cent of the expanded area.

As is known to most architects, such a general space formula cannot be applied unreservedly to an individual problem, for it may need to be adjusted to meet various special conditions. The shape of the room and the location of service exits, especially in very small kitchens, may require that the equipment be arranged in such a way that it will take more than the ordinary area. Other factors, such as location of certain departments in basement space, may affect it in the opposite manner. Theoretical formulæ, therefore, should be used only tentatively.

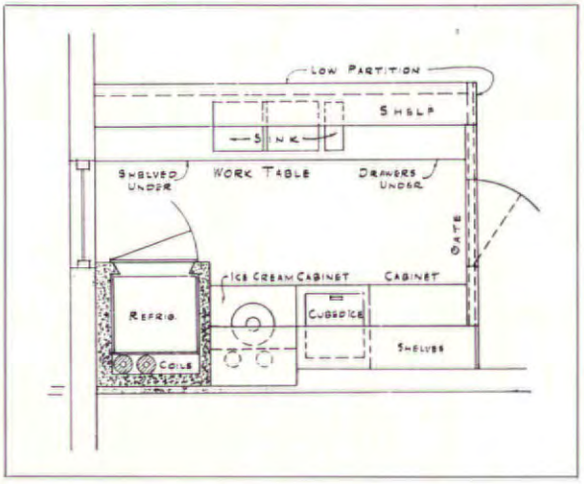
CHARACTER OF SERVICE. Most club restaurants employ the orthodox waiter service method of operation. There is little demand for cafeterias or lunch counters, for such quick service arrangements are not in harmony with a club atmosphere. The buffet idea of serving, however, has much to recommend it. On week days, evenings or at other times when few members are present, the number of dining room employes can be greatly reduced by serving buffet style lunches only, and the members should have no objection to such a policy. There are several ways to use the idea, of which the best is probably to include a buffet kitchen opening into the men's grill room.

KITCHEN FACILITIES. The country club kitchen will not be large, and will be simple in its equipment and layout. In most respects it will be similar to any other waiter-service kitchen. The principal difference will be that in the club kitchen an arrangement will be sought that permits greater flexibility in operation. The equipment will be laid out in such a way that a skeleton staff can operate it during slack periods, and so that an extra crew can be brought in for the holiday rushes. The equipment needed and the details of its arrangement will not require discussion here, for such matters can be understood better from an examination of the several plans reproduced herewith, which have been selected as representative of good practice.

In this connection there is one particular idea which is worth special comment. It has been found that the serving of refreshments or light lunches during non-meal hours presents a difficult problem if this work is handled directly from the main kitchen. In order to make it possible to shut down the main kitchen except during meal hours, it is a good idea to segregate the so-called pantry equipment into a small separate room through which the waiters will pass from the main kitchen into the dining room. In the afternoon and evening this pantry can be kept in operation while the remainder of the kitchen is shut down, and by the inclusion of certain small equipment specialties, sandwiches and light refreshments as well as beverages can be served at all hours. A variation of this idea is found in clubs which include a buffet service bar in the men's grill. Some clubs go a step further and install a small special serving room for soft drinks and refreshments, an example of which may be seen in the plans of the Dearborn Country Club, of Dearborn, Mich. Beverage and light meal service to the men's locker room should not be overlooked. In some clubs this is handled directly from the main kitchen, which is feasible if the two are not widely separated, although other plans are preferable. If the men's grill has a buffet bar, and is located close to the locker rooms, this may solve the problem. In other cases a small serving pantry adjoining the locker room is necessary. This latter plan is excellent in buildings where the kitchen is on an upper floor with locker rooms below, in which case the locker room pantry may be placed directly beneath the kitchen and connected with it by a dumb-waiter.



Special Serving Pantry for Beverages, Etc., Dearborn Country Club. A Plan for a Similar Serving Pantry is Shown Below



AUXILIARY REQUIREMENTS. The fuels used in the kitchen will depend entirely upon the supply which is available locally. Gas for the ranges and other appliances is often not to be

had, in view of which either coal or electricity will be substituted. The latter is preferable although more expensive both as to the cost of equipment and operation. If steam is available in the building, it should be employed by all means, as there is no more economical heating medium for steam tables, urns and other similar equipment. A good hot water supply is a real necessity, and the volume required should be carefully calculated. A plentiful supply at 180° Fahr. is absolutely necessary for the proper operation of dishwashing machines. The equipment specialist will be able to work out the volume required, just as he will be able to define the provisions which will be necessary in connection with plumbing, sanitation, ventilation, fireproofing, location and sizes of flues, etc. The problem of garbage disposal is appropriate to consider in connection with the equipment for the hot water supply. Due to the detached location of country club buildings, an incinerator is very desirable, and if included it can be provided in connection with the hot water heater.

STORE ROOMS AND REFRIGERATORS. The size of the kitchen storage facilities is so dependent upon the local food supply situation that any generalizations would be rather impractical. It will not be difficult to find sufficient space for the store rooms in the ordinary club building, but a little care in their location and arrangement will be well repaid by increased economy of operation. If in the basement, the storerooms must be easily accessible to both the service entrances of the building and the kitchen. Receipt of supplies directly into the store room and not into the main kitchen is the best practice. Although it is entirely practical to separate the store room from the kitchen, this will be less true as far as the refrigerators are concerned. In small kitchens, such as are found in country clubs, there will often be a value in having the storage refrigerators in the main kitchen, in which case they may be combined with some of the service refrigerators, making a more economical installation. The refrigerators should, of course, be mechanically cooled, and the machinery installation for this purpose may wisely be put in the basement adjacent to the store rooms, thus forming the nucleus for a small department for ice and ice cream making as well as drinking water cooling.

View of the Main Kitchen of the Medinah Country Club, of Medinah, Illinois. R. G. Schmid & Co., Architects

Plan of the Kitchen, Serving in Three Directions; Glen Echo Country Club, Normandy, Mo. Preston J. Bradshaw, Architect

ELECTRICAL EQUIPMENT FOR COUNTRY CLUBS

BY
EDWARD S. CLINCH
CONSULTING ENGINEER

PROPER illumination is most essential in any modern building. It adds to the convenience and comfort of those using the building and also to its attractiveness.

The various rooms and spaces should be lighted for the use for which they are designed. In the public areas, that is the entrance lobby, the lounge, the women's reception room, the women's rest room, the main and private dining rooms, the grill room, the card room etc., the lighting fixtures should be designed to correspond with the decorations and style of the rooms. When determining the amount of light required in these rooms, the color schemes must be considered. A Colonial room with its light colored walls will not require as high an intensity as a dark Spanish room.

FIXTURES. Both ceiling fixtures and brackets are usually installed for the general lighting of the lobby and lounge, which should be rather subdued and well diffused, since these rooms are used for resting and social purposes. The general lighting should be augmented by table and floor lamps so as to provide proper light for those desiring to read, and therefore plenty of convenient outlets and floor receptacles should be provided. In most clubs, dances and entertainments will be held in these rooms, and therefore outlets for special lighting effects and for stereopticon and motion picture machines should be provided.

PRIVATE DINING ROOM. As a private dining room is generally arranged with one table in the center, the lighting must be designed to give sufficient light on this table. When these rooms are small and the decorations permit, a pleasant effect may be had by the use of brackets only, but in most cases it is preferable to use ceiling fixtures or a combination of both ceiling fixtures and brackets. Floor receptacles should be installed at the centers of these rooms for convenience in decorating the tables with electric lights.

THE MAIN DINING ROOM should have a well diffused, evenly distributed general illumination of fair intensity supplied by ceiling fixtures and brackets. It is very desirable to have small lamps on the tables around the sides of the room, and therefore convenience outlets should be provided for this purpose. Careful consideration should be given to the control of the lights in this room, as considerable saving in current may be made if this is properly designed.

THE GRILL ROOM, if it is used only as such, should have subdued lighting, as it is here that the members will linger, swap stories and discuss their "game." In some clubs the grill room is

Simple, Effective Lighting, Hollywood Country Club, Hollywood, Cal. Roth & Parker, Architects

also used as the card room, and in such cases the illumination must be bright, well diffused, evenly distributed, and without glare.

TROPHY CASES, ETC. All clubs have their bulletin boards and trophy cases, and these must be carefully lighted. Bulletin boards may be best lighted by reflectors so designed as to direct the light over the entire board but conceal its source from the eye. Trophy cases should have glass shelves for the best lighting effects, as in many instances a properly designed show case reflector installed across the front at the top will give sufficient illumination. Large cases should be so constructed as to permit installing vertical reflectors in the front corners without being conspicuous. All lamps in these reflectors should be frosted so as to diffuse the light and cut down glare on the objects displayed, and the reflectors should be designed to prevent any lights spilling outside of the cases.

FAN OUTLETS should be provided in the dining rooms, grill room, locker room and card room. These outlets should consist of receptacles and hangers for the fans and should be 7 feet above the floor, so that circulation of air may be obtained without causing discomfort to the occupants of the room. If fans are required in the lobby, lounge and similar rooms, those of the floor standard type should be used, as they may be connected to the convenience outlets. When these fans are not required they may be removed and leave no unsightly marks on the walls. This type of fan should not be used in dining rooms, grills, etc., as it is likely to be in the way. There is now on the market a very good ceiling fan and lighting fixture combined which comes in many designs, so that one may be obtained to harmonize with the decorations. The fan of this fixture is designed to keep the air in motion without causing disagreeable drafts or blowing papers or cards from desks or tables. For this reason it would be well adapted for use in card rooms.

CONTROL. In general, the lighting in the public spaces should be controlled from dead front, safety type panelboards located conveniently for those in charge of the various departments. The lights on the stairs leading to the upper floors and those in the bedroom corridors should also be controlled from a panelboard on the first floor. Exit lights should be installed over all exits leading to stairways on bedroom floors so as to assist in finding more quickly the points of egress in case of an emergency.

IN BEDROOMS a good general illumination is required. This is best accomplished by using central, enclosed globe fixtures which should be controlled by wall switches near the entrance doors. Outlets must be installed for bed lights, dresser lights, and table or floor lamps. The last of these outlets are convenience outlets, and if the others are the same, with the bed lights fastened to the beds and lamps to the dressers, it permits of more flexibility in the arrangement of the furniture than if brackets are installed by the beds and dressers.

BATHS, TOILETS AND SHOWERS. The best lighting for private baths and wash rooms is obtained by brackets on each side of the mirrors over the lavatories, but very good results may be had from use of one bracket located over the center of a mirror. In toilets, ceiling fixtures should be used. The fixtures in all these rooms should be porcelain enamel with opalescent shades. The fixtures in shower rooms must be vapor-proof and should be of the bowl type. When the quantity of light is being planned for these rooms, it must be remembered that there may be more or less steam present at times and therefore the intensity increased. The lights in all these rooms should be controlled by wall switches near the doors, and those for the shower rooms should be outside of the rooms because of the vapor and water.

IN LOCKER ROOMS the intensity need not be very high, but the light should be well distributed. There should be some lights at the center of the room, for general illumination, and small lamps on about 7-foot centers over the aisles between lockers. For economical operation the lights in this room should be controlled in sections from a gang of switches located conveniently for the locker room attendant.

As "ultra-violet" and "infra-red" baths are becoming more and more popular and in some clubs have proved to be quite a source of revenue, consideration should be given to planning for them a room which will be convenient to both the men's and the women's locker rooms. This room will require general lighting, a fan outlet, and the special wiring for these lamps and their control, and also convenience outlets for vibrating machines and other apparatus that might be desired.

IN THE KITCHEN a fairly high intensity of light is required for the proper preparation of food. The best results for this room are had by using enclosed globe fixtures with baked enamel finish. Lamp receptacles should be installed under the range hood, as otherwise this is a very dark spot due to the black range and hood. The kitchen should also be wired for motor-driven equipment, such as the dough mixer, meat chopper, egg beater, dish washers, etc.

PORCHES AND TERRACES. The lighting of porches, where there is a possibility of serving meals, should be laid out with this in mind. A very pleasing effect may be obtained by using a number of small fancy fixtures so as to give a festive appearance, and convenience outlets

should also be installed for table lamps. Marine receptacles for special lighting should be installed on open terraces where lawn fetes may be held.

In the professional's department, where golf sticks are made, repaired and cleaned, special lights and outlets for small motors are required for the work bench. This room should also have good general lighting and special lights for show cases. Heavy duty convenience outlets should be installed throughout the building for vacuum cleaners, scrubbing and floor polishing machines, etc.

SWIMMING POOLS. Many clubs now have swimming pools, and these must be well lighted, as it is very important to be able to see an object at the bottom of the pool. Good illumination may be obtained for indoor pools by placing two rows of ceiling fixtures on approximately 15-foot centers over the pool. The fixtures should be vaporproof, and each outlet must have a capacity of not less than 200 watts. Outside pools may be lighted in several different ways, depending upon their sizes and locations. A pool of the size usually built by clubs, if in an inconspicuous location, may be satisfactorily lighted with elliptical angle, enamel steel reflectors mounted about 15 feet above the water and spaced from 20 to 25 feet on centers, using 300-watt or 500-watt lamps. If the pool is in a more prominent location, ornamental street lighting units may be used in place of the angle reflectors. The lighting effect may be made much more attractive by the use of special under-water flood lights installed below the water line in the sides of the pools. These underwater flood lights cause the water in the pool to assume an aspect of sparkling brilliance, and a variety of color effects may be produced by the use of color lenses.

TENNIS COURTS, practice putting greens, and similar spaces may be illuminated for night playing. This may be accomplished by high wattage lamps and steel enamel reflectors so spaced as to give even distribution and proper intensity. Care must be taken to keep the lamps sufficiently high to minimize the effect of glare in the players' eyes. Similar lighting may also be used in lighting parking areas, but the intensity may be much lower. Driveways and foot paths should be well lighted by means of ornamental street lighting units properly spaced along the edges.

SERVICE CABLES and feeders must be run to the service company's lines. These cables and all outside wires should be lead-encased in underground conduits and, if the distances are excessive, manholes should be made to facilitate installation of the cables. When iron conduit is used underground, it should be carefully painted with a waterproof compound to prevent rusting at the joints and, where the coating has been injured by vise and wrench, all joints must be made watertight. A better and more permanent installation will be made if fiber or vitrified tile conduit laid in concrete is used for underground work. If the cost of ground service feeders is prohibitive, they may be run overhead on a pole line all the way or to within a short distance of the building.

TRANSFORMER VAULT. If the load is sufficient to require special transformers for the building, a transformer vault should be furnished, as transformers on poles are very unsightly. The size and construction of this vault and the arrangement of the wiring should comply with the requirements of the service company. At the point where the service feeders enter the building, sufficient space must be provided for the service switches, meters and distribution panel. Power feeders must be provided for ventilating fans, pumps, refrigerating units and any other electrically-driven apparatus that may be installed. Many clubs are so situated that they are dependent for their water supply on deep wells or other sources from which the water must be pumped to a tank or reservoir. In this case, besides the feeder for operating the pumps, an electrical high and low water alarm system should be installed.

TELEPHONE AND RADIO. A conduit system for telephones should be installed for a switchboard in the office and for outlets in each bedroom and in locker rooms, professional's room, kitchen etc. Telephone booths with coin instruments should be installed in the lobby. A service conduit similar to that for electric service should be carried to the location of the telephone company's lines. A radio system may be provided with the receiving set located conveniently to the office and with loud speakers in the lobby, lounge, dining room, porch, grill room, card room etc. Each of these loud speakers should have a cut-off switch and volume control.

The number and locations of push-buttons and bells for entrance doors and signaling purposes depend largely upon the layout of the building, and therefore a careful study should be made of these requirements. Usually it is unnecessary and often undesirable to have waiters constantly in private dining rooms, and it is therefore quite essential to have push-buttons in these rooms to summon a waiter when his services are required. If a Turkish bath is installed, care must be taken to provide properly for all the special electric apparatus which may be needed.

The type of wiring and the selection of the proper grades of materials depend largely upon the size and construction of the building, and therefore these subjects have not been discussed in this article.

THE HEATING AND VENTILATING OF COUNTRY CLUB HOUSES

BY
OTTO E. GOLDSCHMIDT
CONSULTING ENGINEER

IN the selection of a heating system and the necessary boiler equipment for the modern country club, a considerable amount of study is necessary to adapt this equipment to the actual requirements and comfort of the type of building which is contemplated. Great care should be exercised not only in the proper selection of the equipment and type of system but also in its proper design. The character of this equipment should be maintained generally to correspond with the character of the building.

Systems which are expensive to maintain and which include many refinements requiring a great deal of attention for adjustment and care, should generally be avoided. The modern club member demands comfort, and there is nothing more objectionable than to have any of the rooms cold or full of drafts or kitchen odors. These matters must be given careful consideration so that the building will not only be properly heated but also properly ventilated by natural or artificial means. Consideration must also be given to the efficiency of the heating and ventilating installation so that the cost of operation, the cost of fuel, electric power, etc., will be the minimum consistent with efficiency. Labor and attendance also must be given very careful consideration, so that there may not be increased assessments to the members and various financial headaches for the building or house committee due to excessive maintenance costs.

HEATING SYSTEMS. There are several different types of heating systems which may be adopted, depending upon the character and size of the club building. These may be classed generally as the hot water heating system, the one-pipe steam system, the two-pipe vapor system, and the two-pipe vacuum return system. For smaller clubs the old fashioned hot air furnace system is also adaptable, but this system has now been so improved that it can be used in larger buildings by the introduction of electrically-operated fans and humidifying apparatus, and it will be treated later.

HOT WATER SYSTEM. The hot water system, in which heated water is circulated through radiators and pipes, results in very even room temperature, but it has the objection of being slow to respond to temperature changes, especially where the club house is fitted with guest rooms where it is desirable to keep windows open during the night. In such a case the room usually heats very slowly in the morning. It also has the objection of there being the possibility of both pipes and radiators freezing when located near windows which are left open during cold nights. Another objection to use of the hot water system is that the radiators have to be excessively large and do not lend themselves to being concealed in partitions or walls. With these exceptions, however, excellent results can be obtained from hot water heating.

THE ONE-PIPE HEATING SYSTEM is probably the lowest in first cost. It has to be carefully designed and installed with larger pipe sizes because the steam lines carry both the steam and the condensation. Pipes must also have more pitch than is necessary with other steam heating systems. The greatest objection to the one-pipe steam heating system is the air valves which are required on each radiator. If they get out of order they frequently leak steam and water, and thus cause damage to rugs, carpets, walls and decorations.

TWO-PIPE VAPOR SYSTEM. This system, which is probably most adaptable for the average club, differs from the one-pipe system in so far as the air valve is entirely eliminated and a thermostatic trap is provided, through which both air and water are discharged and carried back through a separate return line to the boiler room, where the water is discharged back into the boiler through an automatic return trap, and the air is discharged into the room through a vent trap. Smaller steam lines than in the one-pipe system can be provided and, if this system is properly installed, it will give very satisfactory results with pressures below 1 pound.

THE TWO-PIPE VACUUM RETURN SYSTEM. The only difference between the two-pipe vacuum return system and the vapor system described consists in the substitution of a vacuum pump for exhausting the air and pumping the condensation back to the boiler in place of the automatic return trap and vent trap. Vacuum return pumps are now mostly operated electrically, with automatic control features which cause the pump to operate only during such periods as when there is an accumulation of condensation or when the vacuum in the return system falls below a pre-

determined point. The vacuum return pump is desirable on larger installations or in buildings which extend over areas where it is difficult to carry the returns back entirely by gravity.

HOT-AIR SYSTEMS. The old furnace method of heating is suitable for small club houses. A modification of this system is now available by the introduction of a fan giving positive air circulation throughout the duct system, which overcomes the objection to the old hot air furnace system which was that it was affected by the direction and velocity of the wind. This system also is provided with a humidifier, and therefore it has the added advantage of maintaining a certain amount of humidity in the rooms. This system at present requires gas as fuel, and it is necessary therefore that gas supply be available and that the cost of the gas be sufficiently low to make such a proposition attractive.

BOILERS. For both hot water and steam heating systems either cast iron or steel boilers are suitable. The selection between cast iron or steel boilers is dependent upon the size and the cost of the installation. The successful welding of steel boilers instead of riveting them has brought down the cost of steel boilers so that they are now available for installations where previously they were considered too costly. With the cast iron boiler there is the possibility of cracking of sections in case of careless operation. Steel boilers should always be used where it is necessary to carry higher pressures, as for example, for kitchen or laundry supply. It is customary to provide about 40 pounds pressure for kitchen purposes and about 90 pounds for laundry purposes where an ironer is to be used. An important consideration in connection with the selection of the boiler is the type of fuel which is to be used,—whether coal, oil or gas. A different type of boiler should be used for each kind of fuel and, while it has been quite customary to install oil or gas under a boiler in which coal has been burned, the best practice is to first determine the fuel, and then make the selection of the boiler in accordance therewith. The chimney is also an important consideration, and frequently it presents quite a problem to the architect, as the height necessary for good operation is difficult to work into the general design of the building, especially when the club house is of the low and rambling type. It is essential, however, in order to have satisfactory draft for the boiler, that the chimney be of the required height and that this should not be reduced below the minimum requirements.

FUEL. The selection of the most desirable fuel to use for the heating system depends very largely on the locality of the club house and the section of the country in which it is built. In certain parts of the United States where only one class of fuel is available, this is of course a simple problem, but where coal, oil and gas are all available it is a question which of these to select, and a study of the cost of operating the boiler plant should be made, taking into consideration convenience, labor and other items involved in maintenance. It is, of course, desirable in all cases to avoid smoke, and where soft coal is selected, care should be taken to install boilers which will burn coal without smoke. If anthracite coal is utilized, the size of coal best suited to the conditions should be selected. If the smaller size, such as buckwheat coal, is to be burned, a very considerable saving in cost of operation can be made. This, however, usually involves the installation of forced draft blowers, since natural draft is not ordinarily sufficient to supply the required quantity of air through the fire bed for combustion. Recently several forms of automatic stokers for small boilers have been put on the market for burning this small size of coal. They are proving quite satisfactory, require comparatively little attention, and are adaptable to almost any size of plant; furthermore, the first cost is not very great.

If oil is selected as the fuel, a study should be made of the convenience of delivery, and the size of the storage tank should be determined accordingly. In selecting the type of oil burner, great care should be taken that proper service of the manufacturer is available in the immediate locality.

If gas is selected, careful study should be made, particularly of the probable cost of operation. Undoubtedly it is the most desirable fuel of all, owing to its cleanliness, its ease of control, and the elimination of any responsibility on the part of the attendants of watching the supply on hand, as is the case with oil and coal.

AUTOMATIC BOILER CONTROL through the installation of thermostats and automatic appliances should be adopted in all country club buildings. These appliances range from the simple equipment for controlling the draft on hand-fired boilers to the automatic control of the oil burner and gas flame. A very considerable saving in fuel is accomplished by using these appliances.

STEAM PIPING. In making the piping installation for any of the steam or hot water systems, care should be used in the proper proportioning of the pipe sizes, and the proper grading or pitch of the pipe so that the condensation will properly drain back to the boilers without noise. Nothing disturbs the quiet and restfulness of a country club house more than hammering or gurgling in the steam lines, and there is no occasion for there being this in any heating system.

The method of installing the pipe is also a question for consideration, and it should be determined whether the steam risers are to be exposed in the rooms or concealed in chases in the walls and partitions; also, whether the radiator branches are to be run exposed above the floor or concealed in the floor construction or run exposed at the ceiling below. These are matters of appearance, but they also affect the cost of installation. The least expensive method is to expose the pipes, as those which are concealed should always be insulated. Generally all steam and return lines should be insulated, except those exposed in finished rooms. For this purpose it is customary to utilize an asbestos air cell covering. Boilers should always be thoroughly insulated.

RADIATORS. The design of radiators during the last few years has undergone a considerable change. In cast iron radiators we have a new and better design in the so-called "tube" types, and we also have available now the brass radiators offered by a number of manufacturers. These lend themselves especially to concealment in walls and partitions.

The quantity of radiation to be installed should be determined by someone who is familiar with making these calculations, and the matter of radiator locations should be studied. Radiators are most advantageously located under windows, as more cold penetrates through the windows than through the walls. The heat from the radiator counteracts this, and thus minimizes uncomfortable drafts in the room. Furthermore, a radiator placed against the wall will always soil the wall decorations. Automatic control devices on radiators are available, and, while they add somewhat to the cost of installation, they are desirable from the fuel savings standpoint as well as from the standpoint of room comfort. These devices will automatically shut off the steam supply of the radiator when the room temperature goes above the predetermined point. This control is available through a system which automatically controls the radiator valve through compressed air operated by thermostats. Self-contained automatic control valves are now also available. These require no compressed air or other connections, and are mounted directly on any radiator in place of the hand valve.

VENTILATION. The problem of the proper ventilating for a country club is important, but usually not so difficult to solve as in a city building. The proper ventilating of the kitchen is generally the most important, and frequently this is the only room which needs mechanical ventilating. The kitchen ventilation should be accomplished mostly by exhausting air from the room, and by far the largest amount of this exhaust should be taken from the range hood, so that cooking odors will be carried off before they have an opportunity of getting into the rest of the kitchen. If conditions are such that supply ventilation is also necessary in order to maintain comfortable conditions at all times, the equipment should be installed with ducts well distributed and in such a manner that employes will not be placed in objectionable drafts from the supply outlets.

Grill rooms, private dining rooms, and other such rooms where there is smoking, should be provided with both supply and exhaust ventilation where the character of the building will warrant the expense. The dining rooms, lounges, ball room, etc., where warranted, should also be ventilated by mechanical means, either by a central system of fans, ducts and tempering coils or by individual ventilating units. These ventilating units are frequently placed under the windows and are enclosed in neatly finished metal cabinets. They take fresh air from the outside through an opening in the wall, and by means of small fan equipment the air is blown over tempering coils and discharged into the rooms at any desirable temperature. The electrical requirements for these units are small, as the fans are driven by 1/6 or 1/8 h. p. motors. This method is frequently very desirable for ventilating a room where elaborate systems cannot be installed. This method prevents the drafts which result from trying to ventilate a room by opening windows during cold weather.

Where toilets or baths are installed in rooms which have no outside windows for ventilating, some means of exhausting the air should be employed. This can sometimes be done merely by running a duct through the roof. In large toilets it is desirable to install small exhaust fans, so as to change the air more frequently than is possible, where only natural means are depended upon.

POOLS AND TURKISH BATHS. Where an indoor pool is installed, special attention should be given to its proper heating, and sufficient additional capacity should be provided in the boilers for heating the water when the pool is being filled as well as for maintaining the temperature afterwards. Where a Turkish bath forms a part of the club house equipment, further consideration must be given to the maintenance of the high temperatures required both summer and winter.

CHECK LIST FOR GOLF AND COUNTRY CLUBS

A GREAT deal of time can be saved by both the architect and the building committee if the various items that enter into the construction of a country club are discussed in the early conferences and decided upon in order.

A. SITE AND GENERAL PLAN. Site selected by Architect, Golf Course Architect, Landscape Architect and Committee.

SPORTS AND GAMES. Choice for present plans in order to provide space to accommodate additional sports and games.

Golf 9 holes
" 18 holes Golf 27 holes
Practice Tee and Fairway
Practice Green Clock Golf
Tennis Courts
Grass Courts—Number.....
Clay Courts—Number.....
Swimming Pool—Size
Wading Pool
Horseback Riding
Bowling Green, Lawn Bowls
Archery
Skating Curling Hockey
Ski Jump Toboggan Slide
Handball Courts
Squash Tennis Courts
" Racquet Courts

B. BUILDINGS (Several may be combined)

Main Club House
Locker Room (Separate House?)
Professionals' House Caddy House
Starter's Shelter Garage
Ground Keeping and Tool House
Summer Houses
Shelters at distant tees; at tennis court, etc.
Stables Boat House

C. STYLE OF ARCHITECTURE

General Architectural Style
General Exterior Materials
Wood, Brick, Stone, Stucco, Half-timber

D. ROOMS AND SERVICES

1. MAIN CLUB BUILDING

Porte Cochere Entrance Lobby
Coat Rooms Reception Room
Offices Lounge
Card Room Smoking Room
Billiard Room Trophy Room
Sun Room
Dining Room Grill Rooms
Private Dining Rooms
Kitchen Pantry
Steward's Room
Men's Locker Room
Serving Pantry
Men's Shower Room
Men's Toilet Men's Locker Lounge
Women's Locker Room
Women's Shower Room
Women's Rest Room
Women's Toilet
Linen and Towel Room
Bedrooms
Servants' Dining Room
Servants' Bedrooms
Servants' Toilet
Servants' Locker Room
Storage Rooms
Boiler Room Fuel Room
Laundry Drying Room

2. LOCKER ROOM BUILDING (Services listed above under Main Building)

3. GOLF PROFESSIONALS' SHOP

Sales Space, Counter Display Cases
Shop—for repair
Club Storage, horizontal racks of members' golf bags
Office and Toilet

4. CADDY HOUSE

Caddy Room Lunch Counter
Toilet

5. GARAGE, Sheds, number of cars.....

6. GROUND KEEPING AND TOOL HOUSE

Lawn Mowers, Rollers
Tractors, Small Tools, Hose, etc.

7. STABLES

No. of Stalls Box Stalls
Saddle Room Feed Room
Grooms' Room and Toilets
Riding Ring

8. BOAT HOUSE

Boat Room, Rowboat and Canoe Racks
Lockers
Dressing Rooms, Showers and Toilets
Bath Houses in Connection? Number?

FEATURES OF MAIN BUILDING

1. FOUNDATIONS

Concrete, Stone, Brick, Block
Waterproofing,—Integral, Membrane
Foundation Drainage

2. WALLS

Frame, clapboard, shingle, etc.
Brick; face, common
Brick veneer
Stucco over Frame, Brick, Hollow Tile.
Cement Block
Furring of Walls, wood, tile

3. COLUMNS—Piers, Steel, Lally Columns, Wood Posts
4. EXTERIOR TRIM
   Stone,—kind. Wood Terra Cotta
5. FLOORS
   Wood,—kind
   Steel Joists—rolled, light truss type
   Concrete, flat slab over steel, reinforcement
   Tile, one-way, two-way
   Pan system
6. ROOF—Slate Sheet Metal
   Shingle Composition
   Tile Canvas
7. LEADERS AND GUTTERS
   Material Flashing
8. ROOF TRUSSES
   Exposed Concealed
   Wood Steel
9. PARTITIONS
   Stud,—Hollow Tile, Gypsum, Brick, etc.
   Lath,—Metal (type), wire, wood, wall board, etc.
10. INSULATION, HEAT
    On Walls, Roof, etc.
    Board, Quilt, Sprayed, Fill (type and thickness)
11. INSULATION, SOUND
    Material and Method

INTERIOR FINISH

1. SCHEDULE
   List by Rooms on Schedule Form. Columns across the top of page divided into headings:
   1. Room, 2. Style, 3. Walls, 4. Floor, 5. Finish, 6. Ceiling, 7. Trim Material, 8. Trim Finish, 9. Mantel Material, 10. Special Features
2. WALLS
   Material and Finish, as Paint (number of coats), Textured Plaster (type), Wallpaper, Panel Mouldings, Paneling (pine, oak, etc.), etc.
3. FLOORS
   Oak, Maple, Pine, Parquet, Tile, Stone, Cement, Linoleum, Rubber Tile, Cork, Slate, Terrazzo, Marble, Carpet, etc., etc.
4. TRIM
   Wood, Metal, Plaster
5. TRIM FINISH (number of coats, etc.)
   Paint, Enamel, Lacquer, Stain, Varnish, Wax, etc.
6. HARDWARE
   Make complete List by Rooms, Including Kind, Style, Make, Number and Finish

HEATING EQUIPMENT

FUEL Coal, oil, gas, electricity
Delivery and storage provisions

TYPE OF HEATING PLANT
Warm-air Furnace (type)
Steam, one-pipe Steam, two-pipe
Vacuum Steam Hot Water

RADIATORS
Type; style; material; concealed; radiant; radiator covers

AUTOMATIC HEAT CONTROL
Thermostats, etc. Humidifiers

SANITARY EQUIPMENT

WATER SUPPLY
Source, pumps, storage, pressure tanks

WATER PIPES
Cold—Material, brass, wrought iron, steel
Hot—Material, brass, wrought iron, steel

HOT WATER HEATER
Type and Fuel

WASTE AND SOIL PIPES

FIXTURES
Material, type; Lavatory, Tub, Showers, Shower Heads, Traps, W. C., Faucets, Mixing Valves. Accessories. *(Make list for each shower room, toilet, lavatory, etc.)*

SEWAGE DISPOSAL
Septic Tanks; Sewers

ELECTRICAL EQUIPMENT

SUPPLY
Public Service, Private Plant
Lighting, Power, Heating

OUTLETS *for*
Lighting Fixtures, Floor Lamps, Reading Lamps, Fans, Mixers, Vacuum Cleaner, Radiant Heaters, Water Heaters, etc. Switches (types), Base Plugs (types)

LIGHTING FIXTURES
(List for each room to be made)

BELL SYSTEM for entrances
ANNUNCIATOR SYSTEM to service quarters
INTERCOMMUNICATING private telephone system
TELEPHONE (Long Distance)
BURGLAR ALARM SYSTEM
FIRE ALARM SYSTEM
SPRINKLER SYSTEM OF FIRE PROTECTION
ELEVATOR Dumbwaiter
RADIO, Plugs and Connections

SERVICE EQUIPMENT

KITCHEN EQUIPMENT
Schedule in consultation with Kitchen Equipment Specialist

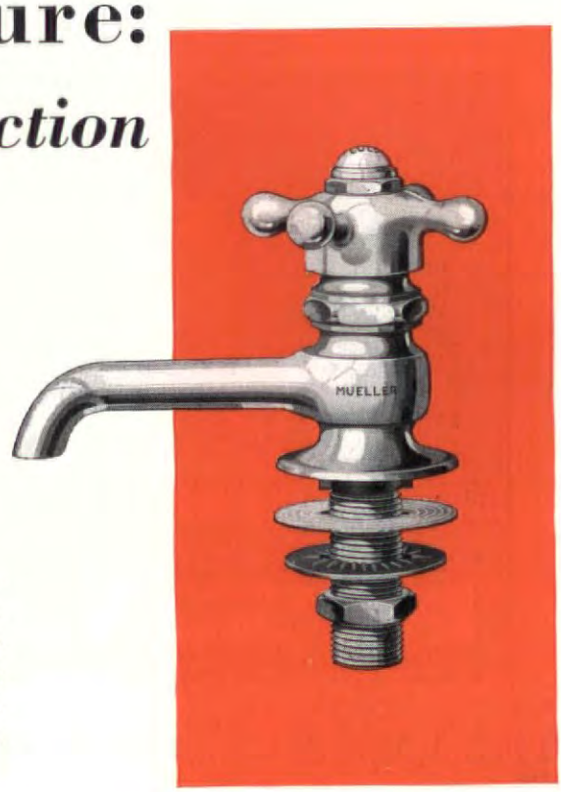
REFRIGERATORS
INCINERATOR
LAUNDRY EQUIPMENT

An exclusive feature:

Roller Bearing Construction

—for ease of operation and long life—

in these self-closing MUELLER Faucets



Below: removable unit of Mueller Self-Closing Lavatory Faucet, G-3360, as shown complete above.

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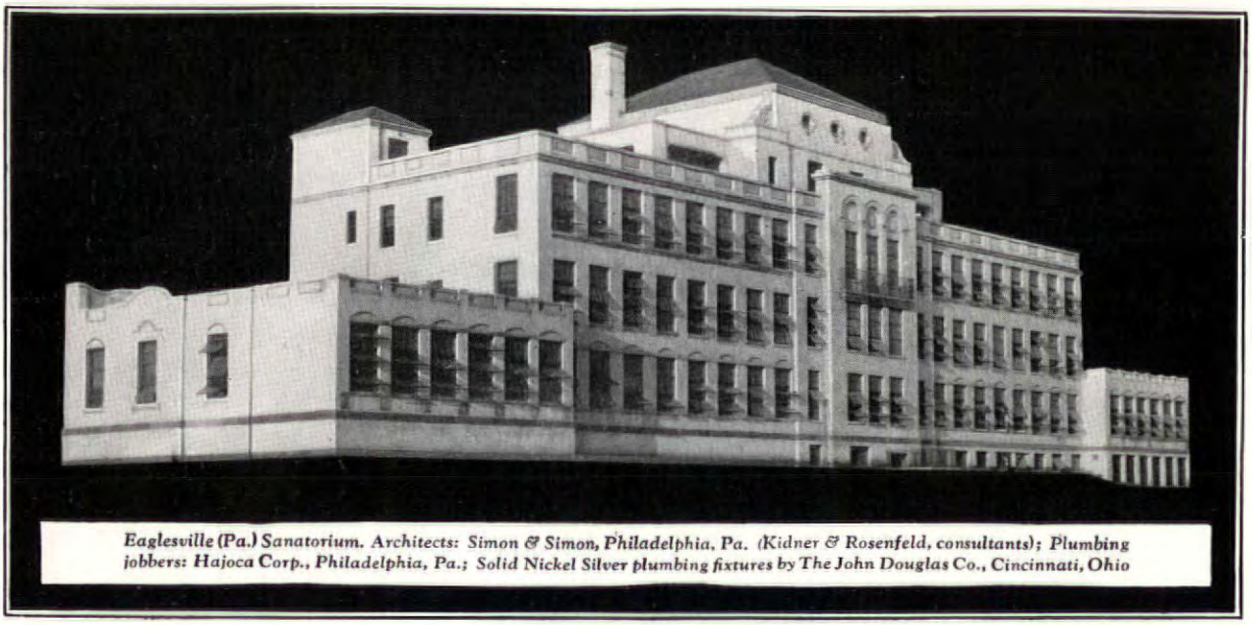

Eaglesville (Pa.) Sanatorium. Architects: Simon & Simon, Philadelphia, Pa. (Kidner & Rosenfeld, consultants); Plumbing jobbers: Hajoca Corp., Philadelphia, Pa.; Solid Nickel Silver plumbing fixtures by The John Douglas Co., Cincinnati, Ohio

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All from the same shower head!

THE new Self-Cleaning, Anystream Speakman shower head is completely different from any other shower head made. It gives any kind of a stream you wish, merely by the turn of a lever. (See illustrations.) It flushes itself free from every bit of clogging scale or dirt with a half turn of this same lever. When the shower is turned off it does not drip, drip, drip.

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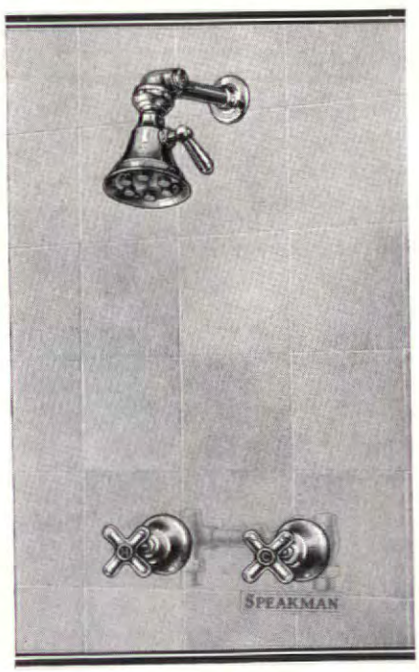
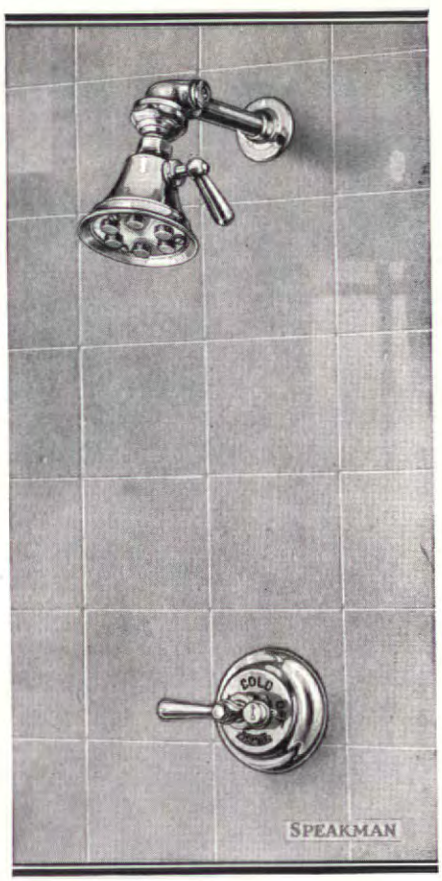
And the finish is in Speakman chromium plate—heavy, brilliant, durable. Speakman Company, Wilmington, Delaware.

K-2636-M—*Speakman Metaline Heavyweate Shower* Same as above except Speakman Hi-Seat valves in place of Mixometer. Hi-Seat valves are equipped with unions, renewable seats, metal escutcheons and metal handles with black enamel indexes. Size, ½ inch.





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SHOWERS & FIXTURES

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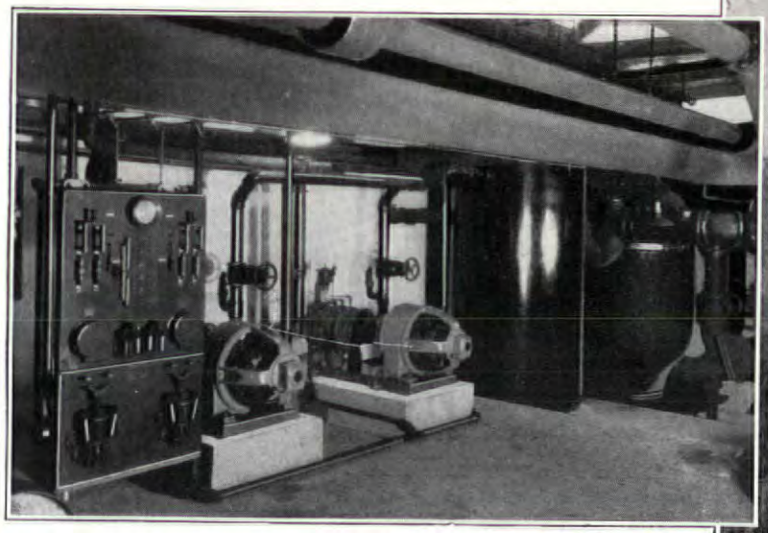

Equipment—Shone Duplex Ejector, Capacity 600 g.p.m.

Architects and Engineers—Murgatroyd & Ogden

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Standard Oil Bldg.
Royal Insurance Bldg.
Barbizon Plaza Hotel
Westinghouse Bldg.
Hotel McAlpin
Hotel Pennsylvania
Masonic Temple
Metropolitan Life Building
The Plaza
Woolworth Building
Palace Theatre
And Many More
Ritz Towers
Level Club
New York American Building
Vanderbilt Ave. Bldg.
Flat Iron Building
Gimbel's
Gotham National Bank
Grace Building
Guaranty Trust Bldg.
Hall of Records
Hotel Commodore
Racquet & Tennis Club
Russell Sage Foundation
Seaboard National Bank
Tiffany's
Wanamaker's

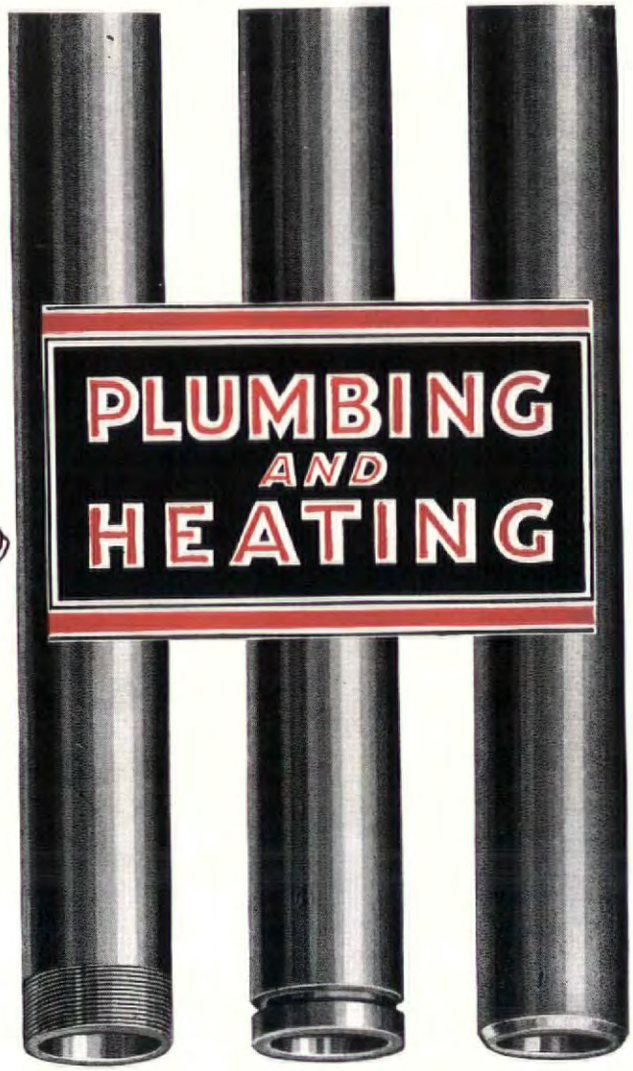
Yeomans Pumps

Sewage and Drainage

YEOMANS PUMPS GIVE YEOMAN SERVICE

Specify

WALWORTH C.N.I. CAST PIPE *for*



● Where permanency of installation is a factor of importance, as in drainage lines, vents and underground lines, Walworth C.N.I. pipe offers unique advantages. ● It has the long enduring life of cast iron, yet can be cut and threaded on the job and made up tight with the usual hand tools. ● And when it's in, it stays for years and years, leak proof and corrosion proof.

● Send for the C.N.I. Pipe Manual. ● It tells where we recommend the use of C.N.I. pipe — and, with equal frankness, where we do not recommend it.

Threaded for SCREWED COUPLING

GROOVED for VICTAULIC COUPLING

BEVELED for FIELD WELDING

Regularly made up in 5-foot lengths or in two or more welded lengths. Available in 1½"-2"-2½"-3"-4"-5" and 6" sizes.

WALWORTH

Walworth Company, General Sales Offices: 51 East 42nd St., New York
Plants at Boston, Mass.; Kewanee, Ill.; Greensburg, Pa.; and Attalla, Ala.
Walworth Company Limited, 620 Cathcart St., Montreal, P. Q.
Walworth International Co., 11 Broadway, New York, Foreign Representative
. . . Distributors in Principal Cities of the World . . .

Your Visions, in the Hollow of His Hands

Time—That Tough Old Tester—takes into the hollow of his hands the materials that go into the buildings you have visioned, planned, and supervised, and begins his work of destruction long before the structures are completed.

Nor do the attacks of Time, and of all his destructive forces, ever let up for a moment until those buildings are crumbled ruins or torn down to make way for the new.

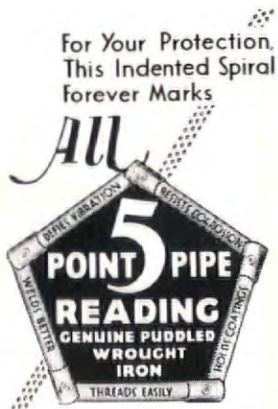
But if you wish to have the structures you plan withstand the attacks of Time to the utmost, if freedom from repairs is desired as long as they last, then specify Reading 5-Point Pipe throughout.

Use only Reading 5-Point Nipples with Reading 5-Point Pipe—you'll know them by the indented spiral band

For Reading 5-Point Pipe is made of genuine puddled wrought iron that has stood the tests of Time—That Tough Old Tester—as has no other pipe material. And the tests of Time are the only conclusive tests of the length of life of pipe materials that man has ever found.

READING IRON COMPANY, Reading, Pennsylvania

For Your Protection, This Indented Spiral Forever Marks



Science and Invention Have Never Found a Satisfactory Substitute for Genuine Puddled Wrought Iron

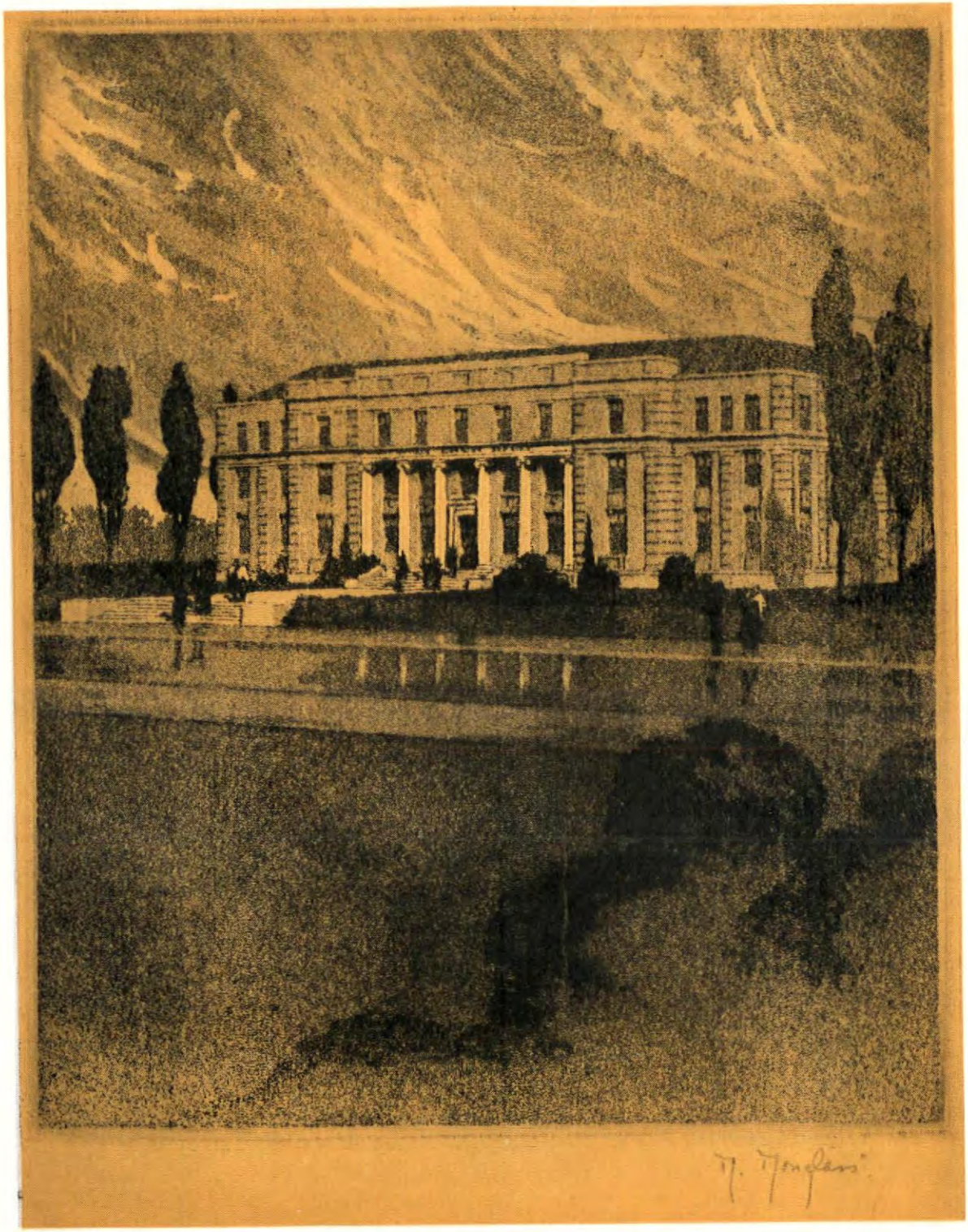
1100 North Dearborn Hotel Apartment, Chicago, Illinois

McNally & Quinn, Architects — *E. B Kaiser, Plumbing Contr.* — *W. F. Thumm, Heating Contr.*

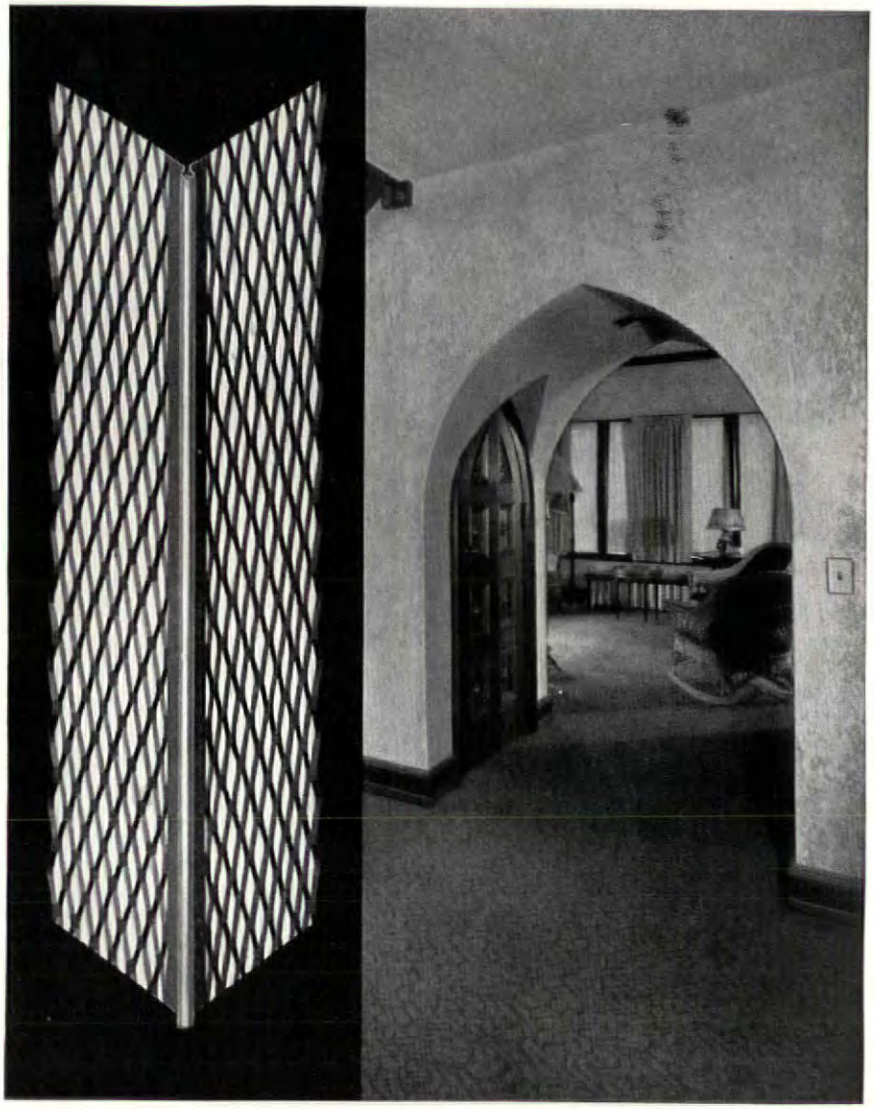
Service—continuous, efficient, trouble-free, every day and night of the year—year after year . . . thousands of residents entirely dependent on the piping system for water, heat, air, gas, electricity, sanitation. Without pipe, life in the building could not continue. To meet satisfactorily such essential requirements, Republic Steel Pipe was chosen for the 23 story North Dearborn Apartments, Chicago.

REPUBLIC STEEL PIPE

REPUBLIC IRON & STEEL CO., YOUNGSTOWN, OHIO



The Expanded Wings of This Corner Bead Offer Advantages Found in No Other



PRACTICALLY indestructible plaster corners . . . lower erection cost due to faster application . . . are the major advantages offered by *Milcor* Expansion Corner Bead. It was developed by *Milcor* engineers to meet the demand for a corner bead that would give greater strength and simplify erection. Today its success is unquestioned and outstanding.

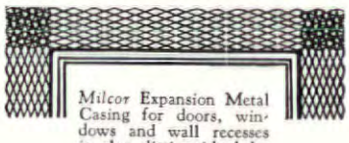
The wings of expanded metal permit keying the plaster right up to the bead. Every square inch of these wings reinforces the plaster. There are no smooth surfaces to which the plaster may or may not "stick". The result is effective reinforcement where it is most needed . . . and substantial assurance that the plaster corners will withstand much more than the average abuse.

There is no hunting for nail holes with *Milcor* Expansion Corner Bead. It goes up fast . . . and can be wired, stapled or nailed to any kind of wall construction at lowest cost.

Truly beautiful arches are encouraged by the use of *Milcor* Expansion Corner Bead. It lends itself easily to graceful curves . . . and assures lasting beauty.

Specify *Milcor* Expansion Corner Bead . . . it has no "equal". Use it on every exposed plaster corner . . . as giving greatest assurance of freedom from chipping or cracking.

You may be interested in a sample section of this better bead. Shall we send one to you?



Milcor Expansion Metal Casing for doors, windows and wall recesses is also distinguished by the expanded metal wings. It cannot pull away during settlement and will not leave cleavage cracks.

Milcor Stay-Rib Metal Lath has unusual strength and rigidity. Its design . . . a *Milcor* patent . . . affords the maximum protection against plaster cracks.

MILCOR

Expanded Metal Building Products are Available in

ARMCO Ingot Iron

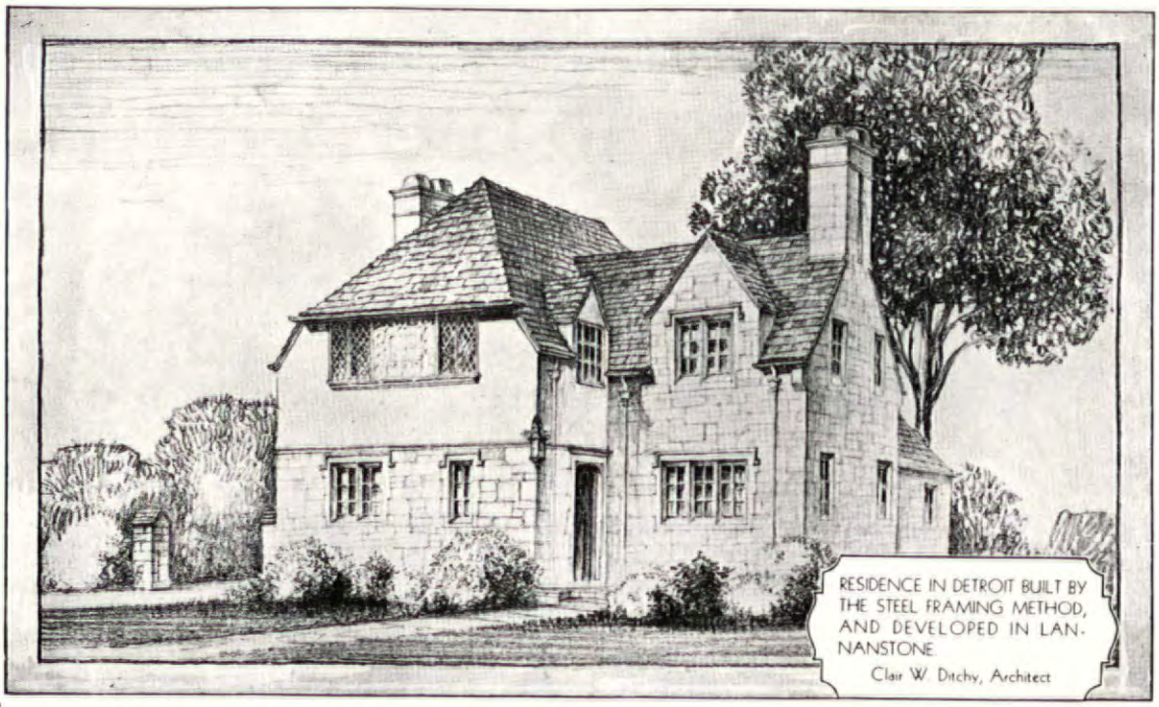
Copper Alloy Steel

Save with Steel

MILWAUKEE CORRUGATING COMPANY
1405 Burnham St., Milwaukee, Wis.

MILCOR PRODUCTS

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



RESIDENCE IN DETROIT BUILT BY THE STEEL FRAMING METHOD, AND DEVELOPED IN LANNANSTONE.
Clair W. Ditchy, Architect

YOUR ORIGINAL PLANS *followed to the quarter of the inch*

That's one great beauty of steel frame construction—your house will go up just as you planned it. No chance for mistakes in proportion. No errors in the cutting of beams or girders—to be covered up or corrected by altering your design. No swelling or shrinkage to be reckoned with.

The framework for your house comes completely pre-fabricated. It leaves the mill cut precisely to your plans. Every upright, every floor beam is exact in dimension. And every member is carefully marked to indicate its place and position, requiring no specialized skill, no adjustments, no trimming or changing.

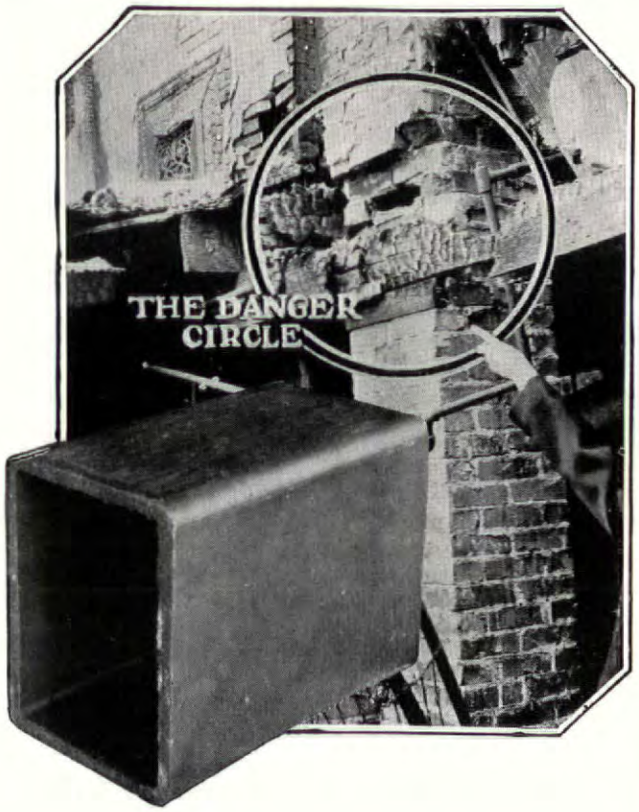
When completely erected—and it's done in an amazingly short time, sometimes a week or even less—check it over and you'll find scarcely a quarter inch variation from your original plans. Yet, if you wish slight changes—for example, a different placing of your windows—they can usually be made without trouble or change in frame members.

If adherence to your original design were the only advantage Steel Framing offers you, it would certainly be more than worth your while to investigate. But, there are countless others. Steel Framing is adaptable to any type of architecture. It is permanent. It protects against sagging, settling, plaster cracks, etc. It provides safety against fire, storm, and weather.

There are facts and concrete evidence about Steel Framing that should be on your desk right now. The complete story of Steel Framing. Examples of finished Steel Frame houses. Etc. May we send them to you? Drop us a postcard.

STEEL FRAME HOUSE CO.
Subsidiary of McClintic-Marshall Corporation
Oliver Bldg., Pittsburgh, Pa.

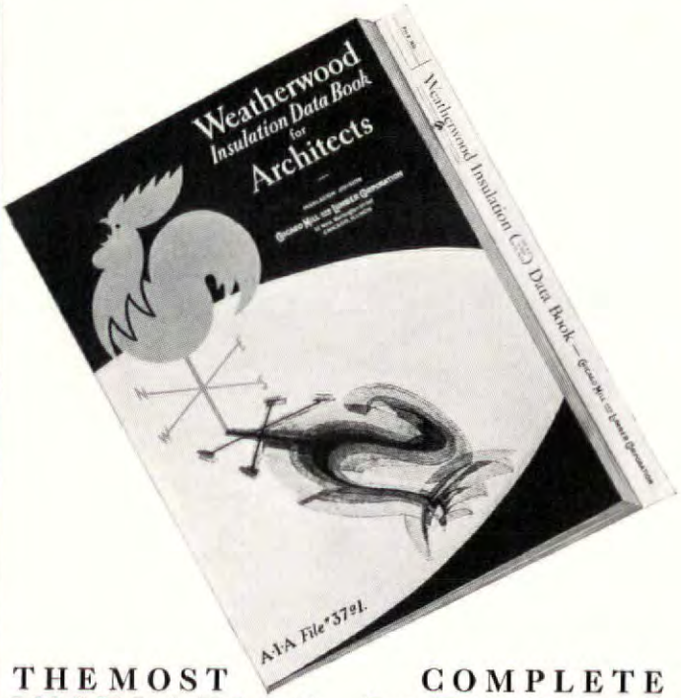
STEEL FRAMING
The modern method of house construction



No more chimney fires when every house is built with fire clay flue lining

CLAY PRODUCTS ASSOCIATION
CONWAY BUILDING
Chicago

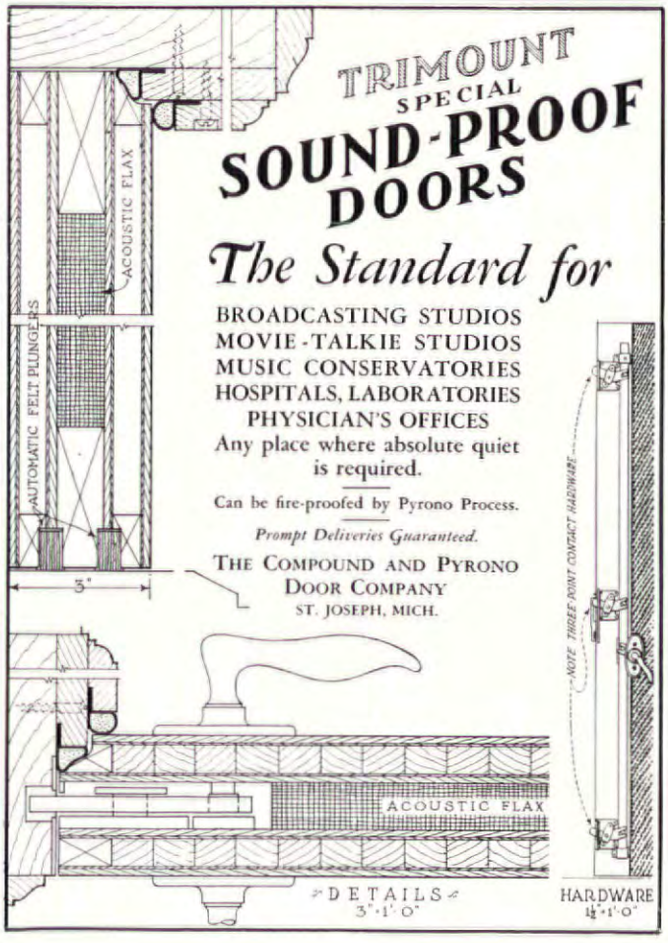
FIRE CLAY
Flue Lining AF3-Gray



THE MOST COMPLETE INSULATION DATA BOOK

Send your name and address for copy of this Insulation Data Book for Architects . . . the most complete general and technical book on wall, roof and floor insulation (residential and industrial) and sound deadening, also on insulating lath.

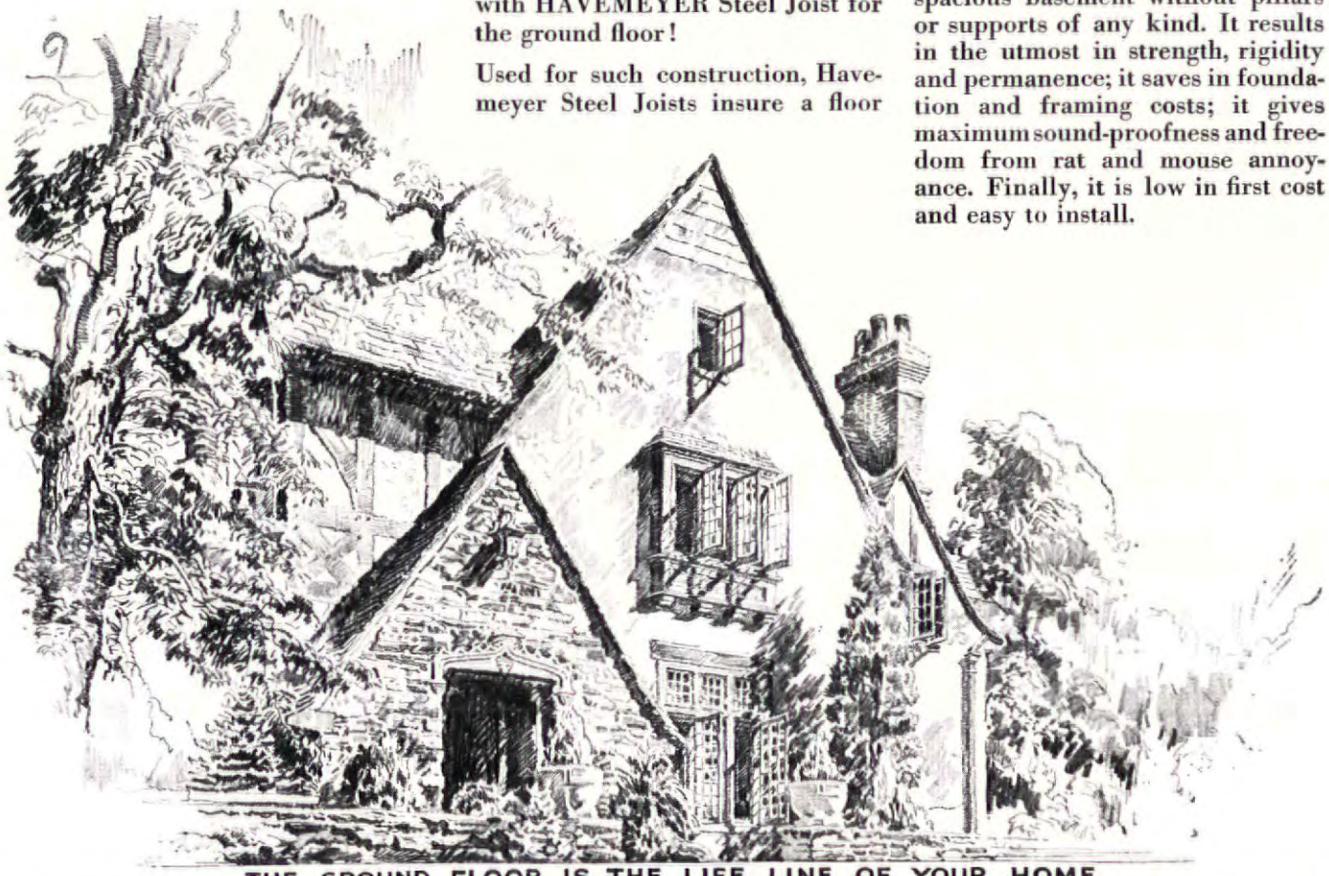
Insulation Division
CHICAGO MILL AND LUMBER CORPORATION
111 West Washington Street Chicago, Ill.



A fire-safe floor construction for dwellings . . .

50% of all serious residence fires originate in the basement . . . and most of this tremendous loss would be saved were the homes built with HAVEMEYER Steel Joist for the ground floor!

Used for such construction, Havemeyer Steel Joists insure a floor that will not shrink, sag, spring or warp, thus minimizing cracking of plaster on walls and ceilings. This construction also insures a clear, spacious basement without pillars or supports of any kind. It results in the utmost in strength, rigidity and permanence; it saves in foundation and framing costs; it gives maximum sound-proofness and freedom from rat and mouse annoyance. Finally, it is low in first cost and easy to install.



THE GROUND FLOOR IS THE LIFE LINE OF YOUR HOME

. . . A clear, usable basement!

HAVEMEYER STEEL JOIST

Concrete Steel Co.

HAVEMEYER FIRE-PROOFING PRODUCTS

Havemeyer flat lath is an expanded metal product made from sheet steel, painted or galvanized; copper bearing steel; or pure iron.

Havemeyer rib lath is furnished in easily-handled sheets. Ribs are straight, absolutely uniform and reinforce the lath to provide maximum strength and rigidity. Prompt shipments.

Havemeyer Fire-proofing Products include all types of metal lath, expanded metal, corner beads, channels, angles and similar products used in the construction of fire-proof dwellings and buildings of all types.

CONCRETE STEEL COMPANY (AF)
42 BROADWAY, NEW YORK CITY

Please send information regarding Havemeyer STEEL Ioist and other fire-proofing products.

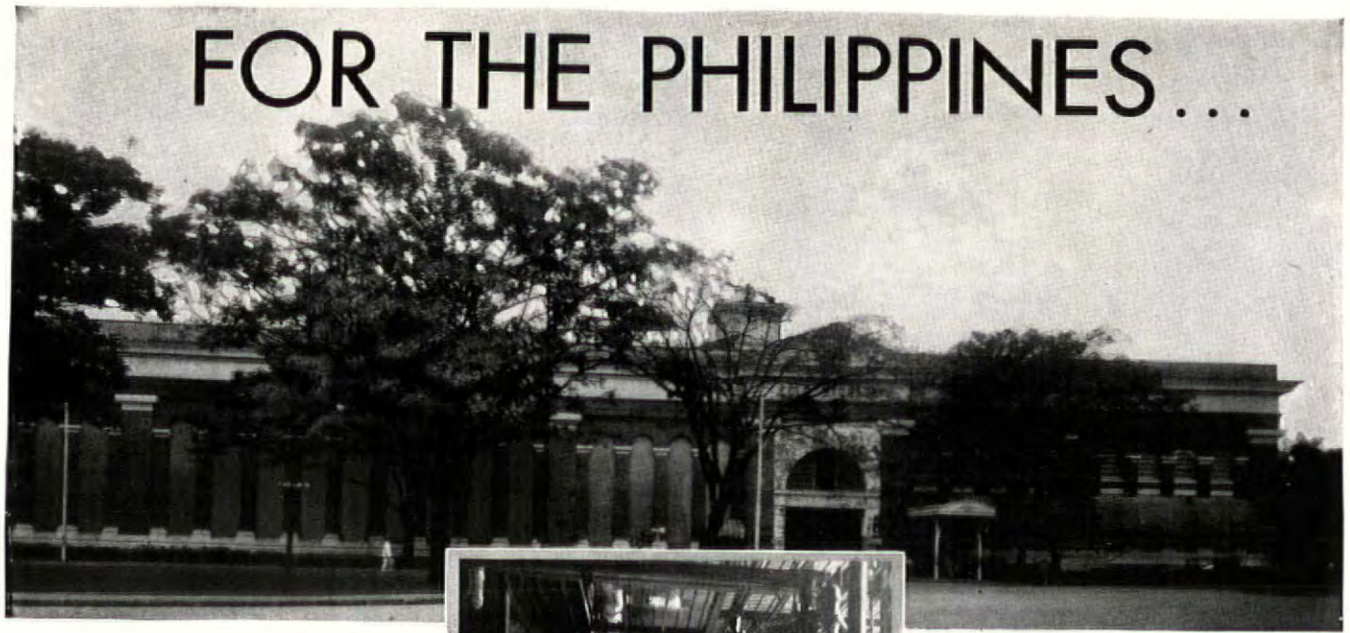
Name .....

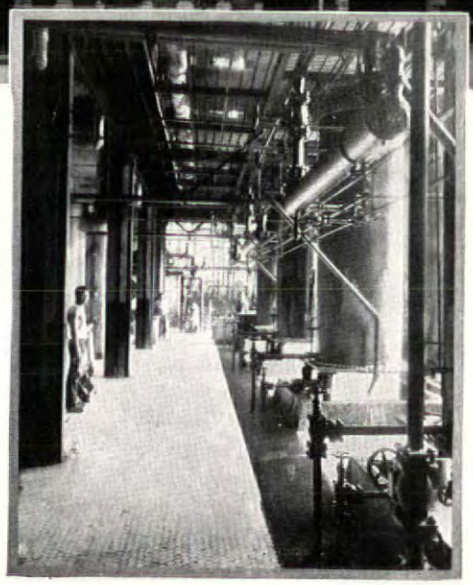
Address .....

Executive Offices
42 Broadway, New York City

Sales Offices: Birmingham, Boston, Chicago, Detroit, Milwaukee, Minneapolis, Philadelphia, Pittsburgh, St. Paul, Syracuse, Washington.

FOR THE PHILIPPINES...





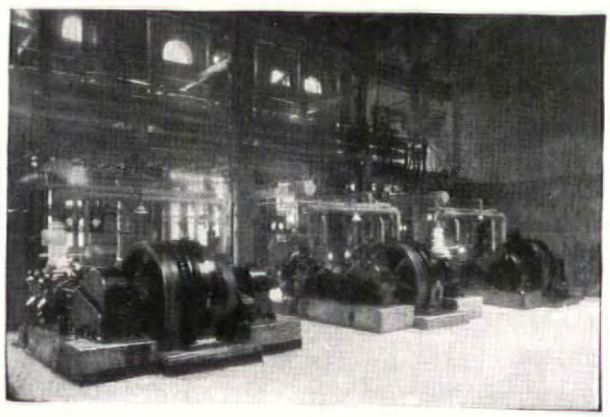
450 TONS OF CARBONDALE REFRIGERATION

"...a very satisfactory installation", says Mr. J. A. V. Corpus, Chief, Division of Cold Storage in Manila concerning this Compression Refrigerating System. "We are able to operate the Spira-Flow Condensers with a lower head pressure...we have found the two stage system of compression to be highly efficient."

Each of the three two-stage Worthington "Feather Valve" Compressors is fitted with clearance pockets for capacity control and is driven by direct connected synchronous motors at a speed of 257 r.p.m. Carbondale Spira-Flow ammonia condensers are placed in the machine room on the same floor level as the compressors.

Every detail has been engineered to fit precisely the required conditions. This is typical of Carbondale, is representative of the more than 35 years of refrigerating experience and comprehensive range in types and machine capacities which Carbondale has developed.

Whatever your refrigerating requirements, there's a Carbondale system for the job. The cooperation of our engineers is freely offered.



THE CARBONDALE MACHINE CO., CARBONDALE, PA.

Branches in Principal Cities

Carbondale CARMACO **Refrigeration**

ABSORPTION AND AMMONIA COMPRESSION MACHINES

Buckingham Bldg.
Chicago

Architects—
HOLABIRD & ROOT

Builders—
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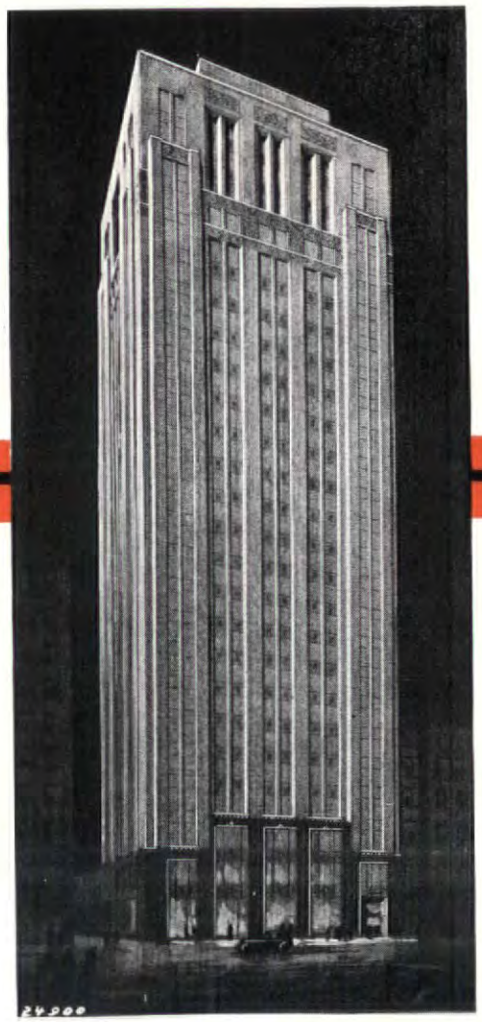
Plumbing
Contractors—
M. J. CORBOY CO.



ARCO METAL
CAST IRON PIPE

In the Buckingham Building Arco Metal Pipe gives permanent protection against rust. The owners of the building have learned through experience that ordinary pipe does not last as long as the building itself. Replacement is costly to the owner and inconvenient to the tenant. Modern design demands much piping that is concealed. Permanence in construction is of first importance. Decay must be conquered, repairs must be minimized.

Cast iron pipe is the only safe, durable and economical pipe for building drainage systems, because it is unaffected by the sewer gases and atmospheric conditions.

Because the iron in Arco Metal Pipe is alloyed with nickel and chromium, its texture is uniform throughout the wall of the pipe, and insures its superior corrosion-resisting qualities either at the bottom of its thread or at any point on its surface. The pipe is of the same dimensions as extra heavy wrought pipe. It can be cut and threaded with standard hand or power tools. It can be welded to any length at the factory or on the job.

Arco Metal Pipe is carried in stock and distributed by jobbers of plumbing, heating and mill supplies.

ALL PLUMBING STACKS FOR WASTE AND REVENT LINES

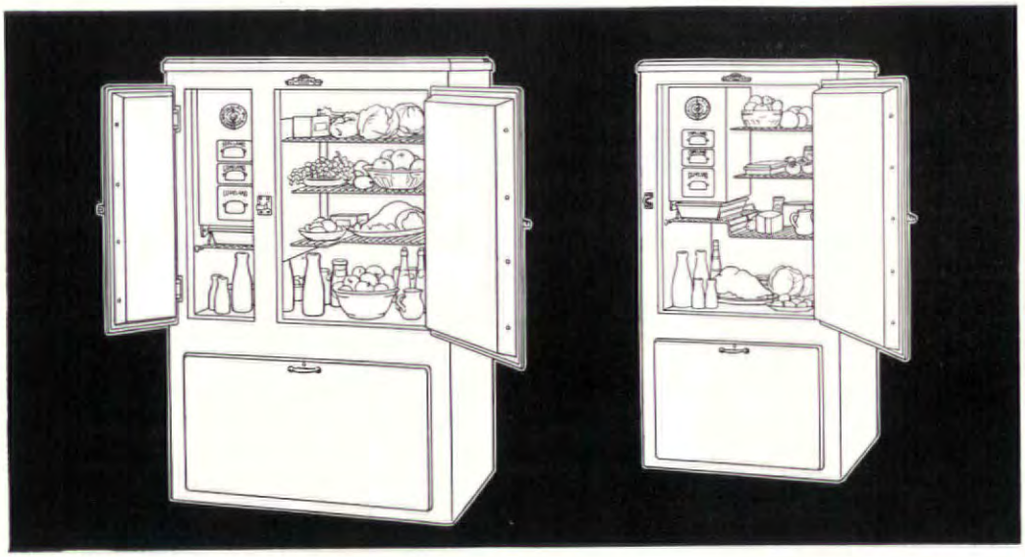
WILL NOT RUST OUT

ARCO · ARCO · ARCO · ARCO · ARCO · ARCO · ARCO · ARCO · ARCO

AMERICAN RADIATOR COMPANY

ARCO METAL PIPE DIVISION
40 WEST 40th STREET, NEW YORK

816 So. Michigan Avenue, Chicago
1294 E. 55th St., Cleveland
1344 Broadway, Detroit
8th and Broadway, Cincinnati
4201 Duncan Avenue, St. Louis



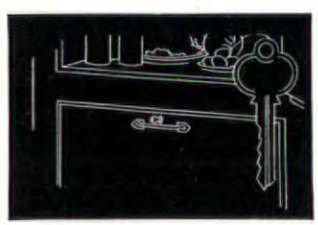
COPELAND

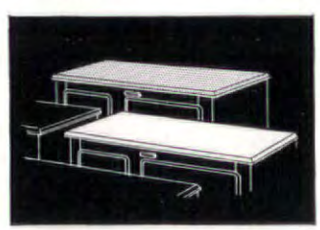
PRESENTS IMPORTANT ADVANCEMENTS IN ELECTRIC REFRIGERATION

Home owners can now purchase an electric refrigerator which not only preserves food but chills drinking water . . . which has an *accessible* Coldial with seven ice-freezing speeds . . . which has electric illumination, a colored top to harmonize with the kitchen, and a *locked* mechanism chamber. ◆ New Copeland models *alone* offer all these advanced features—features which identify them as the finest, most modern and most *complete* refrigerators the world has ever known! And other Copeland products—multiple installations for apartments, water coolers, and units for commercial purposes—are equally outstanding in economy and efficiency. ◆ You owe it to yourself and to the clients who rely on your judgment, to learn how Copeland is advancing the electric refrigeration industry. The information is ready. Just send your name and address.

WATER CHILLER

Exclusive Copeland system for chilling drinking water. Large reservoir, with accessible filler and faucet.





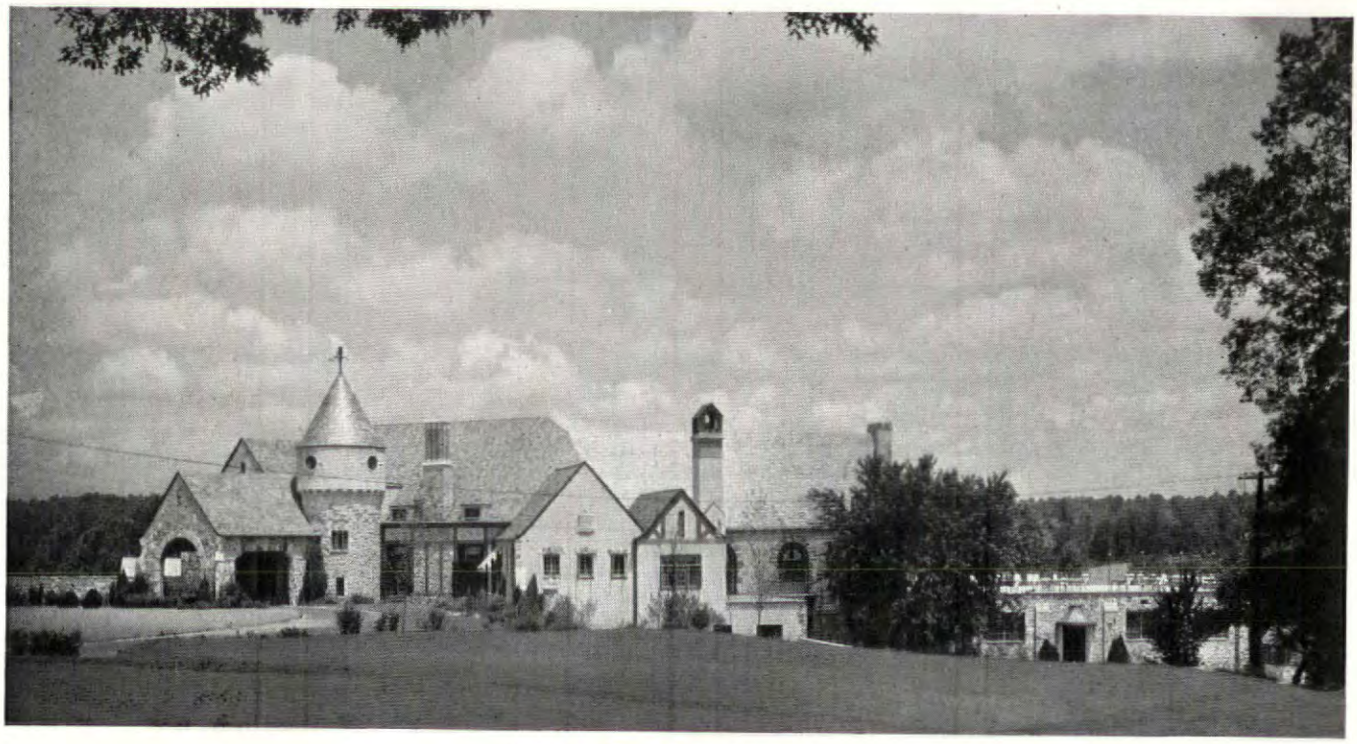
ARCHITECTS' FOLDER

Comprehensive information on Copeland products for 1930 will be mailed to architects who sign name and address below, tear off, and mail to Copeland Sales Company, Dept. AF, Mount Clemens, Michigan.

Name..... Address.....

NAILCRETE

Used in This Fine Country Club Building



Capital City Country Club, Atlanta, Georgia
Burge & Stevens, Architects, Robert G. Lose, Engineer
Griffin Construction Co., Contractors

IN THE splendid new home of the Capital City Country Club, Atlanta, Georgia, Nailcrete . . . the original nailing concrete . . was used as the nailing base for the slate roof. This is one of many Country Clubs in which this modern building material has been extensively employed.

See pages 386, 397, 398, 399, 400 for descriptive articles and illustrations of The Capital City Country Club.

Every square inch of Nailcrete is nailable. It has, too, the additional important advantages of being fireproof and rot-proof.. and its insulating capacity is two to three times greater than that of stone concrete.

Nailcrete is the superior nailing base for floors and roofs in large and small construction. When used for wood floors it eliminates sleepers, sleeper clips, fill and underflooring.

Write for our illustrated descriptive booklet, "Nailcrete"

THE NAILCRETE CORPORATION

105 WEST 40TH STREET, NEW YORK CITY

Consider this file yours

. . . . *consult it freely*

FOR more than fifty years, Troy engineers have been assisting architects in laying out laundry facilities for institutional projects. During this time they have designed innumerable laundry plants, of all types and sizes, meeting every requirement.

From long experience Troy engineers know where best to locate the plant, how to arrange equipment so that work will progress without waste motion, where to put bin and storage space, how to plan for future expansion and how to solve the scores of similar problems which arise with each particular installation.

Through TROY ARCHITECTS' ADVISORY SERVICE, the many sound and practical ideas Troy engineers have assembled on laundry planning are available to you. Consult Troy for this aid and information. No charge...no obligation.

TROY LAUNDRY MACHINERY CO., INC.

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JAMES ARMSTRONG & CO., Ltd., European Agents: London ⊣ Paris ⊣ Amsterdam ⊣ Oslo.

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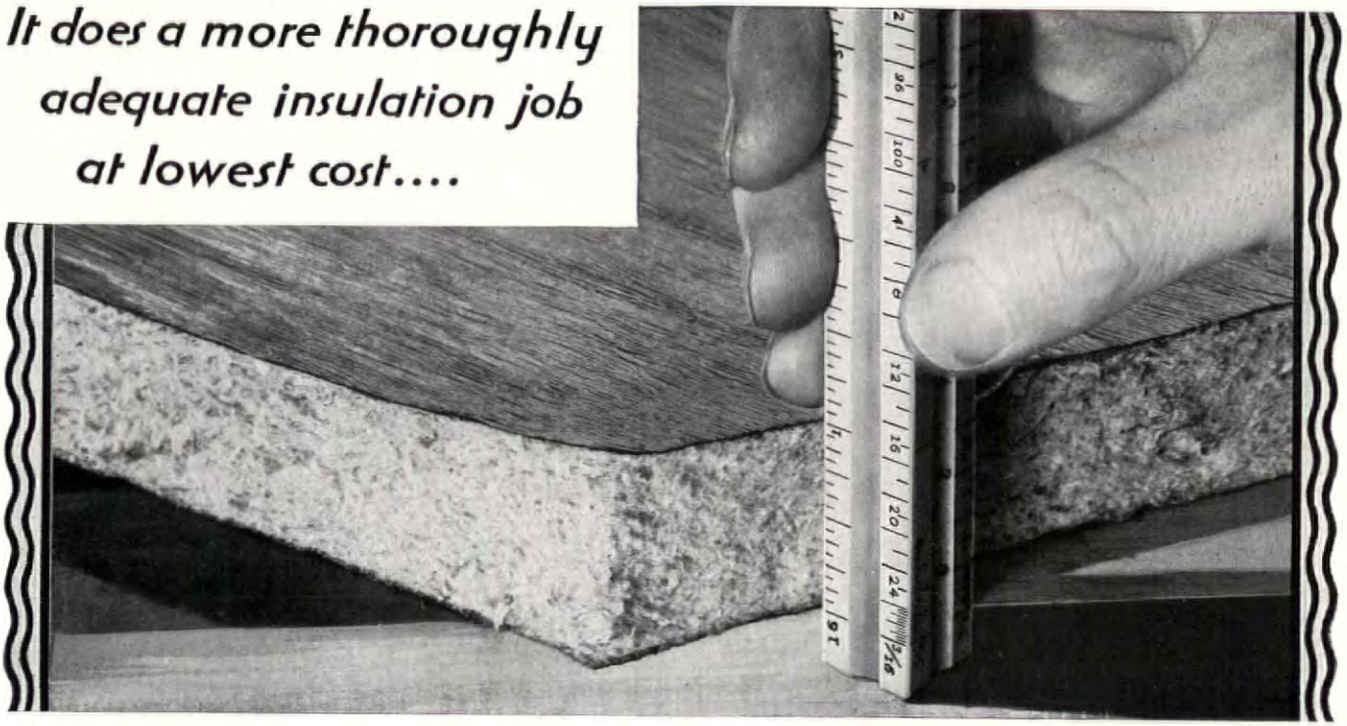
LAUNDRY MACHINERY

SINCE 1879 . . . THE WORLD'S PIONEER MANUFACTURER OF LAUNDRY MACHINERY

It does a more thoroughly adequate insulation job at lowest cost....



This *Doubly-Efficient*... FULL INCH THICK Balsam-Wool

In house insulation there has recently come a new standard of efficiency.

Full inch thick Balsam-Wool has made possible more adequate protection than one application of material ever heretofore afforded.

It offers the two way advantage of: 1. reduced cost in relation to insulating value 2. no extra time or cost for application.

IT TUCKS IN! Balsam-Wool combines the highest insulating efficiency ever attained in practical house insulation with the important advantage of *flexibility*. In these two respects it meets squarely the requirements of true house insulation

Thus one-inch Balsam-Wool permits, for a reasonable cost, a more thoroughly heat-tight job—a comfort factor substantially increased, a fuel reduction larger than ever before.

In attaining the added effectiveness of one-inch thickness, Balsam-Wool has retained its important quality of *flexibility*. One-inch Balsam-Wool *tucks in* even more snugly. It insulates at minimum labor cost all the odd-shaped spaces. Every crevice around door jambs and window frames is caulked tightly.

These are the advantages of *flexibility*—a quality inherent in one-inch as in half-inch Balsam-Wool.

For a complete one-inch specification there is abundant precedent. Many architects now standardize on one-inch Balsam-Wool. Others are using it in combination with the half-inch, specifying the one-inch material for the places of greatest heat loss. The two thicknesses constitute one of the advantages of Balsam-Wool.

If you have not yet examined one-inch Balsam-Wool your request will bring a sample, together with complete data file which includes specification material. In Sweet's Architectural Catalogue you will also find complete descriptive matter and specifications.

WOOD CONVERSION COMPANY
Cloquet, Minnesota

Also makers of Nu-Wood—the All Wood Insulating Wall Board and Lath. Sold only through retail lumber dealers

Branch Offices: New York, 3107 Chanin Bldg.—Detroit, 515 Stephenson Bldg.—Chicago, 360 N. Michigan—Kansas City, 231 W. 47th St.—Minneapolis, 414 Baker Bldg.—Seattle, 616 Liggett Bldg.

A guaranteed Weyerhaeuser product

Balsam-Wool *Blanket*

THICK... FLEXIBLE INSULATION... EFFICIENT

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

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

Hanley Company, Bradford, Pa.
General Catalog. 16 pp. 8½ x 11 ins. Illustrated.
Bradford Reds. Folder. 8 pp., 3 x 8 ins. Illustrated.

CABINET WORK

Henry Klein & Co., 25 Grand Street, Elmhurst, L. I., N. Y.
Driwood Period Mouldings in Ornamented Wood. Brochure, 28 pp., 8½ x 11 ins. Illustrated.
Ensemble Offices for the Banker and Broker. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Luxurious Office Partitions in Walnut, Mahogany and Quartered Oak. Folder. 4 pp., 8½ x 11 ins. Illustrated.

CEMENT

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

Louisville Cement Co., 315 Guthrie St., Louisville, Ky.
BRIXMENT for Perfect Mortar. Self-filing handbook, 8⅓ x 11 ins. 16 pp. Illustrated. Contains complete technical description of BRIXMENT for brick, tile and stone masonry, specifications, data and tests.

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

CONCRETE COLORINGS

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

CONSTRUCTION, FIREPROOF

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

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

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

CONSTRUCTION, STONE AND TERRA COTTA

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

DAMPPROOFING

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

Minwax Company, Inc., 11 West 42nd St., New York.
Complete Index of all Minwax Products. Folder, 6 pp., 8½ x 11 ins. Illustrated. Complete description and detailed specifications.

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

DOORS

David Lupton's Sons Company, Philadelphia.
Lupton Commercial Steel Doors. Folder. 8½ x 11 ins. Illustrated.
Lupton Steel Industrial Doors. Brochure. 8 pp., 8½ x 11 ins. Illustrated. Details and specifications.

DOORS AND TRIM, METAL

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

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

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 181*

DOORS AND TRIM, METAL—Continued

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

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

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

DOORS, SOUNDPROOF

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

DRAINAGE FITTINGS

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

DRINKING FOUNTAINS

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

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 8¼ ins., 60 pp. Illustrated.
Catalog and pamphlets, 8½ x 11 ins. Illustrated. Valuable data on dumbwaiters.

ELECTRICAL EQUIPMENT

R. W. Cramer & Company, 136 Liberty Street, New York.
Sauter Electric Time Switches. Booklet, 16 pp., 8½ x 11 ins. Illustrated.

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

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

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

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

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

ELEVATORS

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

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

Sedgwick Machine Works, 151 West 15th St., New York, N. Y.
Catalog and descriptive pamphlets, 4¼ x 8¼ ins., 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.
Catalog and pamphlets, 8½ x 11 ins. Illustrated. Important data on different types of elevators.

ESCALATORS

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

FIREPLACE CONSTRUCTION

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

FIREPROOFING

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

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

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

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

FLOOR HARDENERS (CHEMICAL)

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

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

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

FLOORS—STRUCTURAL

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

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

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

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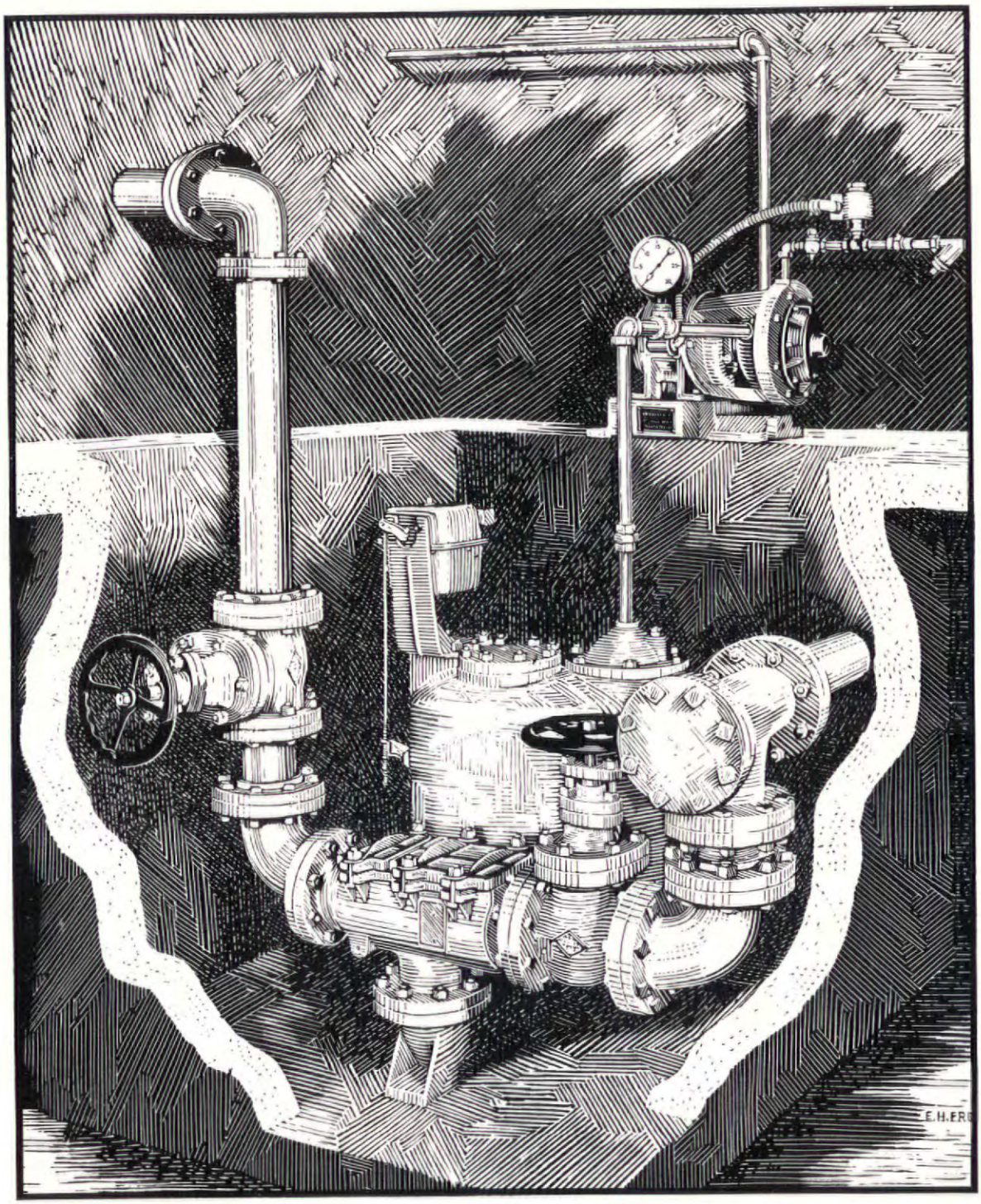

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THIS TYPE B JENNINGS Pneumatic Sewage Ejector is the best equipment obtainable for lifting up to 50 g. p. m. of unscreened sewage from deep basements and discharging this sewage into the street sewer. Write for bulletins.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 182*

FLOORING—Continued

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

Congoleum-Nairn, Inc., 195 Belgrove Drive, Kearny, N. J.
Facts you should know about Resilient Floors. A series of booklets on floors for (1) schools, (2) hospitals, (3) offices, (4) stores, (5) libraries, (6) churches, (7) clubs and lodges, (8) apartments and hotels. Illustrated.

Specifications for Resilient Floors. Booklet, 12 pp. A reprint from Sweet's.

A New Kind of Floor Service. Brochure, 8 pp. Data on Bonded Floors.

Sealex Battleship Linoleum. Booklet, 12 pp. Illustrated. Shows typical installations.

Sealex Treadlite Tiles. Two booklets, 8 and 16 pp. Illustrated.

Colonial Planks. Brochure, 8 pp. Illustrated.

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

C. Pardee Works, 9 East 45th St., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.

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

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

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

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

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.

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 7⅛ 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, 8¼ x 10½ ins.

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

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.

HARDWARE—Continued

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.

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, 6¼ x 9½ ins. Illustrated. Describes a central all-on-one-floor heating plant with radiators for small residences, stores, and offices.

How Shall I Heat My Home? Brochure, 16 pp., 5¾ x 8½ ins. Illustrated. Full data on heating and hot water supply.

New American Radiator Products. Booklet, 44 pp., 5 x 7¾ ins. Illustrated. Complete line of heating products.

A New Heating Problem. Brilliantly Solved. Broadside, 4 pp., 10¾ x 15 ins. Illustrated. Data on the IN-AIRID invisible air valve.

In-Airid, the Invisible Air Valve. Folder, 8 pp., 3½ x 6 ins. Illustrated. Data on a valuable detail of heating.

The 999 ARCO Packless Radiator Valve. Folder, 8 pp., 3½ x 6 ins. Illustrated.

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

C. A. Dunham Company, 450 East Ohio St., Chicago, Ill.
Dunham Radiator Trap. Bulletin 101, 8 x 11 ins., 12 pp. Illustrated. Explains working of this detail of heating apparatus.

Dunham Packless Radiator Valves. Bulletin 104, 8 x 11 ins., 8 pp. Illustrated. A valuable brochure on valves.

Dunham Return Heating System. Bulletin 109, 8 x 11 ins. Illustrated. Covers the use of heating apparatus of this kind.

Dunham Vacuum Heating System. Bulletin 110, 8 x 11 ins., 12 pp. Illustrated.

The Dunham Differential Vacuum Heating System. Bulletin 114. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for small buildings.

The Dunham Differential Vacuum Heating System. Bulletin 115. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for large buildings.

The Fulton Sylphon Company, Knoxville, Tenn.
Sylphon Temperature Regulators. Illustrated brochures, 8½ x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments.

Sylphon Heating Specialties. Catalog No. 200, 192 pp., 3½ x 6¾ ins. Important data on heating.

Hoffman Specialty Company, Inc., 25 West 45th St., New York, N. Y.
Heat Controlled With the Touch of a Finger. Booklet, 46 pp., 5¾ x 8¾ ins. Illustrated.

How to Lock Out Air, the Heat Thief. Brochure, 48 pp., 5 x 7¼ ins. Illustrated.

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

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

Kewanee Boiler Corporation, Kewanee, Ill.
Kewanee on the Job. Catalog, 8½ x 11 ins., 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators. etc.

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A steam trap *tested-in-the-making* now offered by GRINNELL

GRINNELL COMPANY has discovered the one trap which meets its own exacting standards. It is a discovery of great importance because never before could a trap be tested in its making.

The heart of this ThermOflex trap is the Hydron bellows. By the process of its manufacture, each and every Hydron bellows must stand up under a pressure several times as powerful as it will ever be given on any piping job.

"What! Tested in the Making?"

The famous ThermOflex Hydron bellows is formed from the original tube by several hundred pounds internal hydraulic pressure. That is why this sturdy yet sensitive bellows will open and close millions of times without any signs of giving out.

The end fitting is joined to the tube *before* the hydraulic pressure shapes it into a bellows. Therefore, the tremendous internal pressure also tests the end fitting far beyond any pressure the bellows will ever be called upon to stand. Any weakness in either the tube or the end fitting would then and there destroy the bellows. Thus the ThermOflex Hydron bellows is *self-inspected* and *proof-tested in the making*.

Grinnell Company is the exclusive distributor for these traps. Years of unfailing service in all types of buildings and under severe and varied conditions have proved their unfailing value, their uniformly high quality, their long efficient service.

Let our sales engineers work with you to insure permanent satisfaction.

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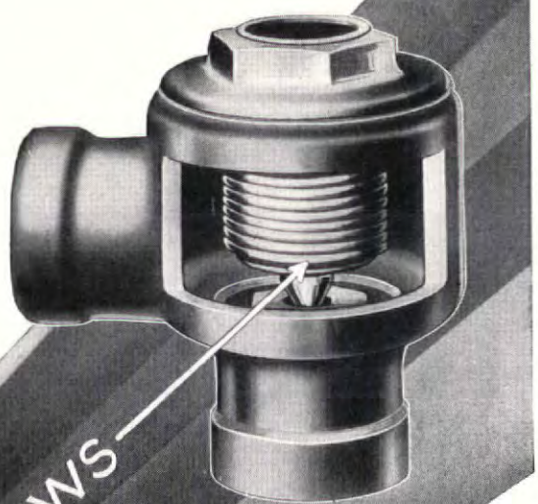

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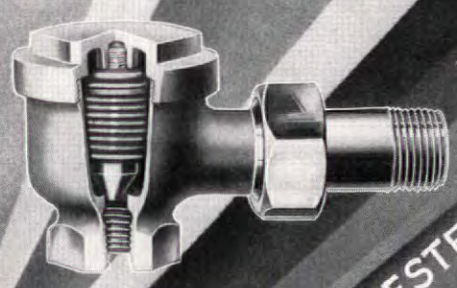
For dripping mains, risers, coils and unit heaters, we offer this type of trap. Cast-iron body, brass cap and inserted brass seat, angle pattern only, without unions.



No. 12 ThermOflex Radiator Trap

Body is extra heavy throughout, using a brass forging for the cap and spudnut, highest-grade cast brass for the body and spud.

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Title_____
Firm Name_____
Address_____

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 184*

HEATING EQUIPMENT—Continued

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.

May Oil Burner Corp., Baltimore, Md.

Adventures in Comfort. Booklet, 24 pp., 6 x 9 ins. Illustrated. Non-technical data on oil as fuel.

Taking the Quest Out of the Question. Brochure, 16 pp., 6 x 9 ins. Illustrated. For home owners interested in oil as fuel.

McQuay Radiator Corporation, 35 East Wacker Drive, Chicago, Ill.

McQuay Visible Type Cabinet Heater. Booklet, 4 pp., 8½ x 11 ins. Illustrated. Cabinets and radiators adaptable to decorative schemes.

McQuay Concealed Radiators. Brochure, 4 pp., 8½ x 11 ins. Illustrated.

McQuay Unit Heater. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Gives specifications and radiator capacities.

Modine Mfg. Co., Racine, Wisc.

Modine Copper Radiation. Booklet, 28 pp. 8½ x 11 ins. Illustrated. Deals with industrial, commercial and domestic heating.

A Few Short Years. Folder. 4 pp. 8½ x 11 ins. Illustrated. Heating for garages.

Dairy Plant Heating. Folder. 4 pp., 8½ x 11 ins. Illustrated.

Industrial Heating. Folder. 4 pp., 8½ x 11 ins. Illustrated.

Modine Unit Heater. Folder. 6 pp., 8½ x 11 ins. Illustrated.

Nash Engineering Company, South Norwalk, Conn.

Bulletin 85. Booklet. 12 pp. 10¾ x 7½ ins. Illustrated in color. Describes construction and operation of the Jennings Return Line Vacuum Heating Pump.

Bulletin 87. Brochure. 8 pp. 10¾ x 7½ ins. Illustrated in color. Deals with Sizes T and U Jennings Vacuum Heating Pump for 2500 and 5000 square feet equivalent direct radiation.

Bulletin 63. Booklet. 4 pp. 10¾ x 7½ ins. Illustrated. Describes in detail the Unit Type Motor Driven Jennings Condensation Pump.

National Radiator Corporation, Johnstown, Pa.

Aero Radiators; Beauty and Worth. Catalog 34. Booklet, 6 x 9 ins., 20 pp., describing and illustrating radiators and accessories.

Six Great Companies Unite to Form a Great Corporation. Booklet, 28 pp., 8½ x 10½ ins. Illustrated. Valuable data on heating.

Prometheus Electric Corporation, 360 West 13th St., New York.

Electric Heating Specialties. Booklet, 24 pages. 8½ x 11 ins. Illustrated. Specialties for heating, cooking, hospitals, organ lofts, etc.

Rome Brass Radiator Corporation, 1 East 42nd Street, New York.

Proof of the Pudding. Booklet, 24 pp., 8½ x 10½ ins. Illustrated. Describes Robras, 20-20 concealed-within-the-walls, lightweight, all-brass radiators.

Within the Walls. Brochure, 16 pp., 4 x 9 ins. Illustrated. Gives facts regarding modern, out-of-sight, lightweight, Robras 20-20 radiators.

Engineering Data. Booklet, 16 pp., 8½ x 10½ ins. Illustrated. Full data and tables to facilitate selection and installation of Robras 20-20 concealed radiators for steam, water and vapor heating systems.

Small Bathrooms Made More Spacious, Brochure, 4 pp. Illustrated. Gives descriptions, sizes and prices of Robras lightweight cabinet radiators to be installed under wash basins.

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

Steam Heating Specialties. Booklet, 6 pp., 6 x 9 ins. Illustrated. Data on Sarco Packless Supply Valves and Radiator Traps for vacuum and vapor heating systems.

Equipment Steam Traps and Temperature Regulations. Booklet, 6 pp., 6 x 9 ins. Illustrated. Deals with Sarco Steam Traps for hospital, laundry and kitchen fixtures and the Sarco Self-contained Temperature Regulation for hot water service tanks.

Spencer Heater Co., Williamsport, Pa.

Catalog. Booklet, 20 pp., 6⅛ x 9 ins. Illustrated. Complete line of magazine feed cast iron sectional and steel tubular heaters.

The Fire that Burns Uphill. Brochure, 24 pp., 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."

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 7¼ ins., inside. Illustrated. Incinerator sanitation equipment for residence use.

A. I. A. File, 12 pp., 8¾ x 10¾ ins., inside. Suggestions for architect on incineration, showing installation and equipment.

Specialized Home Comforts Service Plan Book. 40 pp., 8½ x 11 ins., inside. Illustrated. A complete outline of the many advantages of incineration.

Blue Star Standards in Home Building. 16 pp., 5½ x 8½ ins., inside. Illustrated. Explaining fully the Blue Star principles, covering heat, incineration, refrigeration, etc.

Josam Mfg. Co., Michigan City, Ind.

Josam-Graver Incinerators. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Kerner Incinerator Company, 715 E. Water St., Milwaukee, Wis.

Incinerators (Chimney-fed). Catalog No. 15 (Architect and Builders' Edition). Size 8½ x 11 ins., 16 pp. Illustrated. Describes principles and design of Kernerator Chimney-fed Incinerators for residences, apartments, hospitals, schools, apartment hotels, clubs and other buildings. Shows all standard models and gives general information and working data.

Sanitary Elimination of Household Waste. Booklet, 4 x 9 ins. 16 pp. Illustrated. Gives complete information on the Kernerator for residences.

Garbage and Waste Disposal for Apartment Buildings. Folder, 8½ x 11 ins., 16 pp. Illustrated. Describes principle and design of Kernerator Chimney-fed Incinerator for apartments and gives list of buildings where it has been installed.

Sanitary Disposal of Waste in Hospitals. Booklet, 4 x 9 ins., 12 pp. Illustrated. Shows how this necessary part of hospital service is taken care of with the Kernerator. Gives list of hospitals where installed.

The Kernerator (Chimney-fed) Booklet. Catalog No. 17, 20 pp., 8½ x 11 ins. Illustrated. Data on a valuable detail of equipment.

INSULATION

Armstrong Cork & Insulation Co., Pittsburgh, Pa.

The Insulation of Roofs with Armstrong's Corkboard. Booklet. Illustrated. 7½ x 10½ ins., 32 pp. Discusses means of insulating roofs of manufacturing or commercial structures.

Insulation of Roofs to Prevent Condensation. Illustrated booklet, 7½ x 10½ ins., 36 pp. Gives full data on valuable line of roof insulation.

Filing Folder for Pipe Covering Data. Made in accordance with A. I. A. rules.

The Cork-lined House Makes a Comfortable Home. 5 x 7 ins. 32 pp. Illustrated.

Armstrong's Corkboard. Insulation for Walls and Roofs of Buildings. Booklet, 66 pp., 9½ x 11¾ ins. Illustrates and describes use of insulation for structural purposes.

National Lumber Manufacturers' Association, Transportation Building, Washington.

The Cost of Comfort. Booklet. 80 pp., 8½ x 11 ins. Illustrated. A handbook on the economies of dwelling insulation.

Structural Gypsum Corporation, Linden, N. J.

Heat Insulation Value of Gypsteel. Folder, 4 pp., 8½ x 11 ins. Brochure, by Charles L. Norton, of M. I. T.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 186*

JOISTS

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

Modern Concrete Reinforcement. Brochure, 32 pp., 8½ x 11 ins. Illustrated.

Construction Details for Installing Havemeyer Trusses. Data sheets, 8½ x 11 ins. Illustrated.

Standard Practice for Placing Havemeyer Reinforcement in Columns, Beams and Slabs. Data sheets, 8½ x 11 ins. Illustrated.

KITCHEN EQUIPMENT

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

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

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

Practical Planning for 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, 8¼ x 11¼ ins., 26 pp. Stone for laboratory equipment, shower partitions, stair treads, etc.

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

LANTERNS

Todhunter, 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

Milwaukee Corrugating Co., Milwaukee
The Milcor Manual. Booklet, 96 pp., 8½ x 11 ins. Illustrated. Data on metal lath and similar materials.

Milcor Metal Ceiling Catalog. Booklet, 288 pp., 8½ x 11 ins. Illustrated. Data on metal ceiling and wall construction.

National Steel Fabric Co., Pittsburgh, Pa.
Better Walls for Better Homes. Brochure, 16 pp., 7¾ x 11¼ ins. Illustrated. Metal lath, particularly for residences.

Steeltex for Floors. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Combined reinforcing and form for concrete or gypsum floors and roofs.

Steeltex Data Sheet No. 1. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for floors on steel joists with round top chords.

Steeltex Data Sheet No. 2. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for floors on steel joists with flat top flanges.

Steeltex Data Sheet No. 3. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for folders on wood joists.

North Western Expanded Metal Co., 1234 Old Colony Building, Chicago, Ill.
North Western Expanded Metal Products. Booklet, 8½ x 10¾ ins., 20 pp. Fully illustrated, and describes different products of this company, such as Kno-burn metal lath, 20th Century Corrugated. Plasta-saver and longspan lath channels, etc.

Longspan ¼-inch Rib Lath. Folder, 4 pp., 8½ x 11 ins. Illustrated. Deals with a new type of V-Rib expanded metal.

A. I. A. Sample Book. Bound volume, 8½ x 11 ins. Contains actual samples of several materials and complete data regarding their use.

Norwest Metal Lath. Folder, 8½ x 11 ins. Illustrated. Data on Flat Rib Lath.

Truscon Steel Company, Youngstown, Ohio.
Truscon ¼-inch Hy-Rib for Roofs, Floors and Walls. Booklet, 8½ x 11 ins., illustrating Truscon ¼-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, 3⅛ x 6 ins. Gives analysis, physical qualities, comparison of absorption with granite, opinions of authorities, etc.

Convincing proof. 3⅛ 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 188*

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

Hartmann-Sanders Company, 2155 Elston Ave., Chicago, Ill.
Column Catalog, 7½ x 10 ins., 48 pp. Illustrated. Contains prices on columns 6 to 36 ins. diameter, various designs and illustrations of columns and installations.

The Pergola Catalog. 7½ x 10 ins., 64 pp. Illustrated. Contains illustrations of pergola lattices, garden furniture in wood and cement, garden accessories.

Klein & Co., Inc., Henry, 11 East 37th St., New York, N. Y.
Two Driwood Interiors. Folder, 4 pp., 6¼ x 9 ins. Illustrated. Use of moulding for paneling walls.

A New Style in Interior Decoration. Folder, 4 pp., 6¼ x 9 ins. Illustrated. Deals with interior woodwork.

Driwood Period Mouldings in Ornamented Wood. Booklet, 28 pp., 8½ x 11 ins. Illustrated.

How Driwood Period Mouldings in Ornamented Wood Set a New Style in Decoration. Folder.

Roddis Lumber and Veneer Co., Marshfield, Wis.
Roddis Doors. Brochure, 24 pp., 5¼ x 8½ ins. Illustrated price list of doors for various types of buildings.

Roddis Doors, Catalog G. Booklet, 184 pp., 8½ x 11 ins. Completely covers the subject of doors for interior use.

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

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

MORTAR AND CEMENT COLORS

Clinton Metallic Paint Co., Clinton, N. Y.
Clinton Mortar Colors. Folder, 8½ x 11 ins., 4 pp. Illustrated in colors, gives full information concerning Clinton Mortar Colors with specific instructions for using them.

Color Card. 3¼ x 6½ ins. Illustrates in color the ten shades in which Clinton Mortar Colors are manufactured.

Something New in Stucco. Folder, 3½ x 6 ins. An interesting folder on the use of coloring matter for stucco coated walls.

ORNAMENTAL PLASTER

Jacobson & Co., 241 East 44th St., New York, N. Y.
A Book of Old English Designs. Brochure, 47 plates, 12 x 9 ins. Deals with a fine line of decorative plaster work.

Architectural and Decorative Ornaments. Cloth bound volume, 184 pp., 9 x 12 ins. 18 plates. Price, $3.00. A general catalog of fine plaster ornaments.

Geometrical ceilings. Booklet, 23 plates, 7 x 9 ins. An important work on decorative plaster ceilings.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

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

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book, 5½ x 3¾ ins., 100 pp. Gives directions and formulæ for painting various surfaces of wood, plaster, metals, etc., both interior and exterior.

Red Lead in Paste Form. Booklet. 6¼ x 3½ ins., 16 pp. Illustrated. Directions and formulæ for painting metals.

Came Lead. Booklet, 6 x 8¾ ins., 12 pp. Illustrated. Describes various styles of lead cames.

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

PAINTS, STAINS, VARNISHES AND WOOD FINISHES—Continued

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

PARTITIONS

Circle A. Products Corporation, New Castle, Ind.
Circle A. Partitions Sectional and Movable. Brochure. Illustrated. 8½ x 11¾ ins., 32 pp. Full data regarding an important line of partitions, along with Erection Instructions for partitions of three different types.

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

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

Henry Klein & Co., 25 Grand Street, Elmhurst, L. I., N. Y.
Telesco Partition. Catalog, 8¼ x 11 ins., 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.

Detailed Instructions for Erecting Telesco Partitions. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

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.)

U. S. Gypsum Co., Chicago, Ill.
Pyrobar Partition and Furring Tile. Booklet, 8¼ x 11 ins., 24 pp. Illustrated. Describes use and advantages of hollow tile for inner partitions.

PIPE

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

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

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

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

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 deaereating systems for eliminating or retarding corrosion in hot water supply lines.

"National" Bulletin No. 25. "National" Pipe in Large Buildings. 8½ x 11 ins., 88 pp. This bulletin contains 254 illustrations of prominent buildings of all types, containing "National" Pipe, and considerable engineering data of value to architects, engineers, etc.

Modern Welded Pipe. Book of 88 pp., 8½ x 11 ins., profusely illustrated with halftone and line engravings of the important operations in the manufacture of pipe.

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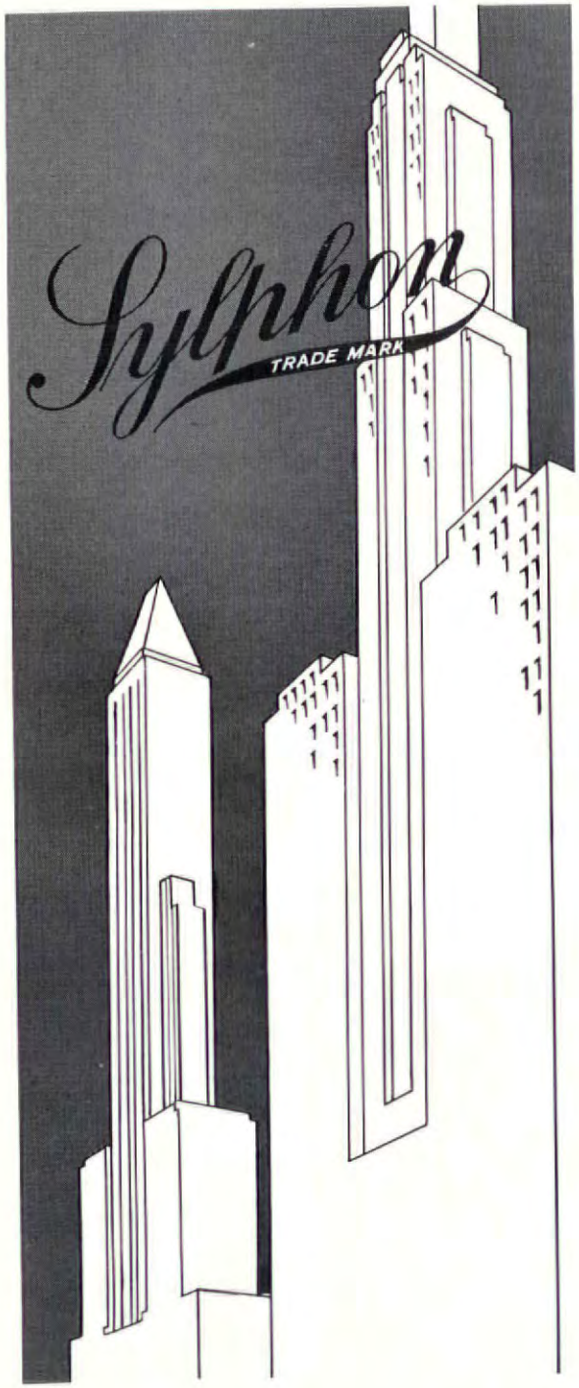

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Sylphon TRADE MARK

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 190*

PLASTER

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

PLUMBING EQUIPMENT

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

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

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

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

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

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

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

PNEUMATIC TUBE SYSTEMS

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

PUMPS

Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill.
Bulletin E. 7¾ x 10¼ ins., 32 pp. Illustrated. Catalog. Complete descriptions, with all necessary data, on Standard Service Pumps, Indian Brand Pneumatic Tanks, and Complete Water Systems, as installed by Kewanee Private Utilities Co.

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, 3¼ x 8 ins., 16 pp. Complete data on an important type of pump.

RAMPS

Auto Ramps Corporation. Builders' Exchange, Richmond, Va.
The Double Spiral Auto Ramp. Brochure, 8½ x 11 ins. Illustrated. Data on a valuable type of equipment.

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

REFRIGERATION

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

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

REINFORCED CONCRETE—See also Construction, Concrete

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

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

RESTAURANT EQUIPMENT

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

ROOFING

The Barrett Company, 40 Rector St., New York City.
Architects' and Engineers' Built-up Roofing Reference Series; Volume IV Roof Drainage System. Brochure, 64 pp., 8½ x 11¼ ins. Gives complete data and specifications for many details of roofing.

Federal Cement Tile Co., 608 S. Dearborn Street, Chicago.
Catalog and Roof Standards. Booklet, 36 pp. 8½ x 11 ins. Illustrated. Describes Featherweight Concrete Insulating Roof Slabs, including complete data, weights and dimensions, specifications and detail drawings. Also includes complete information on Featherweight Nailing Concrete Roof Slabs for use with ornamental slate or copper covering. The catalog is profusely illustrated and contains also a partial list of users.
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., 8½ x 11 ins. Illustrated. Floor tiling adapted from that of Davanzati Palace.
Mission Tile. Leaflet, 8½ x 11 ins. Illustrated. Tile such as are used in Italy and Southern California.
Georgian Tile. Leaflet, 8½ x 11 ins. Illustrated. Tiling as used in old English and French farmhouses.

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

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

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

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

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

SCHOOL EQUIPMENT

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

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. 7¾ x 10¼ ins., 40 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

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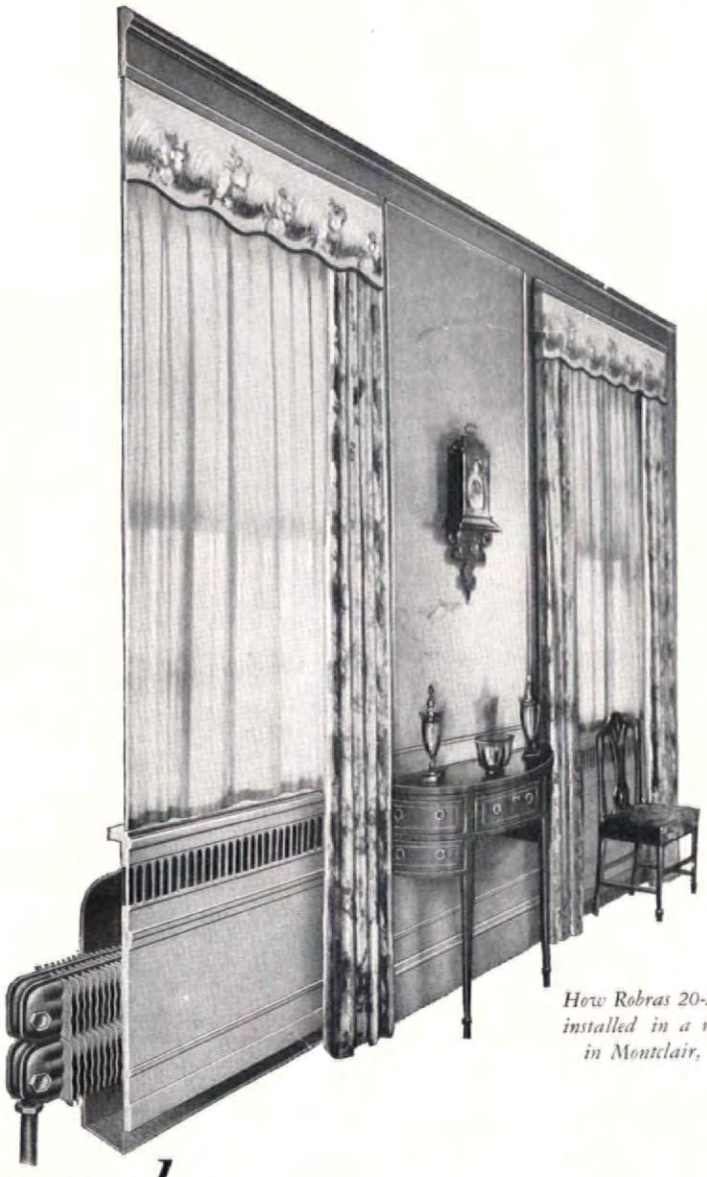

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ROME BRASS RADIATOR CORPORATION, ONE EAST FORTY-SECOND STREET, NEW YORK, N Y.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 194*

SEWAGE DISPOSAL—Continued

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

SCREENS

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

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

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.

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.

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.
Present Day Schools. 8½ x 11 ins., 32 pp. Illustrating 42 examples of school architecture with article upon school building design by James O. Betelle, A. I. A.
Better Banks. 8½ x 11 ins., 32 pp. Illustrating many banking buildings in terra cotta with an article on its use in bank design by Alfred C. Bossom, Architect.

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

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

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

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.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 51. General Catalog. Illustrated. Describes the complete line of the Crane Co.

C. A. Dunham Co., 450 East Ohio St., Chicago, Ill.
The Dunham Packless Radiator Valve. Brochure, 12 pp., 8 x 11 ins. Illustrated. Data on an important type of valve.

Jenkins Brothers, 80 White Street, New York.
Office Buildings Yesterday and Today. Folder, 8½ x 11 ins. Illustrated. Valves for use in office buildings.

VENETIAN BLINDS

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

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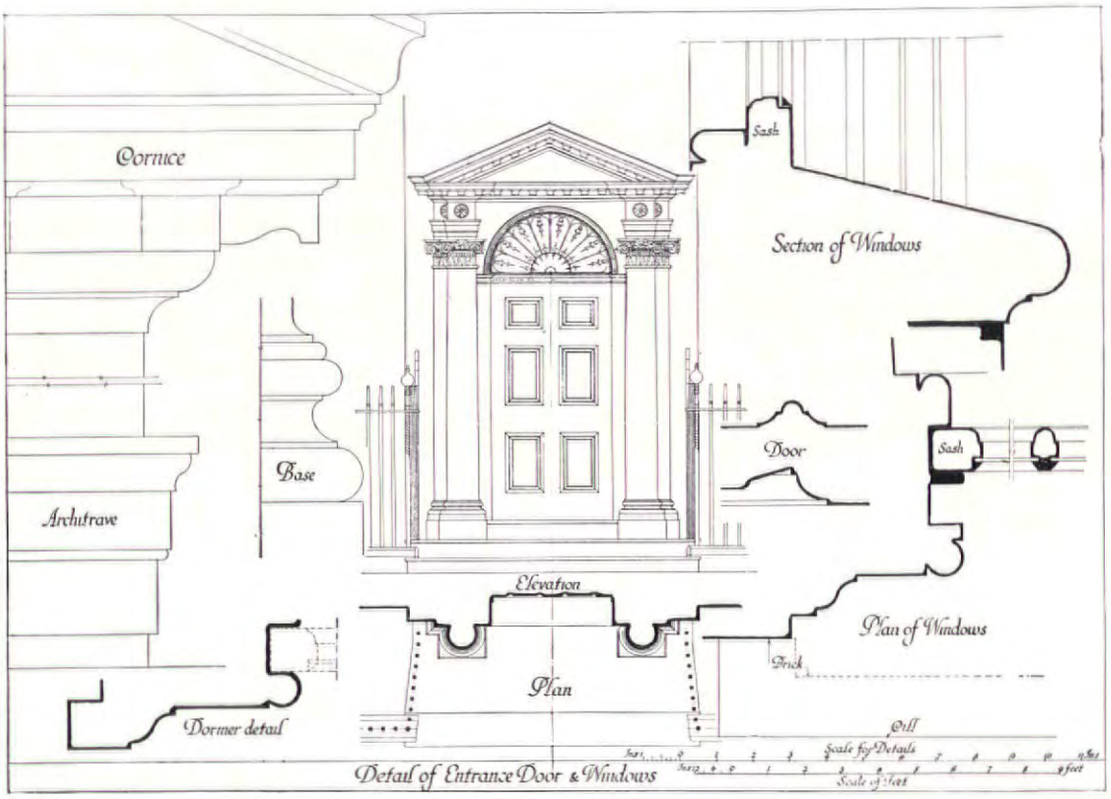

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POWDER FOR
ALUMINUM PAINT

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 194*

VENTILATION

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

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

WATERPROOFING

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

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

Sommers & Co., Ltd., 342 Madison Ave., New York, N. Y.
"Permantile Liquid Waterproofing" for making concrete and cement mortar permanently impervious to water. Also circulars on floor treatments and cement colors. Complete data and specifications. Sent upon request to architects using business stationery. Circular size, 8½ x 11 ins.

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

WEATHER STRIPS

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

WINDOWS

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.
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.

WINDOWS, CASEMENT—Continued

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.

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

WOOD FINISH

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

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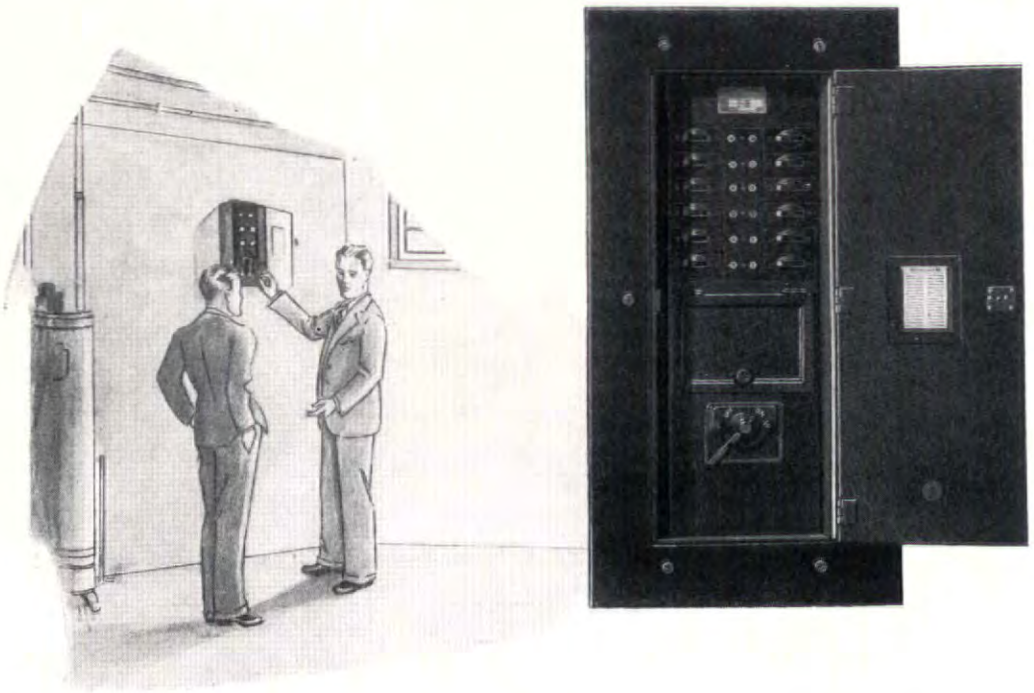

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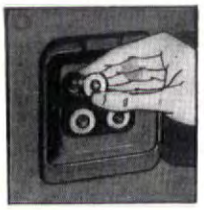
In tampering with the panelboard he tampers with your reputation. The protection to the wiring is destroyed . . . the fire hazard increased. But who knows it . . . until a mysterious fire brings the engines clanging down the street?

Westinghouse Nofuz panelboards reduce fire hazard to a minimum. The circuit breaker which protects the branch circuits cannot be tampered with. It cannot be closed against an abnormal overload or short circuit. Its calibration cannot be altered nor its action blocked. And it is easy to re-close.

Have the Westinghouse panelboard specialist show you a sample breaker. The residences, large buildings and industrial plants you design will have a new fire insurance with this panelboard.



Ends tampering with fuses

No fuse replacement hazards

Eliminates service calls

WESTINGHOUSE ELECTRIC & MFG. COMPANY
BROOKLYN WORKS BROOKLYN, N. Y.
SALES OFFICES AND SERVICE SHOPS IN ALL PRINCIPAL CITIES

Westinghouse

T 30969

A corner of The Kinnear Manufacturing Company's Engineering Department.

Take Advantage of Kinnear's Complete Engineering Service

No matter how apparently simple or obviously complex your rolling door problems—you can conserve your time and play absolutely safe by putting them up to "Rolling Door Headquarters" for speedy, accurate solution.

For over thirty years our activities have been concentrated exclusively on designing, producing and improving steel rolling doors for every conceivable type of installation. Therefore, it is but natural and logical that Kinnear Specification Doors will be *right* from every standpoint.

The great majority of America's architects and contractors know from experience that Kinnear Rolling Doors never fail to render complete satisfaction to the building owner—and thus aid materially in safeguarding their most valued asset—REPUTATION.

The benefit of our experience in "engineering" rolling doors is available without charge or obligation. New, illustrated catalog mailed free on request.

THE KINNEAR MANUFACTURING CO.

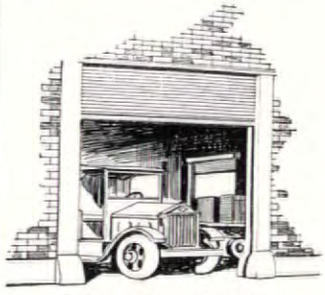
400-440 Field Avenue, Columbus, Ohio, U. S. A.

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

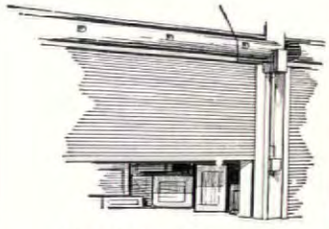
KINNEAR ROLLING DOORS

There *IS* No Equal

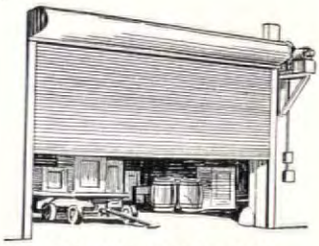
KINNEAR Makes Every Type of ROLLING DOOR



SERVICE DOORS



FIRE DOORS *and* FIRE SHUTTERS



MOTOR OPERATED DOORS

Two Important Announcements

Of Vital Interest To The Entire Plumbing Industry

Majestic Flush Valve
Diaphragm Type

Majestic Flush Valve
Medium-Priced
Diaphragm Type

FOLLOWING the motto of "Buick," a member of the General Motors family, for whom we have great respect, "When better flush valves are made the Imperial Brass Mfg. Company will make them."

We were the first to bring out an art design flush valve, and the original Watrous flush valve, as made for many years by us, has always contained a simple mechanism for regulating the amount of water used for flushing, and an efficient self-cleansing by-pass feature. Competitors have recently, but ineffectually, sought to incorporate these two vitally important features in their products.

We now offer the new Majestic flush valve, illustrated herewith, frankly presented for competitive purposes. But we wish to emphasize the fact that ingenuity born of over forty years' experience in brass manufacturing has enabled us to produce this new valve in the time-proven successful diaphragm-type; it has the same efficient regulating and self-cleansing features as the original flush valve, without resorting to piston or plunger mechanism for the purpose of reducing the cost. Piston or plunger-type valves have been on and off the market for the past twenty-five years, and have yet to be recognized by engineers or architects as the proper principle for flush valve design.

The Imperial Brass Mfg. Company enjoys the highest commercial rating in Dun and Bradstreet and all Imperial products are backed by an unqualified guarantee of satisfactory operation.

Chromium Plating

Since the first inception of the process of chromium plating we have continually experimented until today we are leaders in making quality chromium plate.

We have never been forced to issue a bulletin stating that we would not be responsible for the durability of our chromium plate. We firmly believe that this is the most durable finish for plumbing fixtures. We now announce that we are furnishing chromium plate finish for all types of our flush valves at *the same price* as nickel plate finish.

THE IMPERIAL BRASS MANUFACTURING CO.

1219 WEST HARRISON STREET CHICAGO, ILL.

BRANCH SALES OFFICES IN ALL PRINCIPAL CITIES

Bayley Windows *in* Power Houses

Pivoted Windows Screened
Pivots exclusive to this window are located at center of ventilator. Friction adjusters hold ventilator securely and horizontal bar provides close fitting screen contacts.

Pivoted Windows
Design of sections assures strength and low cost of maintenance. No sharp edges to encourage corrosion. No ledges to collect dirt and moisture.

EXCLUSIVE features of design . . . sturdy construction . . . great durability . . . attractive appearance . . . proven economy! This combination accounts for the large use of Bayley Pivoted Windows Screened, as well as Bayley Pivoted Windows, in the Power Industry . . . and in many other leading industries.

They not only keep out the swarms of flying insects that are attracted by brilliantly lighted interiors in power houses, water works and other plants operated day and night, and give screen protection to sensitive electrical equipment and intricate processes of water purification . . . but, in addition, ventilators operate without movement of screens or flexing of screen contacts and are held firmly in any position they are placed.

They are the evolution of more than 20 years of intensive engineering study and are not ordinary pivoted windows with screens merely attached. Ventilators and screens are built as a single unit, yet screens are easily removable without use of tools for cleaning or winter storage. As in all Bayley windows, sections are 1½" deep for extra strength and durability. Bayley quantity production reduces first cost, Bayley design reduces maintenance expense.

Bayley offers 49 years of engineering experience, without cost or obligation, in preparing plans and specifications. Call the nearest district office. Illustrated literature on Bayley Steel Windows will be sent on request. The William Bayley Co., 147 North St., Springfield, Ohio.

TYPICAL INSTALLATIONS OF BAYLEY WINDOWS

Gulf States Utilities Co.
Beaumont, Texas

Northern States Power Co.
(High Bridge Sta.) St. Paul, Minn.

State of New York Power Plant
Poughkeepsie, N. Y.

Virginia Polytechnic Institute
Blackburg, Va.

Dayton Power & Light Co.
Dayton, Ohio

The Bettendorf Co. Power House
Bettendorf, Iowa

Corn Products Refining Co.
Pekin, Ill.

Reynolds Tobacco Co.
Greensboro, N. C.

Wellesley College
Wellesley, Mass.

Allegheny County Heating Co.
Pittsburgh, Pa.

Columbus Power & Light Co.
Columbus, Ohio

Lynn Gas & Electric Co.
Lynn, Mass.

Montaup Electric Co.
Somerset, Mass.

Hartford Electric Co.
Hartford, Conn.

Columbus Electric & Power Co.
Bartletts Ferry, Ga.

Northern Indiana Power Co.
Kokomo, Ind.

City of Rockville Center
Rockville Center, L. I.

Appalachian Electric Power Co.
Glenn Lynn, Va.

Connecticut Light & Power Co.
Devon, Conn.

Western States G. & E. Co.
Placerville, Calif.

Ohio Edison
Springfield, Ohio

Bayley Pivoted Windows Screened and Bayley Pivoted Windows are widely used in leading American industries, including that of Dairying, Candy, Bakery, Milling, Printing, Publishing, Textile, Warehousing, Retail Stores, Electrical Manufacturing, as well as Hospitals, Institutions and Public Buildings.

BAYLEY
STEEL WINDOWS & DOORS

District Offices

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Boston, 5 Park St.
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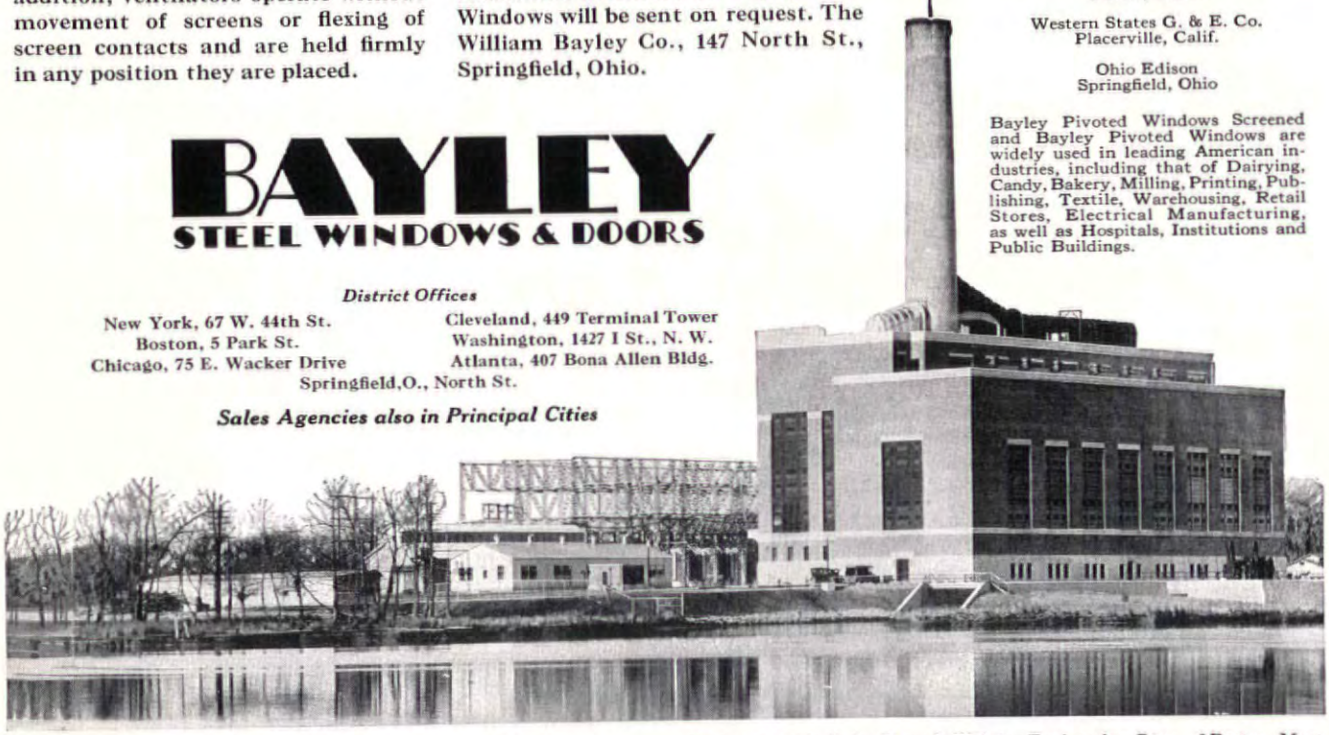


Neches Power Station, Gulf States Utilities Co., Beaumont, Texas.

Designed and built by Stone & Webster Engineering Corp. of Boston, Mass.

Cambridge Court, Flushing, L. I.
Rosario Candela, Architect
Ratsler Heating Co., Heating Contractors

Equipped with SARCO Radiator Traps

WHAT a lot of little things are required to make a building give satisfaction, and the sort of luxury that shows right planning!

The SARCO Radiator Trap is one of them. Great big, expensive steam system—and yet how well it works depends much on whether the traps are ornaments or well-trained traffic cops.

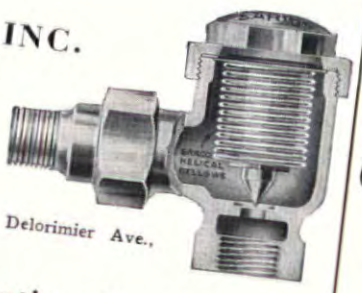
Architects, engineers and contractors have been pretty kind to SARCO Radiator Traps; seem to like them, specify them and install them on all sorts of fine, important-looking jobs. Suspect it is because SARCOS have always justified the confidence placed in them. And here's why.

Long life of efficiency, because expansion element is stressed less than in common constructions. Wide open movement of valve discharges freely. No steam or vapor can enter the return. Maximum closing pressure, perfect seating insure a positively tight valve. Won't air bind, water hammer, or freeze. Maybe a few other things. Anyway, our catalog will tell you and you ought to have one. It will come if you call it. Mail the coupon.

SARCO CO., INC.

183 Madison Avenue,
New York, N. Y.

Boston, Buffalo, Chicago, Cleveland, Detroit, Philadelphia, Pittsburgh, St. Louis
Sarco (Canada) Limited, 1605 Delorimier Ave., Montreal



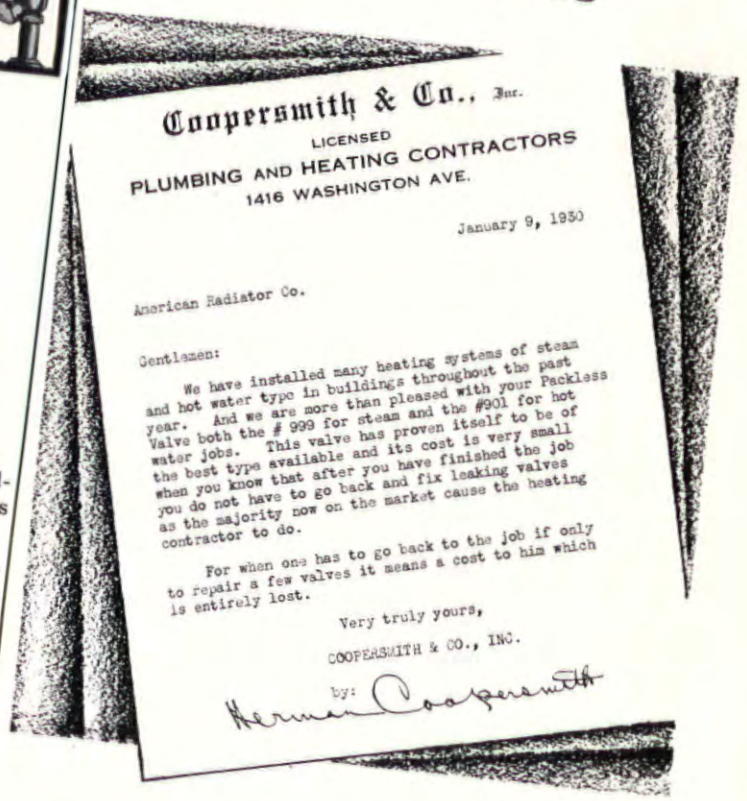
A GOOD Heating System

Sarco Co., Inc.,
183 Madison Ave., New York

Without any obligation on our part, you may send a copy of your Booklet AK-75.

Name.....
Address.....
City..... State.....

"You DON'T have to GO BACK to FIX LEAKING VALVES"



Coopersmith & Co., Inc.
LICENSED
PLUMBING AND HEATING CONTRACTORS
1416 WASHINGTON AVE.

January 9, 1930

American Radiator Co.

Gentlemen:

We have installed many heating systems of steam and hot water type in buildings throughout the past year. And we are more than pleased with your Packless Valve both the # 999 for steam and the #901 for hot water jobs. This valve has proven itself to be of the best type available and its cost is very small when you know that after you have finished the job you do not have to go back and fix leaking valves as the majority now on the market cause the heating contractor to do.

For when one has to go back to the job if only to repair a few valves it means a cost to him which is entirely lost.

Very truly yours,

COOPERSMITH & CO., INC.

by: Herman Coopersmith

ARCO PACKLESS VALVES are handsome in appearance, last indefinitely, open with one smooth turn and insure owners against damage from leaks. They require no repacking so they cost less than the old style valves that make a return trip necessary.

STANDARDIZE ON ARCO PACKLESS

No. 999 for Steam
No. 901 for Water
A complete line of Packless Valves for steam, water, vapor or vacuum. Made in Angle, Corner, Globe and Gate patterns.

No. 901
Equalizing Arco Packless

AMERICAN RADIATOR COMPANY
Makers of a complete line of guaranteed heating accessories

Let the Ladies have their 76°

—the Men their 69°

Now — room-by-room temperature control

Modern woman's scanty raiment brings the need for more heat in homes than is comfortable for wool-clothed men. Today a uniform temperature throughout the house cannot satisfy every member of the family.

Heating engineers have kept pace with Paris couturieres. They have made it possible to deliver to each room as much or as little heat as its occupants desire, without effect on other rooms. They have developed the modern heating system; the system with room-by-room temperature control; Hoffman Controlled Heat.

In homes equipped with Hoffman Controlled Heat, the touch of a finger on the lever handle of the radiator valve commands that radiator to deliver full heat, three-quarters, half, one-quarter or none at all. Action is sure and prompt.

Heat is generated only as the call for heat increases. Thus there is no waste. Operated under low pressure (4 to 6 ounces heats large homes) fuel costs are drastically low.

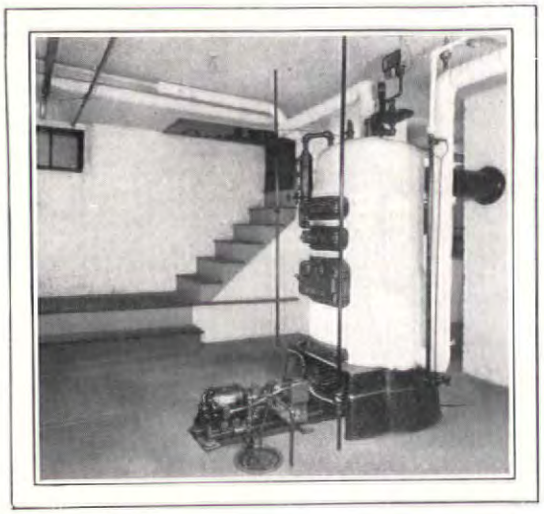
It doesn't matter what standard boiler and radiators you select. It doesn't matter whether you use oil, gas or coal as fuel. You can add the equipment that makes it a Hoffman Controlled Heat system. This equipment comprises (1) Hoffman Modulating Valves and Return Line Valves for radiators; (2) the accurate Hoffman Damper Regulator; (3) the Hoffman Differential Loop, and (4) the Main Vent. When properly installed, the system is guaranteed by a conscientious maker, to operate for years as promised in this advertisement.

For every residence, apartment house, office building, hotel or hospital, the comforts of Hoffman Controlled Heat may be provided. We have published an interesting catalog which tells the entire story. May we send you a copy? Address Hoffman Specialty Co., Inc., Dept. EF-16, Waterbury, Conn.

Tell your clients: "Swing the lever handle of this little valve, and command the radiator to deliver (quickly) as much or as little heat as you desire, without effect on other rooms."

HOFFMAN CONTROLLED HEAT

See pages D-4815 to 4874, 1930 Sweet's



The Hardinge

was intended for

medium-priced *homes*

MANY architects think that because the Hardinge Fuel Oil Burner is so widely used in homes of wealth, it must necessarily be an expensive device. That is a mistake. The Hardinge compares in price with any good oil burner. Its exceptional staunchness and economy therefore recommend it for bungalows even as its dependableness has won it a place where price is not a first consideration.

Nothing can be said here about the Hardinge which has not already been said about other good oil burners. The difference is in degree rather than kind. You see this in the weight of castings, the careful machine work, the combustion principle which anticipates any coming changes in fuel oil composition as oil refining advances.

The Hardinge is recommended to you with the knowledge that your reputation, in turn, depends to some degree upon the equipment you recommend to your clients. Would you like to have all the Hardinge details? Ask, then, for the Hardinge working data, if you please. Hardinge Bros., Inc., 4149 Ravenswood Avenue, Chicago, Illinois.

HARDINGE

Fuel Oil Burners

Why use 12 feet of pipe when 9 will do the job?

No capable steam-fitter will cut a twelve-foot pipe to reach from the floor to a nine foot ceiling.

The expert workman takes a foot rule, measures the distance, and cuts the pipe to fit the space where it is to go.

No allowance need be made for variation in the "foot" that measures pipe and space. Two things are always equal if they equal the same thing.

In determining boiler capacities, as in measuring lengths, certain definite standards must be observed. Yet architects have known that boiler ratings as established by some manufacturers have not always observed these standards, in so far as the actual published "commercial rating" is concerned.

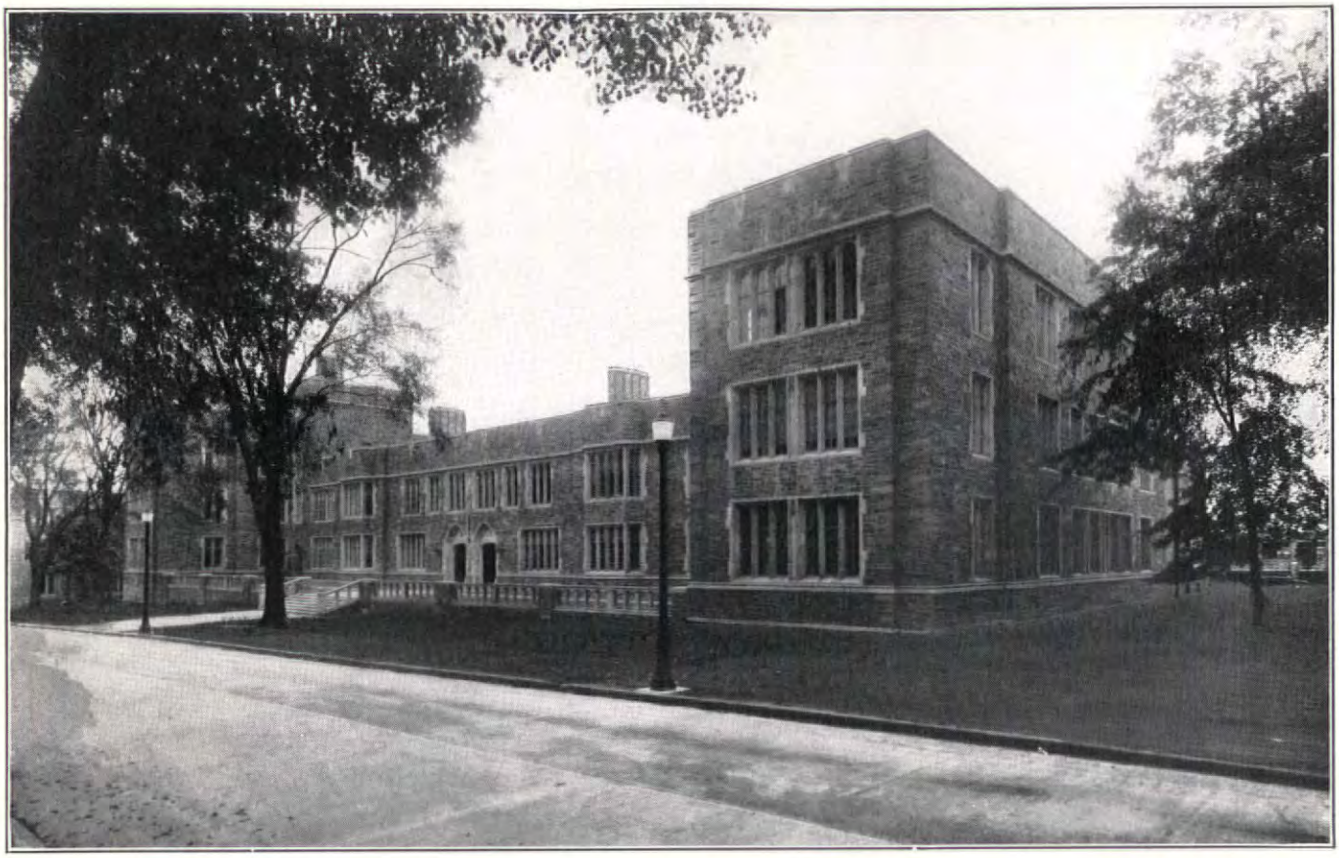
Commercial ratings have sometimes meant that a twelve hundred foot boiler had an actual capacity of eleven, ten and even as low as six hundred feet. What some boilers will do in actual practice, you can learn only by experience and observation. That is why architects are often obliged to specify a larger boiler than the actual boiler tax seems to require.

With the Spencer, the architect need look no further than the catalog. Spencer capacities are guaranteed—and they are given in the actual square feet of direct cast iron column radiation, or its equivalent, with allowance already made for peak loads and covered mains, risers and returns.

In comparing the price of the Spencer with other boilers, remember this: Compare the price of the Spencer with a capacity to match the total boiler tax in the building with the cost of another boiler that requires you to make an allowance for over-rating.

The first cost of a Spencer is little more than other boilers of the same actual capacity. Yet is a quality, precision-made boiler, and it quickly saves its entire cost by burning small size, low price fuels. Spencer Heater Company, Williamsport, Pa.

SPENCER
Magazine Feed
HEATERS
for steam, vapor or hot water



The Chemical Laboratory—Princeton University

KNIGHT-WARE Equipped . . .

Installation	Architects & Engineers
PRINCETON UNIVERSITY Chemistry Building Princeton, N. J.	*C. Z. Klauder* *L. T. Klauder* *Philadelphia, Pa.*
COLUMBIA UNIVERSITY Chemistry Building New York City	*McKim, Meade & White* *New York City*
COLUMBIA PRESBYTERIAN Hospital Centre New York City	*James Gamble Rogers* *New York City*
WEST VIRGINIA UNIVERSITY Hall of Chemistry Morgantown, W. Va.	*Davis, Dunlap & Barney* *Philadelphia, Pa.*
OHIO STATE UNIVERSITY Chemistry Building Columbus, Ohio	*Jos. N. Bradford* *Columbus, Ohio*
JOHNS HOPKINS UNIVERSITY Chemistry Building Baltimore, Md.	*Carerre & Hastings* *New York City*
JOHNS HOPKINS UNIVERSITY Hygiene Building Baltimore, Md.	
JOHNS HOPKINS UNIVERSITY Physiology Building Baltimore, Md.	*Archer & Allen* *C. L. Reeder* *Baltimore, Md.*
DUKE UNIVERSITY Chemistry Building Durham, N. C.	*Horace Trumbauer* *Philadelphia, Pa.*
McGILL UNIVERSITY Pulp & Paper Research Bldg. Montreal, Que.	*Nobbs & Hyde* *Montreal, Que.*
BATTELLE MEMORIAL Chemistry Laboratory Columbus, Ohio	*Otto C. Darst* *Columbus, Ohio.*
*PENN STATE COLLEGE Chemistry Building State College, Pa.	*C. Z. Klauder* *L. T. Kauder* *Philadelphia, Pa.*
*LAFAYETTE COLLEGE Mining Engineering Hall Easton, Pa.	*C. Z. Klauder* *L. T. Klauder* *Philadelphia, Pa.*
*PURDUE UNIVERSITY Pharmacy Building Lafayette, Ind.	*Walter Scholer* *Lafayette, Ind.*
*PURDUE UNIVERSITY Chemistry Building Lafayette, Ind.	*Walter Scholer* *Lafayette, Ind.*
WASHINGTON UNIVERSITY Biology Building St. Louis, Mo.	*Jamieson & Spearl* *St. Louis, Mo.*

*Buildings under construction and KNIGHT-WARE being supplied.

THE paramount consideration in the selection of equipment for conducting acids, corrosives and corrosive gases from the modern Chemical Laboratory is *safety*. *Safety* with *economy* is especially desirable and that, no doubt, is why KNIGHT-WARE was included in the specifications for the new Chemical Laboratory at Princeton.

Here all *Waste* and *Drain Lines, Ventilating Ducts* and *Acid Sumps* were of KNIGHT-WARE—over 16 carloads in all being used.

A survey of the list at the left will convince you that ours has been a very broad experience in acid proof laboratory equipment. This experience and knowledge is yours for the asking. May we serve you?

MAURICE A. KNIGHT

OFFICE AND PLANT
AKRON, OHIO

GUARANTEED SATISFACTORY — KNIGHT-WARE — "IT IS THE BODY ITSELF" — ACID-PROOF CHEMICAL STONEWARE

The Sign of Quality
In Acid Proof Chemical Stoneware

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Montreal, Que.
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Main 2625

Architects are using this consultation service

—for the formulation of heating plans and specifications

KNOW ELECTROL BY THE HOMES IT HEATS
Home at 111 South Delancey Place, Atlantic City, N. J.

FIRST at New York and now throughout the whole country, architects in increasing numbers are making use of the Electrol consultation service.

Architects who know Electrol performance employ this consultation service with the same confidence that prompts them to recommend the Electrol burner to their clients.

They have found welcome and trustworthy help from Electrol's staff of engineers. These experts devote their entire time to the formulation of heating plans and specifications from information sent us by architects.

Electrol welcomes the opportunity to put this complimentary service at your disposal—just as Electrol welcomes its responsibility to the architects of America who know and recommend Electrol Automatic Oil Heat.

To avail yourself of this consultation service, write to the address below. —Or, better still, talk over your immediate heating problems with the Electrol representative in your city, and let him enlist the aid of Electrol's engineers for you.

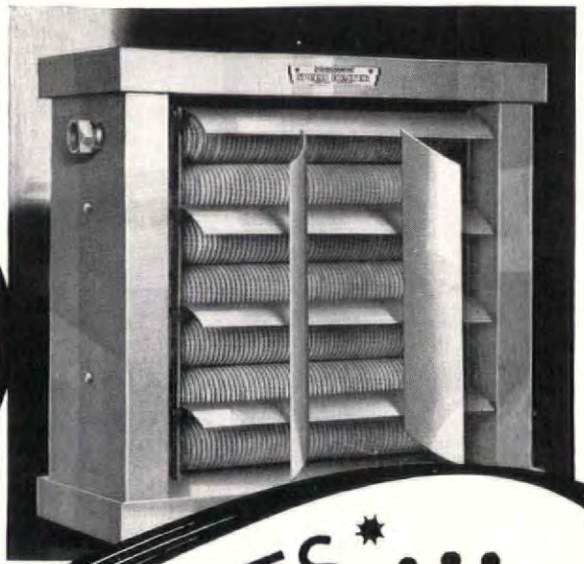
ELECTROL INCORPORATED
227 East 45th Street New York City

ELECTROL

The OIL BURNER *with the Master Control*

LISTED AS STANDARD BY THE UNDERWRITERS' LABORATORIES

MEMBER
OIL HEATING
INSTITUTE



THE PERTINENT FACTS*...

*This advertisement was suggested by a prominent Architect.

...about SPEED HEATERS

"As many useful facts as possible... all the data and no drama"...

SPEED HEATERS are suspended electric blower-type steam heaters for industrial and commercial applications. Very rapid action. May be thermostatically controlled. Extremely economical in first cost and operation.

"Facts, with the least insulation possible"...

SPEED HEATERS have two operating speeds. High speed for quick heating. Low speed for maintaining set temperature. All models equipped with high pressure Aerofin... for steam pressures up to 350 lbs. Vertical louvres spread air stream over wide area. Units are very quiet.

Sturtevant men are in principal cities ready to figure on short notice. Our "blue" catalog contains complete working data for Architects and Engineers. Copies distributed by our local offices. The coupon awaits your pencil.

THE PRICE IS WAY DOWN

COUPON

B. F. STURTEVANT CO.
Hyde Park, Boston, Mass.

Kindly send me a copy of the SPEED HEATER DATA BOOK.

Name of Company.....

Street Address.....

City..... *State*.....

B. F. STURTEVANT COMPANY

Plants and Offices at: Berkeley, Cal. · Camden, N. J. · Framingham, Mass. Galt, Ontario · Hyde Park, Mass. · Sturtevant, Wis.

Branch Offices at: Atlanta; Boston; Buffalo; Camden; Charlotte; Chicago; Cincinnati; Cleveland; Dallas; Denver; Detroit; Hartford; Indianapolis; Kansas City; Los Angeles; Milwaukee; Minneapolis; Newark; New York; Omaha; Pittsburgh; Portland; Rochester; St. Louis; San Francisco; Seattle; Washington, D. C. *Canadian Offices at:* Toronto; Montreal and Galt. · *Canadian Representatives:* Kipp Kelly, Ltd., Winnipeg

Also Agents in Principal Foreign Countries

Sturtevant
(REG. U. S. PAT. OFF.)

SPEED HEATERS
"More Heat Less Steam"

REVIEWS OF MANUFACTURERS' PUBLICATIONS

DETROIT STEEL PRODUCTS COMPANY, Detroit. "Industrial Airation by the Fenestra Method."

Two means are available for ventilating a building,—use of mechanical systems and natural forces. Since mechanical ventilating details such as blowers, fans, roof ventilators, etc., mean extra expense, every building should be so designed as to properly utilize its windows which are necessary for daylighting anyway, and usually they can be made to accomplish the airation of the building as well. Ventilation really means the removal of used or polluted air from the zone of occupation, and its replacement by fresh air. The effectiveness with which this work is done, usually is expressed in cubic feet of air flow per minute or number of air changes in the building per hour. In buildings designed to shelter many people in a state of comparative rest,—churches, theaters, schools, etc,—from 1,200 to 2,000 cubic feet of fresh air per hour would not be harmful or uncomfortable if no objectionable drafts were created. For years the Detroit Steel Products Co. has been consulted by architects and engineers about problems of daylighting and airation in industrial buildings. Seven years ago, in order to answer such queries more adequately, they established contact with the Department of Engineering Research of the University of Michigan. Combined laboratory work and field surveys have been carried on ever since, and the results obtained from these two sources are so nearly identical as to establish the accuracy of the methods used. This interesting catalog, issued by the Detroit Steel Products Co., refers, as was said before, to mechanical systems and natural forces for industrial airation. Through illustrations and tabulations, one will no doubt find this brochure interesting.

EDISON LAMP WORKS, GENERAL ELECTRIC CO., Harrison, N. J. "Luminous Harmony in the Home."

Luminous harmony for the home is the latest note in interior decoration. Volumes have been written on the subject of home lighting, and thousands of hours have been spent in describing ways and means of securing successful decorative effects. There are thousands of fixtures on the market which will give satisfactory lighting, but still there are too many which have the sameness and lack of individuality for avoiding which the progressive architect should strive. Let us say that the house is adequately wired, that we may place any type of luminaire where we desire, and we may now begin to examine those little new touches which take our homes from the ordinary class and give them that personality and charm which are so distinguishing. In the kitchen, for instance, we need plenty of light for cooking and other household duties, and we obtain this with the so-called kitchen unit. In the dining room one's idea of luxury is met with cove lighting, for with it the housewife can use the candles which so delight her, and at the same time the man of the house, who likes to see his food, is provided with an adequate intensity of well diffused lighting. From the dining room to the living room more problems arise in choosing correct lighting than anywhere else in the home. This is due to the multiplicity of uses for which the modern living room serves. A generation ago in any pretentious house, there were at least three, and possibly four rooms,—the salon or parlor, the library, the music room and the smoking room or lounge. Now, due to changes in our habits, living conditions, the servant problem and the like, the living room has to serve for various uses which were formerly split up among several rooms. To meet all these demands the lighting must indeed be flexible. When we are listening to music,—radio, phonograph, piano, or vocal,—we are much more at ease, more comfortable, and better contented with a very low intensity of general lighting. The idea of using light for ornament originated in France, and French artists and designers, with their taste and skill, have developed many interesting varieties. These have long been available through some of the better class shops, but within the last few years American manufacturers have visualized possibilities in this field and more and more ornaments of domestic manufacture are constantly becoming available. The ornaments illustrated in this booklet are products of both France and America. Every page of this booklet, published by the Edison firm, is interesting and very valuable to architects.

U. S. GYPSUM COMPANY, 300 West Adams Street, Chicago. "The Red Book of Building Materials."

To keep its great variety of excellent building materials before architects, specification writers and builders, and then to make sure that the materials are properly used by superintendents and workmen, the United States Gypsum Company has prepared and issued this brochure. Here there are presented "in concise form a detailed description of the building materials of the company's manufacture. In addition there are estimated covering capacities, complete specifications and engineering details of special value to architects, engineers, contractors and builders, material dealers, and the building trades. A unique feature is a section devoted to the prevention and correction of plaster troubles. On pages 1 to 35 there are described the company's gypsum plasters and white and colored plaster finishes, finishing and mason's lime, exterior stucco base coat and colored finishes, gypsum lath, metal lath, insulating lath, gypsum wallboard and tile board, sheathing materials of both gypsum and fiber, plastic paints, limeproof colors, and insulation boards and fills. Beginning on page 36 there will be found descriptions of the company's fireproofing materials, gypsum partition tile, column and beam fireproofing, gypsum floor and roof materials and systems; also a sound-insulation system, and plaster and tile for acoustical correction. All materials and systems, with the exception of the poured floor and roof system and the acoustical tile, are sold on a unit basis. On all materials described in this second section, except acoustical plaster, the company offers a contracting service." The booklet lists one one page the sales offices which the firm maintains in the centers of population from the Atlantic to the Pacific.

L. SONNEBORN SONS, INC., 114 Fifth Avenue, New York. "Data and Specifications on Re-surfacing Floors."

Quite lately this well known house has issued a set of sheets giving data on its various materials and specifications for their proper use, these sheets being produced in accordance with the recommendations of the American Institute of Architects, each sheet enclosed in a folder labeled to be fitted into the files of any office which follows the use suggested by the Institute. This particular sheet deals with "Sonomend, For Patching, Repairing and Re-surfacing Floors." "Sonomend is a water miscible bituminous material which is mixed with sand and cement, then spread over the floors, wood or brick, to form a tough, elastic surface which can be walked or trucked on and which, when dry, is water-proof, acid-proof and alkali-proof. It adheres to the original surfaces firmly and does not peel or crack. When Sonomend is mixed with Portland cement, sand and water, it produces a plastic concrete, the strength and hardness of which can be regulated in mixing. Sonomend concrete is very adhesive to surfaces of all kinds. It is a superior article for lining tanks, for acid-proofing floors or walls, battery boxes, etc., or for repairing and waterproofing cracks in floors. *Floor Treatment.* Concrete floors which have worn into holes and ruts cannot be successfully patched or re-surfaced with ordinary Portland cement mixtures or patented cements, because such mixtures in drying will shrink and break away from the old surface, and the bond between the old and new concrete will be destroyed. This causes patches to quickly break again. On wood floors the boards separate with age, the edges splinter, and the surface becomes rough under traffic. By using Sonomend there is no need to tear up the old floor or to chisel holes. The complete operation can be finished the same day; floors can be used in 24 hours, and will stand trucking after 48 hours. *Shades.* When this material is mixed with cement and sand, the resulting concrete can be made either black, gray or the natural color of the concrete. Sonomend is furnished only in black, and is not made in colors. *Colors.* Sonomend concrete can be coated with our Transparent Cement Filler for dustproofing, or with cement filler in colors for decoration. *Packages.* Shipment is made in drums, half drums and pails, and it is kept in stock for immediate delivery." The inside front cover of the folder lists the other materials made by the firm, for each of which there is issued a sheet giving data and specifications, any or all of which may presumably be had by architects, engineers or builders.

REVIEWS AND ANNOUNCEMENTS

CODE FOR THE RATING OF LOW PRESSURE HEATING BOILERS

Adopted by the Steel Heating Boiler Institute December 10, 1929

1. The purpose of this Code is to provide a uniform method of rating low pressure heating boilers.
2. The rating of a boiler shall be expressed as square feet of steam or water radiation or as B.t.u. per hour.
3. For purposes of this code, boilers are divided into two general classes:
   - A. Steam and water boilers in which solid fuel, hand fired, is used as the heat generating medium.
   - B. Steam and water boilers in which solid fuel, mechanically fired, oil or gas is used as the heat generating medium.
4. The rating of a boiler in Class A, expressed in square feet of steam radiation, shall be not more than 14 times the heating surface of that boiler in square feet.
5. The grate area of a boiler for the rating as determined by Section 4 shall be not less than that determined by the formulæ:

   For boilers with ratings 300 sq. ft. to 4,000 sq. ft. of steam radiation;

$$\text{Grate Area} = \sqrt{\frac{\text{Catalog rating (in sq. ft. steam radiation)} - 200}{25.5}}$$

   For boilers with ratings of 4,000 sq. ft. of steam radiation and larger:

$$\text{Grate Area} = \sqrt{\frac{\text{Catalog rating (in sq. ft. steam radiation)} - 1500}{16.8}}$$

6. The rating of a boiler in Class B, expressed in square feet of steam radiation, shall be not more than 17 times the heating surface of that boiler in square feet.
7. The furnace volume of a boiler (as defined in Section 10) for the rating (as determined by Section 6) shall be not less than 1 cubic foot for every 140 square feet of steam rating.
8. Boilers selected on the basis of this code shall be connected to stack and breeching in accordance with the manufacturer's specifications.
9. The rating as defined here for purposes of selection is intended to correspond to the estimated design load, which is to be the sum of items A, B and C.
   - A. The estimated normal heat emission of the connected radiation required to heat the building as determined by accepted practice, expressed in square feet of radiation or in B.t.u. per hour.
   - B. The estimated maximum heat required by water heaters or apparatus connected to the boiler, expressed in square feet of radiation or in B.t.u. per hour.
   - C. The estimated heat emission of piping connecting radiation and other apparatus to the boiler, expressed in square feet of radiation or in B.t.u. per hour.
10. Definitions.

    For purposes of this code these definitions will be used:

   - A. One square foot of steam radiation shall be considered equal to the emission of 240 B.t.u. per hour, and 1 square foot of water radiation shall be considered equal to the emission of 150 B.t.u. per hour.
   - B. Heating surface shall be expressed in square feet and include those surfaces in the boiler which are exposed to products of combustion on one side and water on the other. The outer surface of tubes shall be used.
   - C. Grate area shall be considered as the area of the grate surface expressed in square feet and measured in the plane of the top surface of the grate. For double-grate boilers the grate area shall be considered as the area of the upper grate plus ¼ of the area of the lower grate.
   - D. Furnace volume shall be considered as the cubical content of the furnace between the top of the base or the normal grate line and the plane of entry into or between the tubes plus the net base volume under the firebox. The net base volume shall be determined by deducting the volume of the refractory lining from the gross base volume under the firebox.

Schwab, Palmgreen & Merrick announce their removal to the Koppers Building, Pittsburgh.

Announcement is made of admission of W. Oscar Mullgardt into the firm of Mauran, Russell & Crowell, St. Louis.

Francis James Erhart and Howard S. Eichenbaum, architects, announce the formation of a partnership with offices in the Gem Building, Little Rock, Ark. They desire the publications and samples issued by manufacturers.

As Albert Buchman is retiring from active practice, the firm of Buchman & Kahn has been dissolved. Ely Jacques Kahn and John M. Montfort have formed a co-partnership under the firm name of the Firm of Ely Jacques Kahn, with offices at 2 Park Avenue, New York.

Benjamin Wistar Morris announces the formation of a partnership with Robert B. O'Connor under the firm name of Morris & O'Connor, with offices at 101 Park Avenue, New York. The firm will have as associates Crandel A. Cochran, Thomas B. Temple, Charles H. Koop and Howard R. Hutchinson.

JOHN VAN RANGE COMPANY, Oakley, Cincinnati. "Practical Planning for Club Food Service.

Architects who are interested in planning hotels, hospitals, Y.M.C.A. buildings and other structures intended for the use of more or less permanent residents may well be interested in a series of booklets being issued by the widely known John Van Range Company, a division of the Pick-Barth Company, Inc., dealing with the planning and equipment required for the preparation and serving of food. Already the firm has issued brochures concerning this problem as it is met in buildings of various types, and the most recent addition to the series has to do with the problem as it concerns the club. The present-day club house, be it in town or country and of whatever type, exhibits skill in the matter of design, furnishing and decoration, and proves the care with which every detail of its equipment has been thought out,—and nothing is more important than details which have to do with food service, since in a club, as in a hotel, success or failure is likely to depend upon the smoothness or lack of smoothness with which its kitchens and restaurants are operated. And what detail of operation is more important than the matter of equipment? A suggestion as to the booklet's helpfulness may be gathered from the headings of the sections into which it is divided: (1) "A Foreword to Club Officials; How a Practical Approach to Country Club Food Service Will Facilitate Planning and Operation." (2) "Fitting the Country Club Restaurants into the Architectural Plans." (3) "Requirements of the Country Club Kitchen Plan as Developed by Van Engineers." (4) "Social, Athletic and Residential Clubs and Fraternal Buildings," while in a final section entitled "The Service and Facilities of the John Van Range Company" there is summed up the completeness of the service which the firm, based upon 75 years of equipping and outfitting, is prepared to render. The booklet is well illustrated by views of the exteriors and interiors of many different clubs and the plans of their kitchens and serving departments of various kinds.

FIGURE THIS SAVING

A typical example of fuel economy

The Prairie Oil & Gas Co. office building at Independence, Kansas, is now heated with a Dunham Differential System, a change-over of the previous system. Direct comparison of "before and after" costs of gas fuel shows a 33.4% saving effected by Differential Heating.

Another example in a 40 story office building

The superintendent of the Barlum Tower, Detroit says, "The Differential System solved two great problems of operating our large heating system—(a) satisfactory heating, (b) reasonable cost. Fast circulation and efficient heating save an average of 1½ hours on the heating-up period each day."

FOR YOUR OWN HEATING NEEDS

Dunham Differential Heating Systems save from 25 to 40% of fuel costs, by direct comparisons in change-over installations from ordinary heating systems to those differentially operated. Similar fuel economy is obtained in new buildings.

Apply even the low figure of 25% to the usual fuel costs, and you will see that the plain dollars and cents consideration warrants an investigation of Differential Heating performance.

When you look into the exclusive operating characteristics of Dunham Differential Heating you will find that fuel saving is but part of the story. Maximum comfort and health conditions, unusually important in modern building projects, are uniformly maintained by Differential Heating.

The simple and effective operating principles based upon the controlled use of hot steam, warm steam, cool steam, as required by outside weather, are exclusive Dunham Differential features. Automatic control maintains room temperatures without wasteful overheating.

Investigate the operating features that make Dunham Differential Heating so satisfactory in hundreds of installations throughout the United States and Canada. Write for descriptive bulletins and for facts bearing on your own requirements.

» » »

Many existing heating systems can be converted to Differential operation at moderate cost. These change-overs will pay for themselves. Dunham engineers will survey present systems without obligation.

» » »

Look for the name DUNHAM. This nameplate identifies a genuine Dunham Thermostatic Radiator Trap.

The Dunham Differential Vacuum Heating System and individual parts of the apparatus used in that system are fully protected by United States Patents Nos. 1,644,114, 1,706,401 and 1,727,965 and Canadian Patents Nos. 282,193, 282,194, and 282,195. Additional patents in the United States, Canada and foreign countries are now pending.

C. A. DUNHAM CO.

Dunham Building

450 East Ohio Street Chicago, Illinois

Over 80 branch offices in the United States, Canada and the United Kingdom bring Dunham Service as close to you as your telephone. Consult the 58-page Dunham Architectural Handbook in Sweets—Volume D. Dunham engineers are at your service with complete and authoritative data on improved heating practice

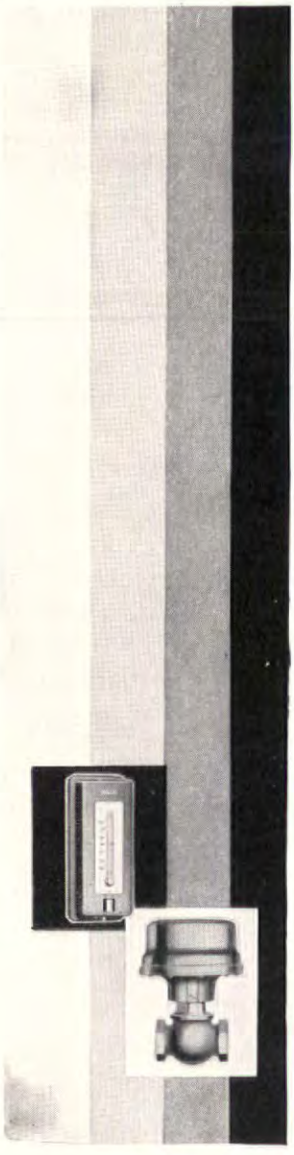
INDEX TO ADVERTISING ANNOUNCEMENTS

Part 1—Architectural Design

Part 2—Architectural Engineering and Business

"In the heart of Brooklyn, on a site long familiar to millions of people, we are erecting one of the most beautiful buildings in America, devoted exclusively to retailing merchandise. The year 1929 will witness the completion of the first unit of a great structure that will eventually cover almost this entire block, a block with the largest frontage in the city" . . . . . from statement by Simon F. Rothschild.

The New Abraham & Straus Building, Brooklyn. . . . From Drawing by Hugh Ferriss - *Arch.* Messrs. Starrett & Van Vleck



A MOST INTERESTING INSTALLATION *of* TEMPERATURE CONTROL

The Johnson System Of Heat & Humidity Control is installed throughout this impressive, new structure, now in its first stage of completion.

Direct radiators are along the outside walls, as usual. Johnson Thermostats, are placed on piers between the radiators, each thermostat controlling from one to two radiators. Parallel with the outside walls, partitions about nine feet high are erected, a passageway thus formed to make easy access for merchandise to all parts of the store. Inside of these partitions, or in the store space proper, Johnson Pilot Thermostats are erected on columns. The branch lines from these Pilot Thermostats supply air to the Thermostats on the outside wall between the radiators, which in turn operate the valves on the radiators in accordance with the temperature requirements in the store space proper, beyond the partitions.

The store's ventilating apparatus is controlled by Johnson Cold Air Thermostats, placed in the cold air inlet duct and operating the diaphragm valve on the first row of the heated coil. Johnson Multiple Thermostats are placed in the fan discharge, controlling the inner rows of the heater coils. Johnson Model Indicators are installed with the ventilating apparatus, operating the cold air inlet and recirculating dampers: so that the supply of cold and recirculated air can be modulated as may be necessary.

The store's vestibules are heated and ventilated with recirculated air: taken from the store, passed through heater coils and delivered into the vestibules. The heating coils here are controlled by Johnson Two-Point Insertion Thermostat, placed in the diaphragm of the fan and operating the diaphragm valves on the heater coil—in conjunction with the pilot thermostat in the main store near the vestibule. If the thermostat at that point becomes too low, the Pilot Thermostat releases air from the Two-Point Thermostat and the full capacity of the heater coils is used for the purpose of heating the vestibule to a temperature sufficiently high to prevent cold drafts in the store space adjacent to the vestibules.

Thus is given another impressive example of the broad utility of Johnson Heat and Humidity Control and the recognized value of Johnson Control on buildings' heating and ventilating apparatus: for maximum efficiency and minimum cost.

JOHNSON SERVICE COMPANY MILWAUKEE, WISCONSIN

ESTABLISHED 1885

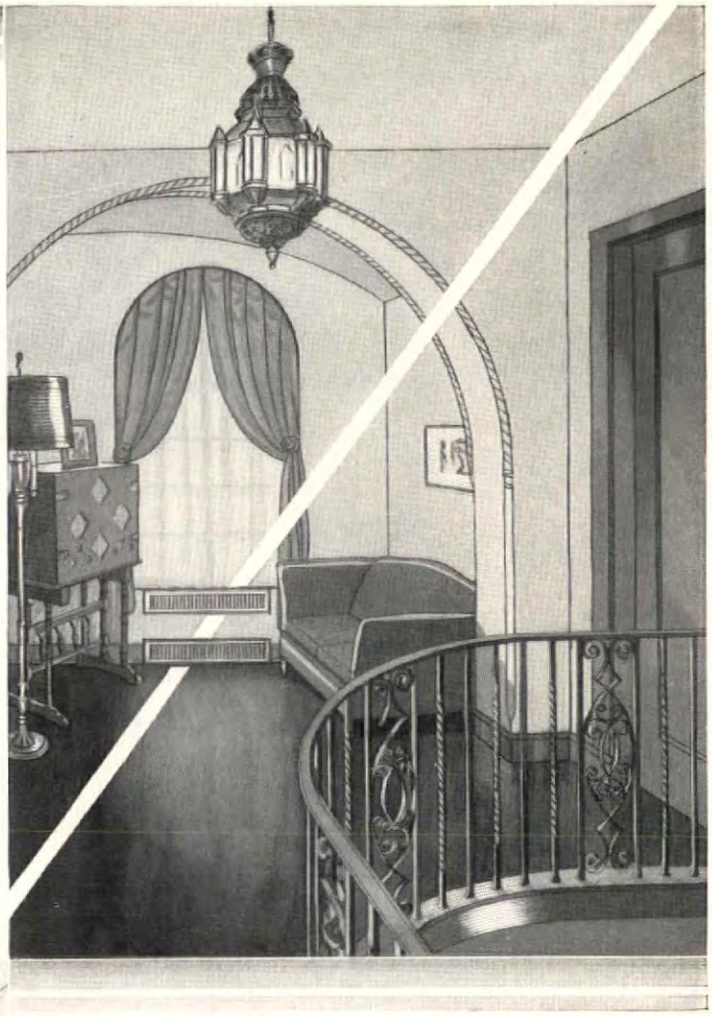
JOHNSON HEAT AND HUMIDITY CONTROL

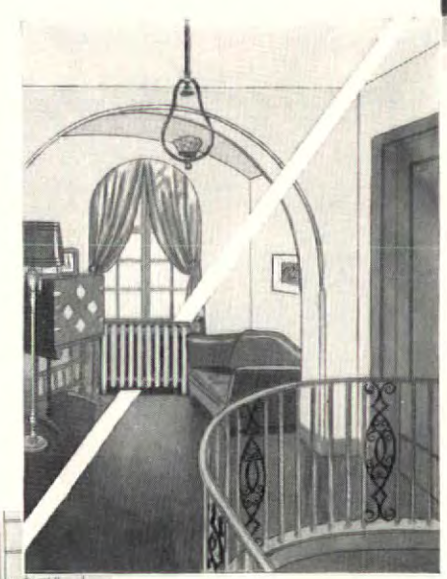
YOU WOULDN'T *put an old fashioned chandelier in this beautiful room*

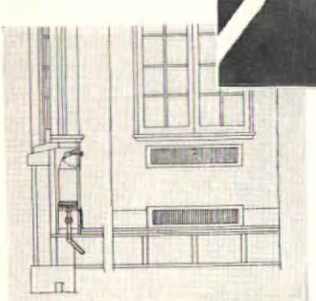
HEATING too, has been modernized for the beautiful room such as this.

Modine Concealed Radiation is the fulfillment of the fondest dreams of the builder and home buyer who long have recognized the need for unobtrusive equipment that will provide better heating.

It is a step forward that appeals to the individual in the market for the better quality ready-built home.







Above, the Modine is installed in the wall beneath the window. Two artistic grilles are all that can be seen.

◆ ◆ ◆

Modine Concealed Radiation is so much more satisfactory. Ordinary limitations in furnishing and arrangement are gone. Each piece may be placed to the best advantage. The entire floor area is available. The wall grilles are decorative factors in themselves.

The advantages of Modines do not stop there. This equipment, in addition, provides cleaner, quicker, more easily regulated room heating. And it's built for lifetime service. You couldn't offer the home-builder more. Let us give you complete information now. Write today.

MODINE MANUFACTURING COMPANY

Manufacturers of

Unit Heaters — Copper Radiation — Automotive Radiators

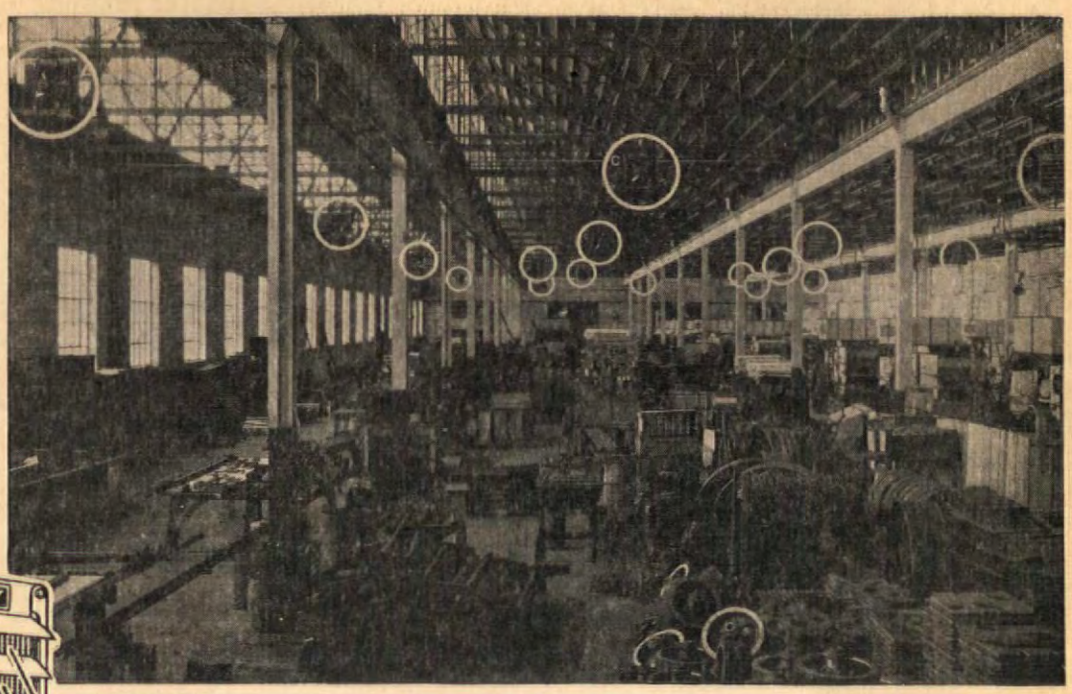
1718 RACINE STREET RACINE, WISCONSIN

London Office: S. G. Leach & Co. Ltd., 26-30 Artillery Lane.

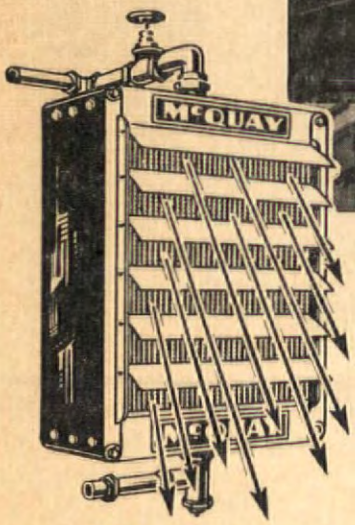
MODINE

COPPER RADIATION

A MODINE Product



A typical installation of McQuay Unit Heaters. If old-style heating methods were used here, most of the heat would be wasted up near the roof.



All Copper Heating Element

Tubes of the heating element are of heavy gauge copper, welded into a copper header—giving equal expansion and contraction, and eliminating chance of leaks that occur when tubes and headers are of different materials.

A particular McQuay feature is that *after* the heating unit is completely welded it is dipped into a tin bath, coating it both inside and out. This gives the tubes a glassy smoothness, preventing clogging; and also prevents attacks from impure water.

The motor and fan are supported, according to a McQuay idea, in such a way as to take care of vibration and make them noiseless.

Stop Wasting Heat

McQuay Unit Heaters force the warmed air down into the working areas—where heat is needed. Unlike old-time methods little, if any, heat is wasted in the upper unused portions. Fuel bills are less — and every workman is comfortably warmed.

Even on a cold morning, after the boiler has been banked all night, an entire building can be comfortably heated in a very short time. For, a *few seconds after the heat and fan are turned on a flood of heated air is circulating over the entire floor.* And it keeps on circulating until the heat is turned off.

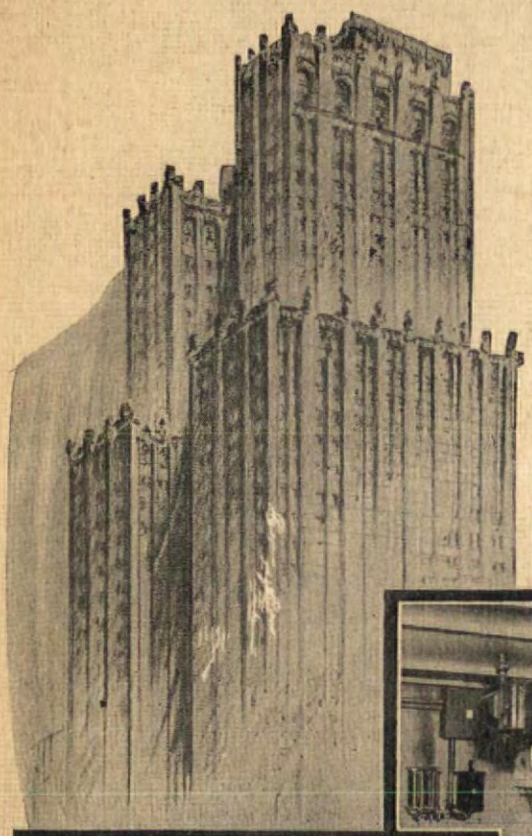
Each unit can be individually controlled so that the heat is easily turned off in idle parts of a factory.

Quickly and easily installed in any building, McQuay Units are made in capacities equivalent to from 50 to 2000 sq. ft. of cast iron radiation. They are excellent supplementary equipment to present inadequate heating systems. Ask for complete data.

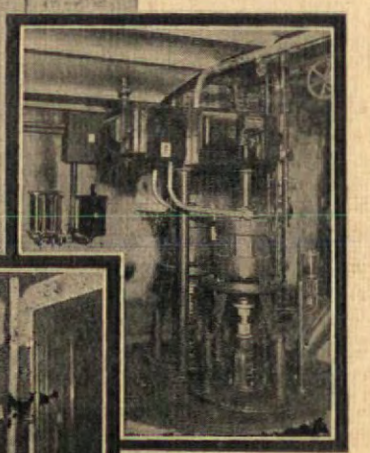
McQUAY
UNIT HEATERS

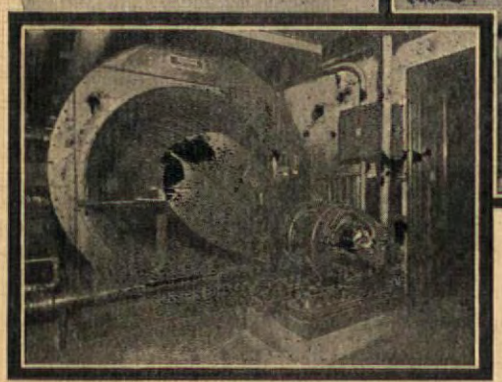
McQUAY RADIATOR CORPORATION
General Offices: 35 East Wacker Drive, Chicago

Where careful planning is done--



Grant Building, Henry Hornbostel, Architect Thompson Starrett Co., Contractors.





Westinghouse vertical motors and Linestarter on Yeaman Bros. pumps.

Westinghouse motor and Linestarter driving one of the Sturtevant fans.

THE Grant Building in Pittsburgh offers an impressive example of careful planning by its builders and engineers. They realize that, for efficient service, nothing should be lacking which would add to the comfort and convenience of its patrons.

For this modernly-equipped office building Westinghouse motors and control were selected to power the ventilating fans and the pumps.

Long-lived Sealed Sleeve bearings, dual-treated windings and a sturdy frame construction fortify Westinghouse motors and the service they render. That's why these motors installed on ventilating and pumping equipments last so many years and require such little attention. They fulfill every expectation of building engineers.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

T 31065