THE ARCHITECTURAL FORUM

IN TWO PARTS

ARCHITECTURAL ENGINEERING & BUSINESS

PART TWO

SEPTEMBER

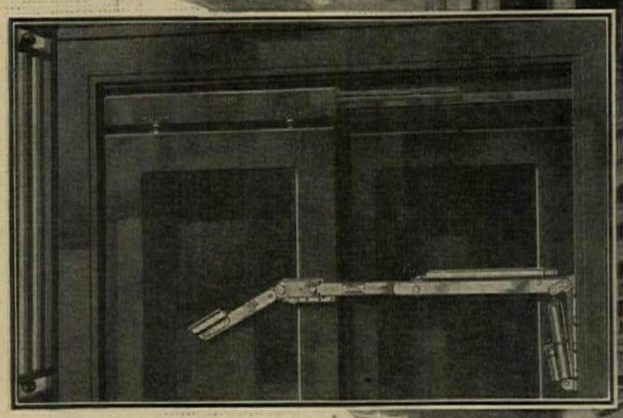
1928

COUNTRY HOUSE REFERENCE NUMBER
PRICE $3

Centralized Safety

With Richards-Wilcox complete line of Elevator Door Hardware, full safety is possible from one responsible source. Closers, hangers, checks, electric door operators, mechanical, electro-mechanical or electric safety interlocks for any and every requirement. Standardize on R-W hardware.

Lowers casualty insurance rates.



A few of the buildings in Seattle, Washington, that are equipped with Richards-Wilcox Elevator Door Hardware.

Write for complete data for your files

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

Largest and most complete line of door hardware made

An innovation a year ago... an established favorite today!

AN insistent demand for an attractive, structural tile which would lay up in an interior load-bearing or partition wall with one or both faces finished, was recognized—and Natco Vitritile was developed to meet it. Its acceptance was immediate—its popularity amazing.

Natco Vitritile is furnished in several shades, ranging from a light buff to a rich dark brown. Its beautiful, glazed, sanitary finish is easily cleaned and kept clean, and requires no plaster, painting or maintenance.

Its field of use is in subways, basements, corridors, gymnasiums, garages and auto sales rooms, hospitals, laundries, laboratories, natatoriums, restaurants, substations and similar applications. Proper units for both 3-¾ and 8″ walls are available for wainscoting, lintels, bullnose corners, etc., making possible practically any desired form of construction. Units are also furnished kerfed or split for furring.

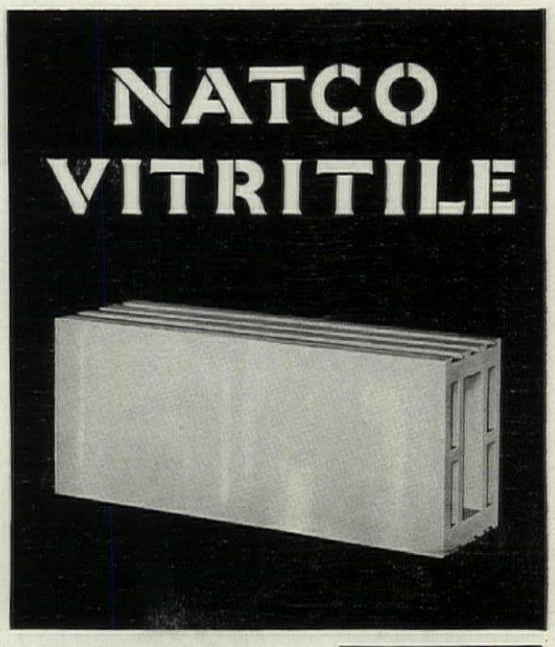
Natco Vitritile is shipped in corrugated wrappers, assuring its arrival in perfect condition. A folder showing sizes, shapes and shade ranges available will be sent on request.

NATIONAL·FIRE·PROOFING·COMPANY

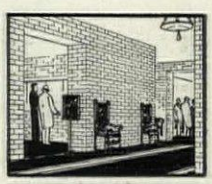
General Offices: Fulton Building, Pittsburgh, Pa.

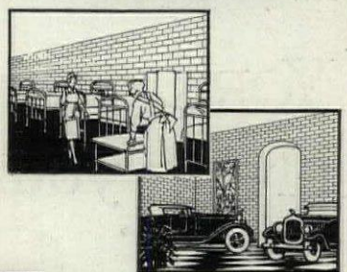
Branch Offices: New York, Flatiron Bldg; Chicago, Builders Bldg; Philadelphia, Land Title Bldg; Boston, Textile Bldg.

In Canada: National Fire Proofing Co. of Canada, Ltd., Toronto, Ontario



The standard grade of Natco Vitritile is first quality material and comprises a pleasing blending of all shades from a light buff to a dark rich brown.



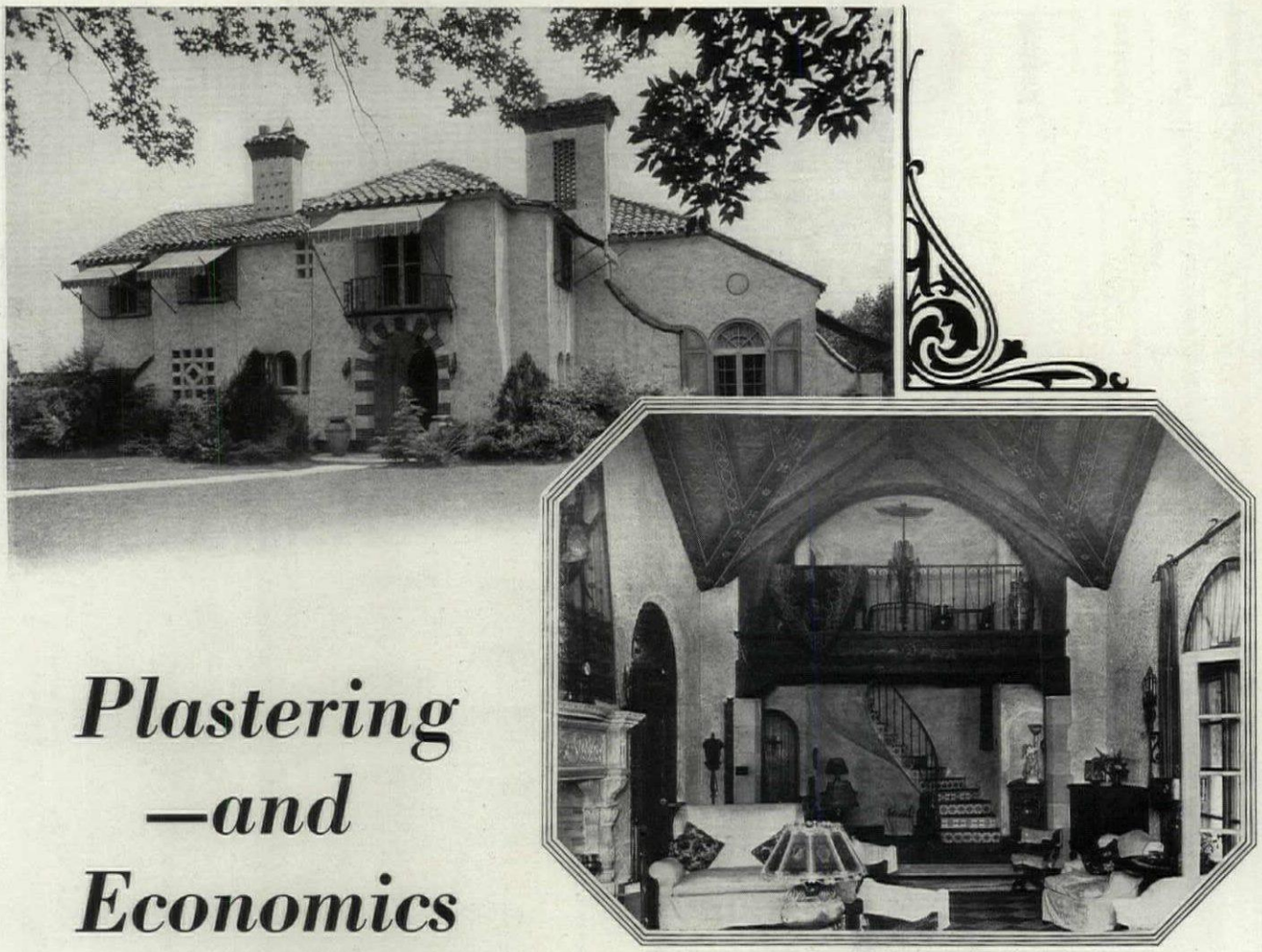


Individual shade ranges may be obtained in the select grade. They are approved by samples before shipments are made.

NATCO

NATCO
THE *COMPLETE* LINE *of*
HOLLOW BUILDING TILE

HOLLOW BUILDING TILE



Plastering —and Economics

PLASTERING as a decorative medium is but beginning to come to its own.

Architects revel in the opportunities it affords for individual expression. But with the dawning realization of its possibilities comes an insistent demand for better-than-average work. Any one can secure fine plastering if cost be no object. To obtain it at a price that conforms with present day demands for economy, however, requires a shrewd knowledge of plastering bases—their properties and *behavior under test.*

It was because of its satisfactory "performance" record that North Western PLASTA-SAVER Metal Lath was specified and used thruout Mr. Wm. Lewin's beautiful Clayton, Mo. home, as well as in thousands of other fine residences.

And on this performance record we base our assurance that you will find North Western PLASTA-SAVER Metal Lath a most dependable, satisfactory and *economical* reinforcing base for any type of interior plastering work.

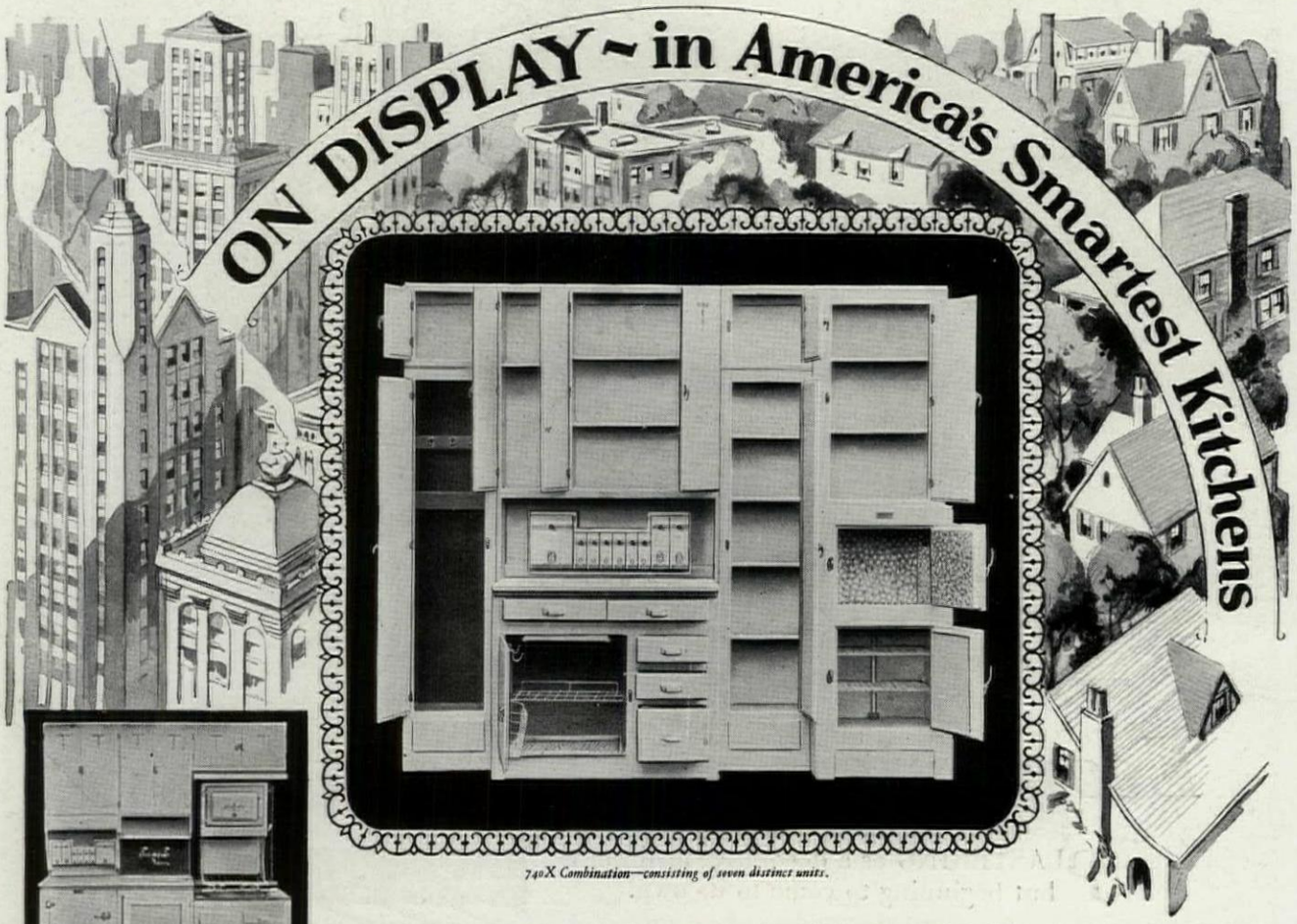
May we have the privilege of sending you Samples and Recommended Specifications

NORTH WESTERN EXPANDED METAL CO.

1234 Old Colony Bldg., CHICAGO

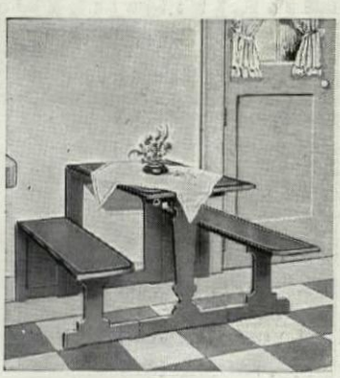
KITCHEN MAID

STANDARD UNIT SYSTEMS



740X Combination—consisting of seven distinct units.

Kitchenette assemblage. A compact combination including refrigerator, range and sink



DINOFOLD—a "breakfast nook" of table and seats for four. Entire unit folds up with one single, simple operation

The large variety and flexibility of Kitchen Maid Units are factors of especial importance to the architect. These units cover *every* need of every size and type of kitchen—in choice of Cactus Green, Dove Gray, Lama Tan, Travertine Ivory, Shasta White.

Each unit is complete in itself—may be used singly or in combination—recessed or set against the wall. Kitchen Maid Units are the only equipment with sanitary rounded inside corners, smooth doors and concealed hinges. They are the product of America's largest exclusive makers of built-in equipment for the kitchen.

Now—Famous Dinofold Member of Kitchen Maid Line!

Henceforth, the famous patented folding breakfast nook—Dinofold—will be a member of the Kitchen Maid line, manufactured and sold by the Wasmuth-Endicott Company. Dinofold, consisting of a roomy, rigid dining table and seats for four, folds up by one simple operation, on a wall, on a door, in a wall recess, or in a cabinet. Dinofold is smoothly lacquered in Olive Green or Mandarin Red, with gold striping and antique shading (five coats). Also finished in Early American Maple, antique shading, with green trimming, or furnished unfinished. Write for information on Dinofold and catalogue, dimensional drawings and prices on all Kitchen Maid Units.

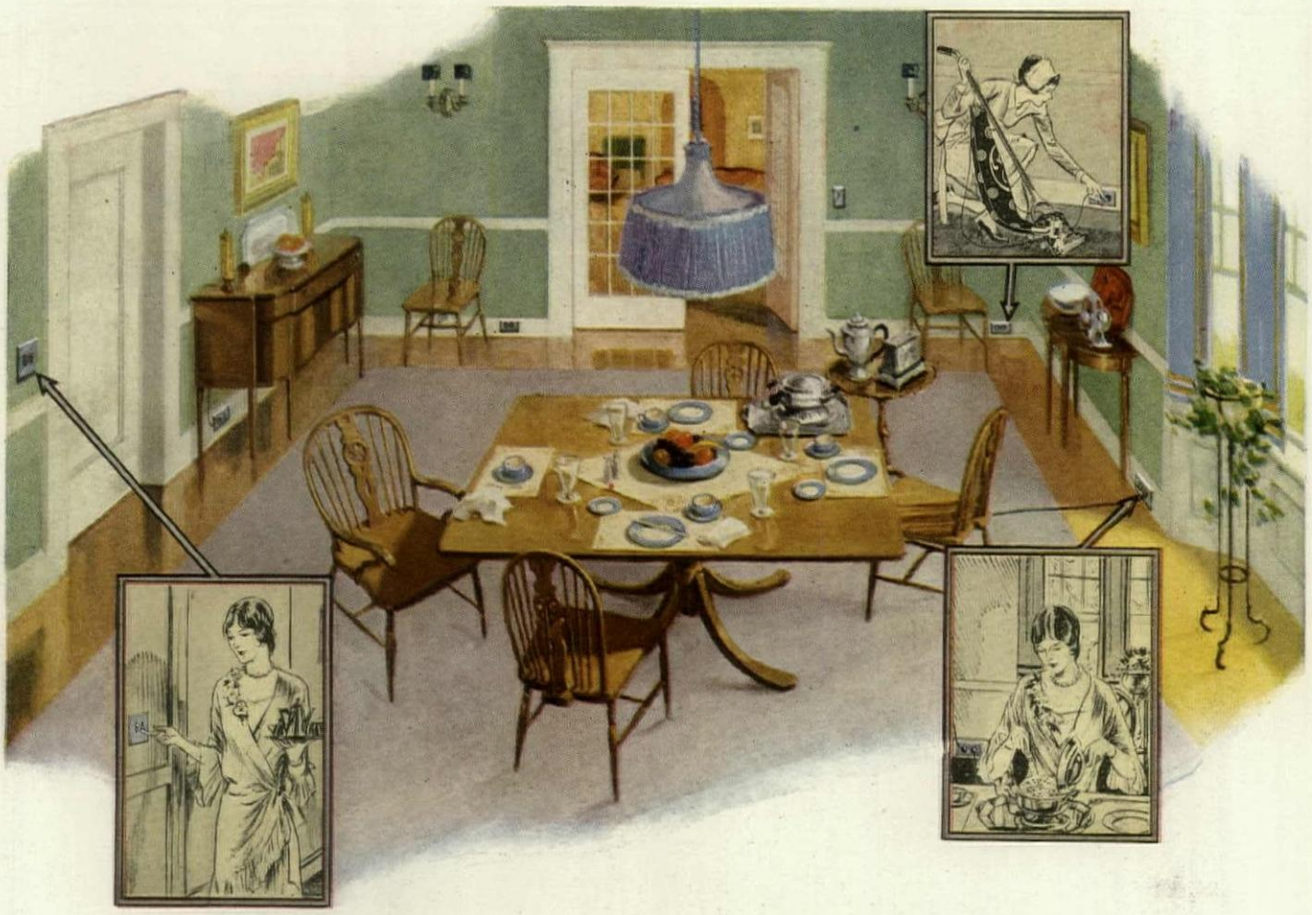
WASMUTH-ENDICOTT COMPANY 1809 Snowden St., Andrews, Indiana

"Let the Kitchen Maid Be Your Kitchen Aid"

Representatives in all Principal Cities

KITCHEN MAID
STANDARD UNIT SYSTEMS

If in Canada, address Branch Office Waterloo, Ontario



You specify *comfort* by this simple system!

When you specify a General Electric Wiring System you are specifying lasting comfort. You are assuring your client of a truly modern home which can use electricity to the limit of its helpfulness.

National advertising of the General Electric Wiring System has made the home-builder keenly conscious of the advantages of modern wiring. Now he appreciates plenty of outlets and switches. And he likes to know that the materials built into his walls are all made by General Electric.

Write for this helpful booklet you should have it in your files

GE **WIRING SYSTEM**
—for lifetime service

Merchandise Department,
Section 29
General Electric Company,
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GENERAL ELECTRIC

Library in the Office of The Architectural Forum, New York

You are invited to use the offices of

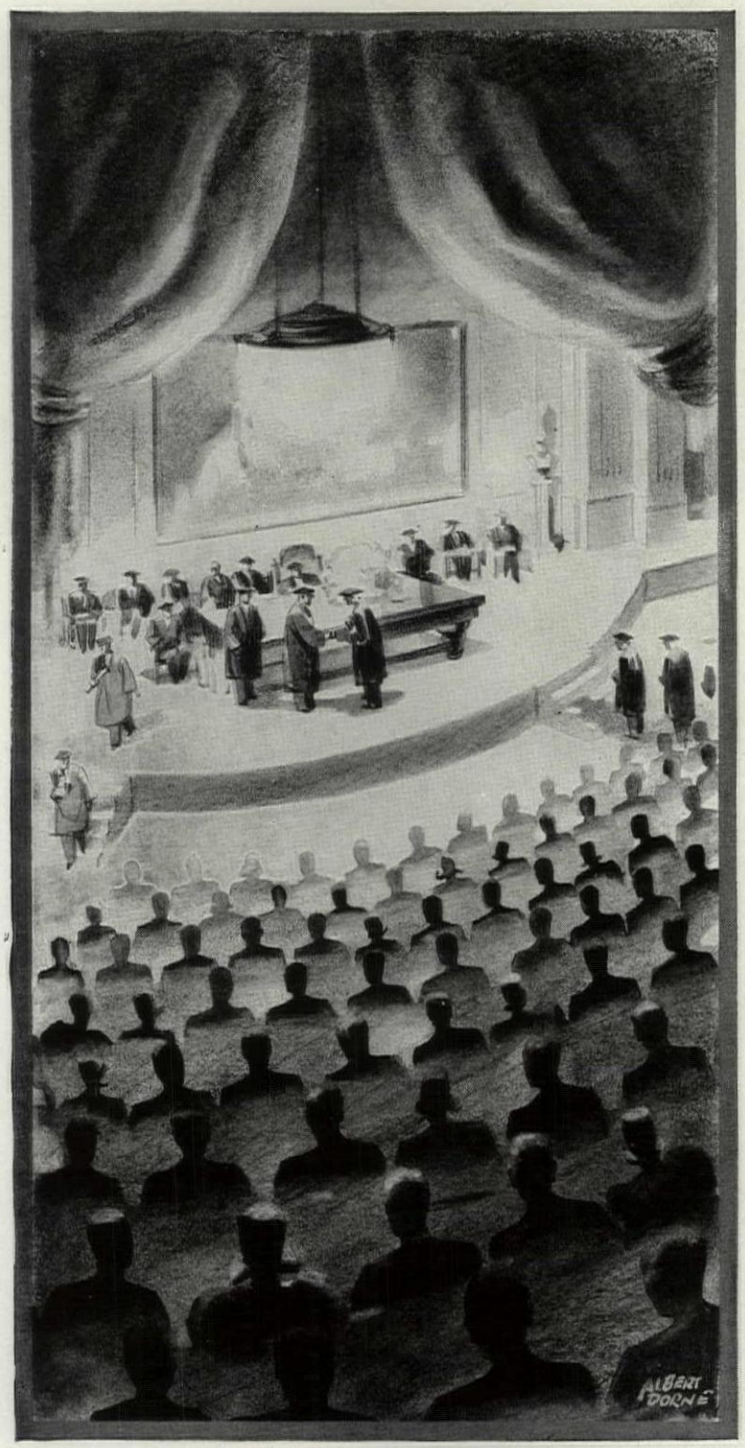
The ARCHITECTURAL FORUM

as headquarters when you visit New York

Here will be found such practical conveniences as telephone and stenographic service, an adequate architectural library, and in fact many of the dozen and one things which may contribute to the pleasure and profit of a sojourn in New York.

THE ARCHITECTURAL FORUM, 383 Madison Avenue

Do your lighting plans *have this* FACTOR *of* SAFETY *... emergency lighting....*



A great assembly hall thronged with people—lights shining brilliantly . . . Suddenly the power fails—lights out . . . a blanket of darkness that can bring disorder and fear. Continuous light is imperative where the public assembles as well as in the operating rooms of hospitals. *Exide Emergency Lighting Batteries will insure continuous lights.*

ALL the material you specify carries a *factor of safety.* How about your lighting plans? Emergency lighting is a veritable *factor of safety* for lights. Modern building plans include lighting protection as a matter of course.

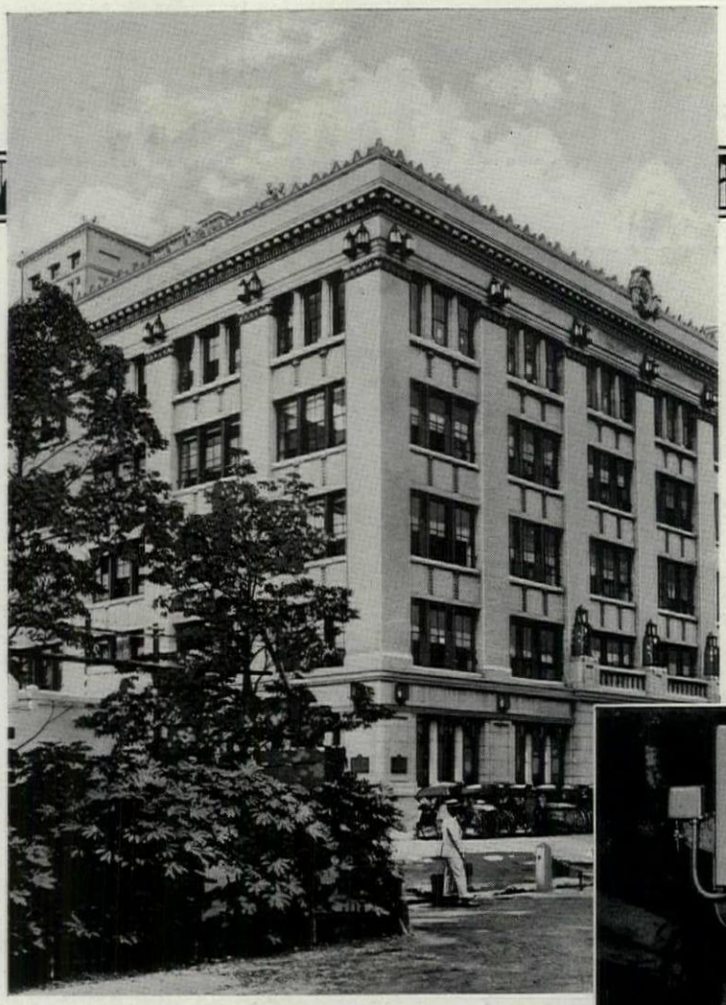
And architects, seeking lighting protection at once reliable and flexible, are specifying Exide-equipped emergency lighting. Exide Emergency Lighting Batteries are adaptable to any plan. They may be used to protect single rooms or entire buildings. The devices used to control Exide Emergency Lighting Batteries are extremely simple with automatic operation. And these batteries are unfailingly reliable—constantly on guard.

Exide engineers have been building batteries for forty years. You are sure of these qualities when you specify Exide Batteries: (1) power dependability, (2) long life, (3) freedom from trouble, (4) low first cost, (5) low operating cost.

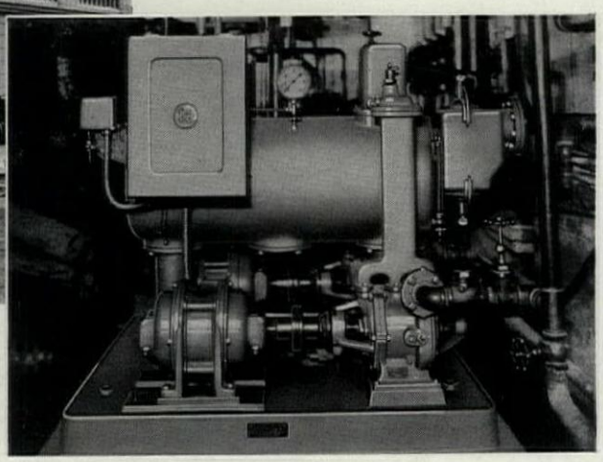
An experienced representative will be glad to consult with you. Please write.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia
Exide Batteries of Canada, Limited, Toronto

Exide
EMERGENCY LIGHTING BATTERIES



Mitsukoshi Department Store, Japan.



Jennings Return Line Vacuum Heating Pump, duplex type, installed in the Mitsukoshi Dept. Store, Japan.

At the Mitsukoshi Department Store

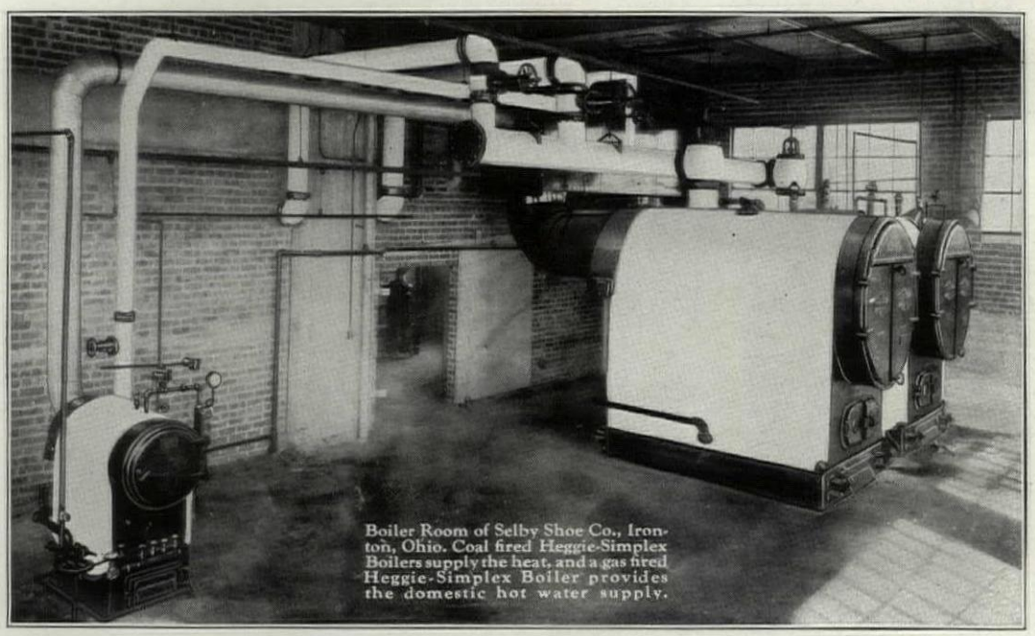
WHEN Mitsukoshi's decided on a vacuum steam heating system, they also had the foresight to equip it with a Jennings Heating Pump. A duplex unit that, by automatically removing the condensation and air from the radiators and return line, enables the system to function always at high efficiency.

The Jennings Pump was chosen from consideration of economy as well. It helps save an appreciable amount in fuel every season. There is no need for generating steam at high pressure, or for the steam to *push* its way through the system. Due to the vacuum created by the pump, the steam is *pulled* into the radiators. Operating pressures and temperatures are lower. Boiler firing is easier and less frequent. Less fuel is consumed.

Bulletin 71 should be consulted for detailed specifications.

Jennings Pumps

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



Boiler Room of Selby Shoe Co., Ironton, Ohio. Coal fired Heggie-Simplex Boilers supply the heat, and a gas fired Heggie-Simplex Boiler provides the domestic hot water supply.

Uniformly High Quality —the basis of success

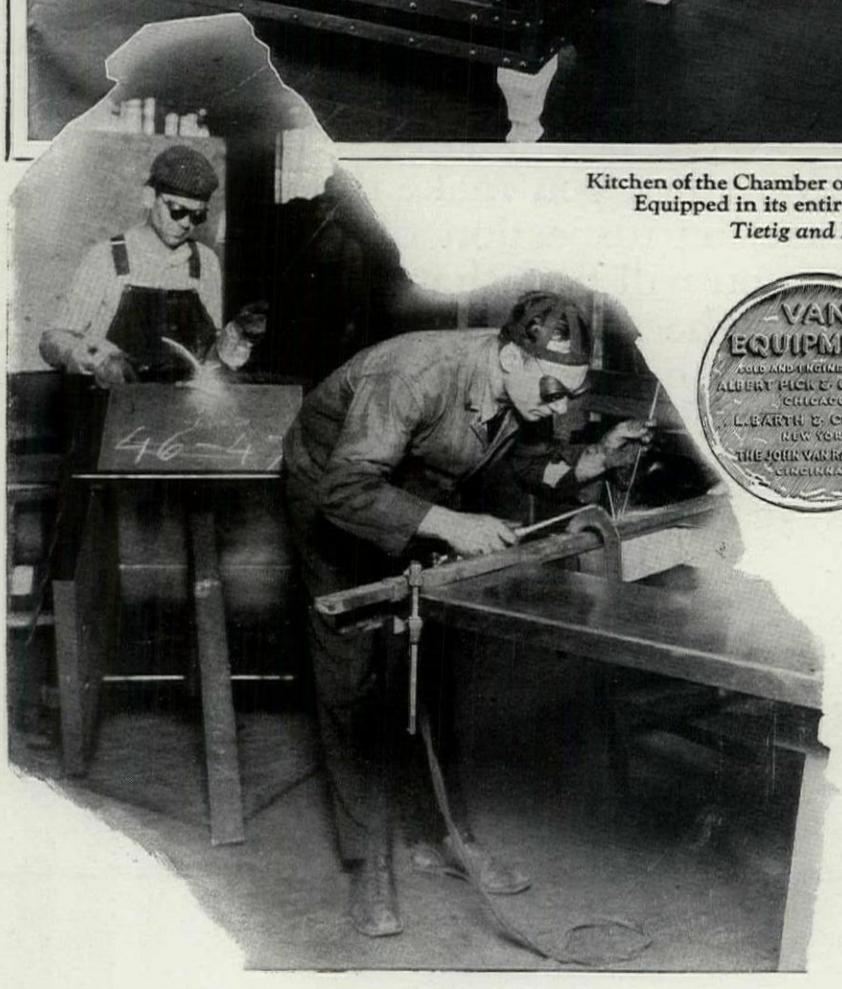
THE high standards of precision established by the Heggie-Simplex Boiler Company make quality materials and quality workmanship essential. Whether you make the briefest or the most exacting inspection of a Heggie-Simplex Boiler, you will find that every detail is in keeping with the reputation we have created for uniformly high quality throughout. And it is that enviable reputation which helps to explain why our sales for the first fiscal period of this year exceeded last year's volume by 95%.

Heggie-Simplex Boiler Co., Joliet, Illinois. Representatives in principal cities — telephone and address listed under "Heggie-Simplex Boiler Company."

HEGGIE-SIMPLEX

ELECTRIC-WELDED STEEL HEATING BOILERS

Kitchen of the Chamber of Commerce, Cincinnati, Ohio
Equipped in its entirety with Van Equipment
Tietig and Lee, Architects



VAN EQUIPMENT
SOLD AND ENGINEERED BY
ALBERT PICK & COMPANY
CHICAGO
L. BARTH & SON, INC.
NEW YORK
THE JOHN VAN RANGE CO.
CINCINNATI

Van Equipment is now sold and engineered by the largest and most authoritative engineering organization in the world—three great companies united to give you better service.

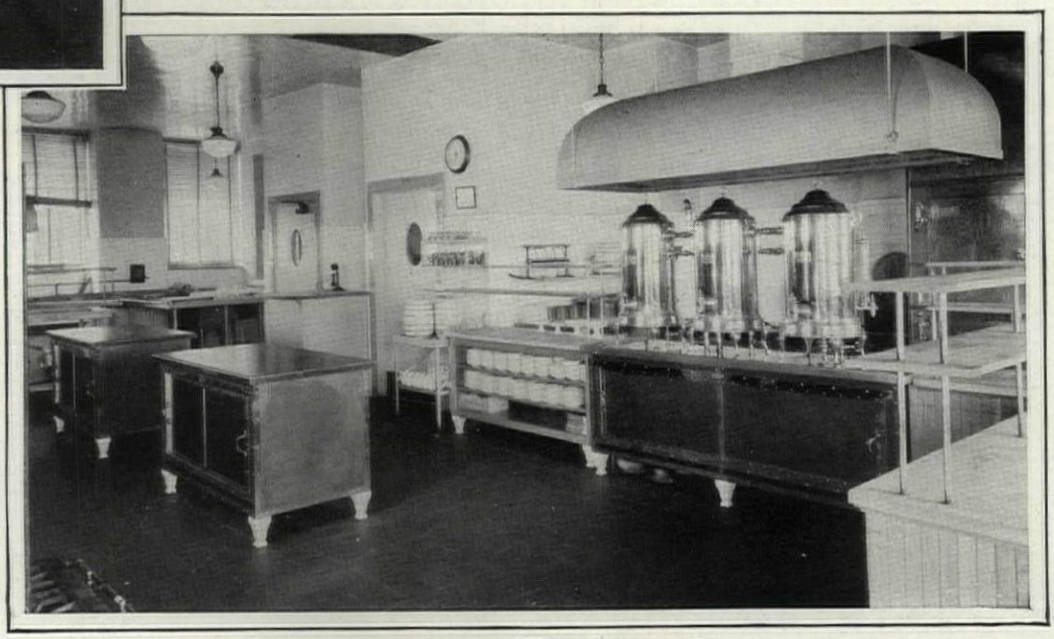
A typical scene is one of the welding departments of the vast John Van Range Company plant in Cincinnati. Two Van Craftsmen are arc welding a Monel Metal sink and the Monel top of a steam table. Three types of welding are used in the Van plant—arc, spot and oxy-acetylene—each for its special advantages in producing Van Quality Equipment.

Van Equipment Maintains its Reputation--and Yours!

THE reputation of Van Kitchen Equipment, maintained for over seventy years, is as much your assurance of superlative quality as it is our pride. We painstakingly build into every piece all the endurance it will ever need....for it *must* uphold the Van Standard!

We make no extravagant claims for Van Equipment. We do say that it is thoroughly dependable under any stress; that it is sturdily built of the most durable materials; and that it is economical the day it is purchased and every day after that.... Much of the original Van Equipment built sixty years ago is still in active use!

You can put your faith in Van Equipment, confident that it will maintain its own reputation *and yours!* Every user will assure you of its trouble-free reliability—its negligible cost of maintenance and its freedom from replacements. May we name some of the prominent users in your vicinity, so you may inquire concerning Van Equipment for yourself?



Another view of the Van Kitchen in the Chamber of Commerce, Cincinnati, O.

THE ALBERT PICK-BARTH COMPANIES

ALBERT PICK & COMPANY
208-224 W. RANDOLPH STREET, CHICAGO, ILL.

L. BARTH & CO., INC.
32 COOPER SQUARE, NEW YORK, N. Y.

THE JOHN VAN RANGE CO., CINCINNATI, OHIO, *Manufacturing Division*

Residence of Mr. David Lawrence, Washington, D. C.; A. B. Heaton, Architect.

Residence of Mr. S. N. Hicks, Cherry Hills, Denver, Colo. W. A. Marean & A. J. Norton, Architects.

There can be but one "Best"

PRICE is the most unimportant thing in the world—when an automobile won't run or an incinerator won't w-o-r-k.

The Kernerator is made by a permanent, solidly organized company which introduced flue-fed incineration 15 years ago. It has never been successfully imitated—in design, quality of parts or in the thoroughness with which it destroys all garbage and waste without fuel.

The owners of many of the homes it serves read like "Who's Who". Some of them appear below. But remember this—the owner of a bungalow is often a severer critic of poor performance than he who dwells in a mansion.

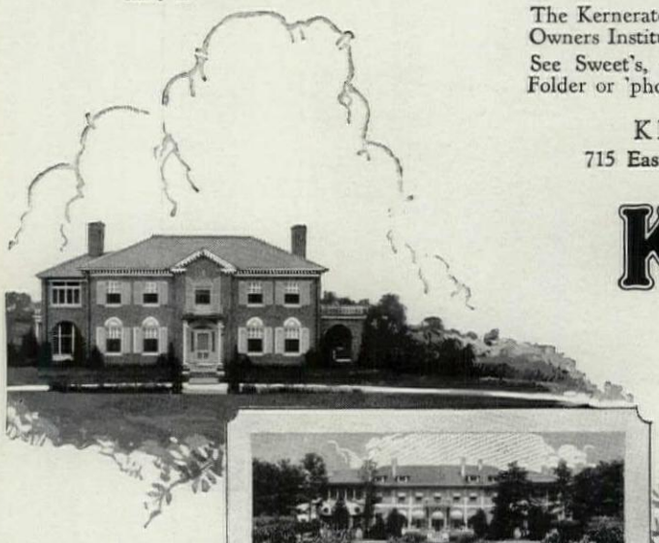
Miss Anne Morgan, New York
Payne Whitney, Manhasset, L. I.
Samuel Appleton, Marblehead, Mass.
Julius Fleischman, Eastern Point, Ct.
Senator Walter Edge, Atlantic City, N. J.
John J. Marshall, Philadelphia, Pa.
H. Watt Ellison, Richmond, Va.
Asa G. Candler, Atlanta, Ga.
Chas. E. Ringling, Sarasota, Fla.
Edsel Ford, Detroit, Mich.
Senator James Couzens, Detroit, Mich.
Booth Tarkington, Indianapolis, Ind.
S. P. Crosby, St. Paul, Minn.
John F. Jelke, Jr., Lake Forest, Ill.
Craig Cullinan, Houston, Tex.
E. B. Stern, New Orleans, La.
Judge Wilson A. Taylor, St. Louis, Mo.
Newton D. Baker, Cleveland, Ohio
Fred'k B. Patterson, Dayton, Ohio

The Kernerator was selected for each of the Model Homes of the Home Owners Institute in 30 principal cities.

See Sweet's, write for Kernerator catalogs in a ready-to-file A. I. A. Folder or 'phone your local Kernerator representative. Offices in 89 cities.

KERNER INCINERATOR CO.
715 East Water Street Milwaukee, Wisconsin

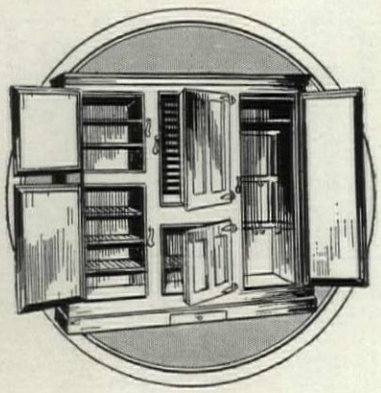
Residence of Mr. F. L. Maytag, Newton, Iowa. Cervin & Horn, Architects, Rock Island, Ill.



Residence of Mr. J. Ogden Armour, Lake Forest, Ill. Arthur Heun, Architect.

KERNERATOR
REG U S PAT OFF
THE CHIMNEY-FED INCINERATOR

Garbage and Waste Disposal without Leaving the Kitchen



Over 250,000 SATISFIED Users

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

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

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

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

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

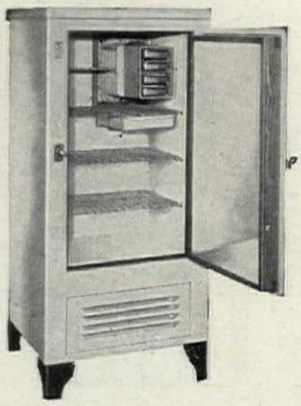
Send for latest catalogs and further information about refrigerators to meet your specific need. No obligation, of course.

McCRAY REFRIGERATOR SALES CORPORATION
864 Lake St., Kendallville, Indiana
SALESROOMS IN ALL PRINCIPAL CITIES *(See Telephone Directory)*

McCRAY REFRIGERATORS

Why the *Gas Refrigerator* is ideal for *Apartments*

Electrolux is noiseless . . . has no moving parts . . . needs no attention . . . costs little to operate . . . gives perfect refrigeration



The Hostess Model Electrolux. Food capacity 5 cubic feet. Plenty of ice cubes. Steel and Armco Ingot Iron construction. Cork-Board Insulation.

IN the new Electrolux Refrigerator, heat makes cold without mechanical means. A tiny gas flame does all the work. Since nothing moves, nothing can make any noise and there are no moving parts to wear out.

Add to these features extremely low operation cost and you have the ideal refrigerator for apartment houses. It is hardly surprising that architects are specifying Electrolux in the finest new modern apartments.

The imposing new apartment dwelling pictured below is an example of this. This building, designed by H. Lansing Quick, Architect and built by the Wingrey Realty Corporation on Locust Hill Avenue, Yonkers, N. Y., contains 100 gas refrigerators.

Electrolux is adaptable to your decorative schemes. This refrigerator is available in four new color harmonies besides the snowy white finish. (Biscay Blue, Ivory Tan, Crystal Green, Silver Grey.)

There is a wide range of standard sizes and a special low model that can be used as a table or the base for a gas range. An excellent space saver.

The Hostess Model is pictured above. Food capacity 5 cubic feet. Plenty of ice cubes. Steel and Armco Ingot Iron construction. Cork-Board Insulation.

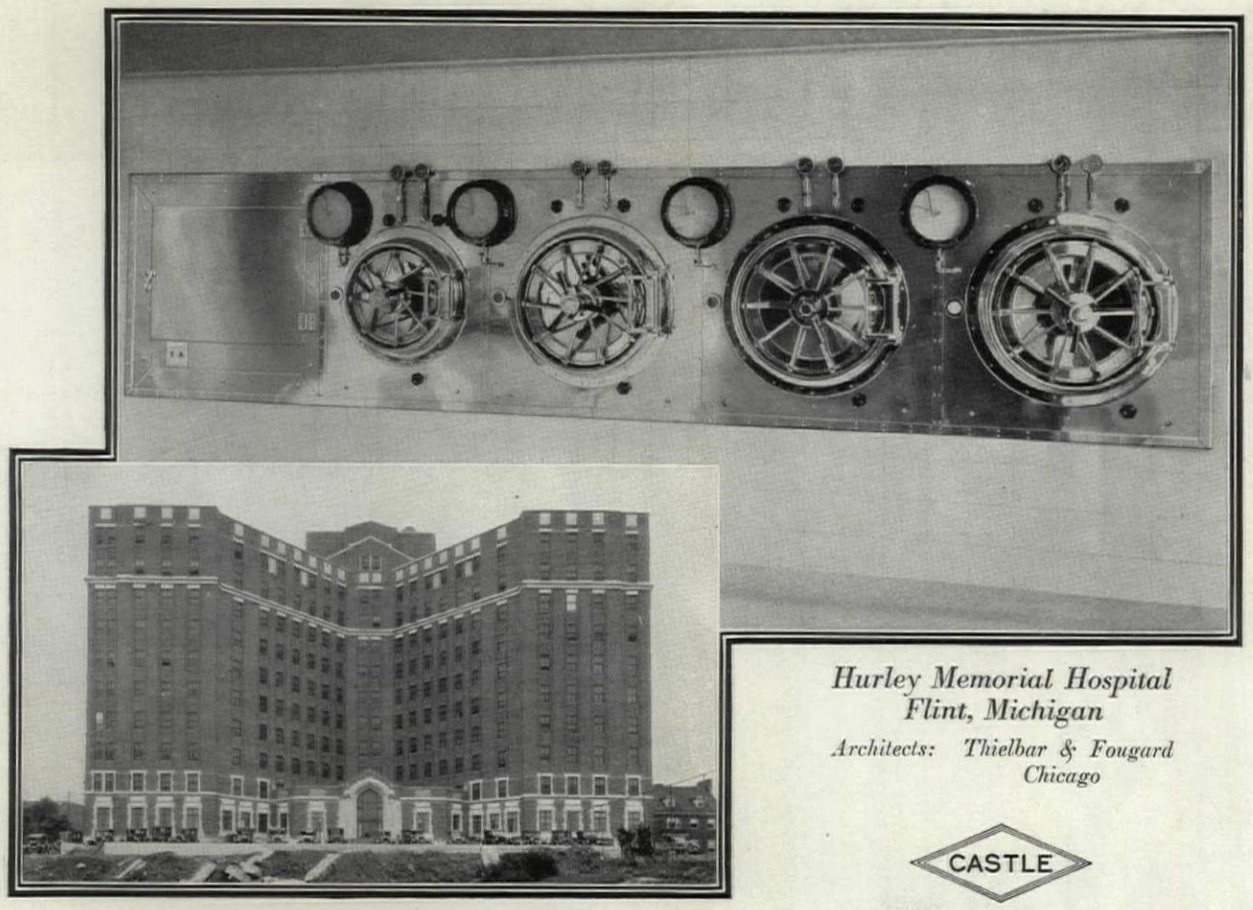
May we send you detailed specifications or any information you wish? Please write: Servel Sales, Inc., Evansville, Indiana.

Builders: Wingrey Realty Corporation. H. Lansing Quick, Architect.

The beautiful new apartments built on Locust Hill Avenue, Yonkers, N. Y. Electrolux equipped throughout.

ELECTROLUX REFRIGERATOR

MADE BY SERVEL



Hurley Memorial Hospital
Flint, Michigan

Architects: Thielbar & Fougard
Chicago

CASTLE

Originality Distinguishes Another Large Castle Sterilizer Installation

1917 Castle originated "Forced Air Evacuation" for 100 percent penetration of steam in autoclaves.

1926 Castle originated *automatic* discharge of air and water from autoclave chamber.

1927 Castle connected this direct to plumbing.

1928 These improvements universally recognized as essential for good technique.

Castle originality in construction and design was recognized in the selection of Castle equipment throughout the new Hurley Hospital in Flint, Michigan.

The value of these improvements pioneered by Castle has created a new standard of sterilizing efficiency and safety everywhere. Let us tell you how they may be applied to your hospital.

Sales and service agents throughout United States and Canada

CASTLE

WILMOT CASTLE COMPANY 1209 University Ave. ROCHESTER, NEW YORK

World's Largest Manufacturers of Sterilizers for Hospitals, Dentists, and Physicians

PLEASE SEND DATA ON CASTLE SAFE HOSPITAL STERILIZATION

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MANGER HOTEL
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Architect
H. Craig Severance
Engineer
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Your HEATING ENGINEER has NATIONAL SERVICE BEHIND HIM~

THE COMPLETE LINE THAT BRINGS UNIT RESPONSIBILITY

Your heating engineer, when he uses National Products, has behind him a complete line of Boilers and Aero Radiation. Each unit of this complete line represents an outstanding achievement by some one of the six great companies which united to form the National Radiator Corporation. Every unit is backed by one satisfying, uncompromising responsibility.

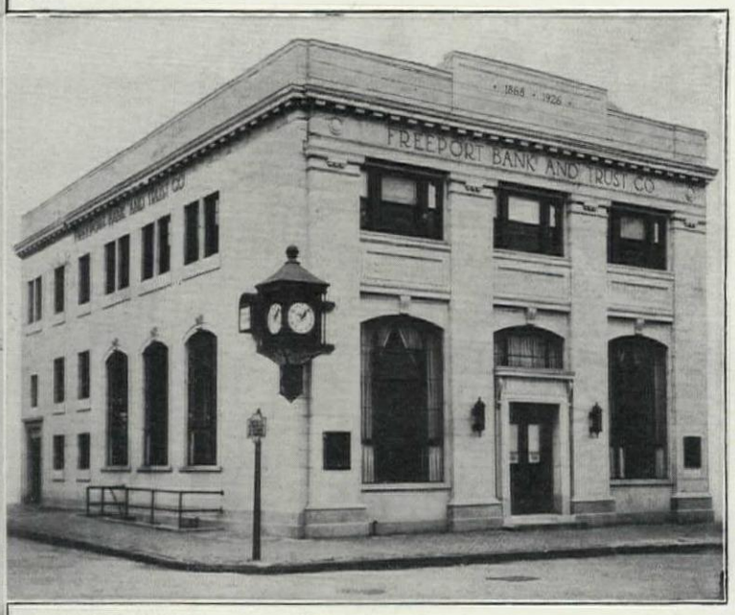
Your heating engineer has behind him the many phases of National service—of *production,* made possible by the tremendous facilities of ten great plants—of *delivery,* made possible by the adequate system of warehousing and distributing—of *cooperation,* made possible by the seventeen National district offices, strategically located to serve you quickly and efficiently.

NATIONAL RADIATOR CORPORATION

MANUFACTURER OF RADIATORS AND BOILERS

Nine Plants devoted to National Service through these Branch Offices and Warehouses:

Baltimore, Md.—2600-2622 Frisby Street
Buffalo, N. Y.—259-265 Delaware Avenue
Cleveland, Ohio—935 E. 63rd Street
Indianapolis, Ind.—431 W. Georgia Street
Milwaukee, Wis.—124-130 Jefferson St.
Omaha, Neb.—108-112 S. Tenth St.
Pittsburgh, Pa.—1509 Arrott Building
St. Louis, Mo.—1042 Central Industrial Ave.
Boston, Mass.—93-97 Oliver Street
Chicago, Ill.—2445 N. Keeler Avenue
Cincinnati, Ohio—Spring Grove and Elmira Avenue
Johnstown, Pa.—221 Central Ave.
New York, N. Y.—55 W. 42nd St.
Philadelphia, Pa.—121 N. Broad St.
Richmond, Va.—3032 Norfolk St.
Washington, D. C.—2205 Fifth St., N. E.



The Invisible Safeguard of Fine Bank Buildings

PLASTERED walls and ceilings are no better than the plaster key that supports them—no better than the invisible safeguards that protect it from force of gradual disintegration.

Among the many fine bank buildings protected by Par-Lock, we call attention to these two splendid Pennsylvania structures, the Freeport Bank & Trust Co. and the Aliquippa National Bank, both designed by Architects Simmons, Brittain & English of Pittsburgh.

The Par-Lock Appliers of Pittsburgh furnished and applied Par-Lock to the interiors of all exterior walls and also to all concrete surfaces that were plastered—assuring dependable key, expansion joint and protection against dampness and stain.

The nearest Par-Lock Applier will gladly consult with regard to your own forthcoming fine building.

THE VORTEX MANUFACTURING CO., *1984 W. 77th St.*, CLEVELAND, O.

Par-Lock
PLASTER KEY

PAR-LOCK APPLIERS

ALBANY,
425 Orange Street
ATLANTA
Bona Allen Building
BALTIMORE,
613 West Cross Street
BOSTON,
45 Commercial Wharf
BUFFALO,
958 Ellicott Square Bldg.
CHICAGO,
111 West Monroe Street
CLEVELAND,
218 Hunkin-Conkey Bldg.
COLUMBUS,
751 South Cassingham Rd.
DETROIT,
2544 First National Bldg.
KANSAS CITY, MO.
2035 East 19th Street
MINNEAPOLIS,
434 Builders Exchange
NEWARK, N. J.,
24 Commerce Street
NEW YORK CITY,
50 Church Street
PHILADELPHIA,
1700 Walnut Street
PITTSBURGH,
614 Bessemer Building
SCRANTON, PENNA.
Cedar Avenue
ST. LOUIS
1011 Telephone Building
TORONTO,
2258a Bloor Street, West
TRENTON,
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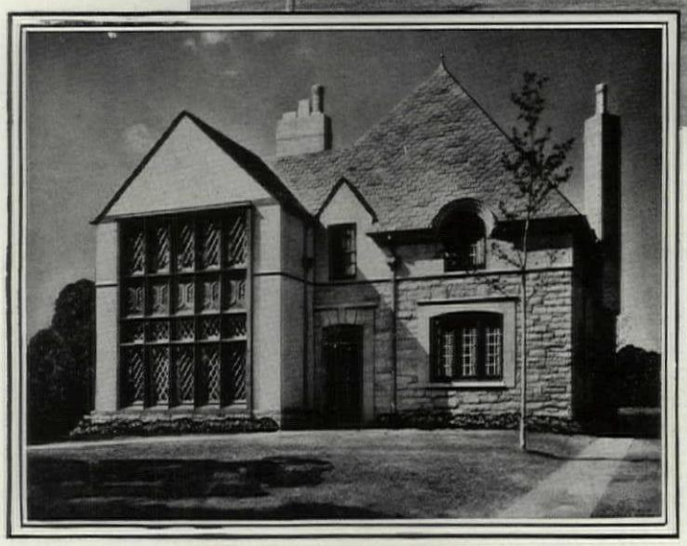

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BOOK DEPARTMENT

KITCHEN MANAGEMENT

Reviewed by
C. W. SPENCER

THE ever-increasing tendency among Americans toward living and eating in groups in such places as hotels, restaurants and cafeterias has produced a tremendous business in the sale of prepared foods, and it has become highly important that everyone concerned in any way with this enterprise should study it in a careful and scientific manner. Any architect who expects to be concerned with the designing of such buildings should be thoroughly conversant with the workings of a kitchen organization, so as to be able to plan this portion of the structure in such a manner that it will function smoothly and with a minimum of cost, lost motion and waste. He must know the methods of doing the work so that he may properly provide for the sanitation and ventilation of this department and provide equipment that will safeguard the life and health of both employes and guests. Since about 21 per cent of all meals served in America are prepared in such kitchens, it will readily be seen how great the importance of the industry is and what an amount of waste can arise from poorly planned kitchens.

It is only recently that the subject of kitchen management has been placed on a scientific business basis, and the change from old, haphazard methods has resulted in the saving of untold millions of dollars. Being a new science, there has been little published material on the subject, and what improvement was made was attained slowly by actual experience. The men who were in a position to know best about such things were too busy or lacked the inclination to put their experiences in form to be used by the rest of the industry. J. O. Dahl, who has spent many years in hotel departments, both at the "back" of the house and "out front," has devoted a great deal of time to the investigation and study of kitchens in all classes of buildings in all parts of the country, and has published the results of his research in a volume entitled "Kitchen Management." The importance of the layout of kitchens and the great opportunity for their improvement are indicated by this author when he says that of all the several hundred kitchens in which he has worked or which he has studied, only 49 were over 90 per cent efficient in construction and layout. This applies to new as well as to old kitchens, and is due in many cases to the fact that kitchens were put into areas that were not originally designed for that purpose, and also to the fact that the kitchen is often laid out by someone who knows practically nothing about food service and preparation.

Thus it is apparent that the kitchen should be carefully planned as to layout and equipment while the building is still "on paper," and that this should be done by an architect who has made himself thoroughly familiar with the processes of serving and preparing food and with the modern tendencies toward scientific management and use of up-to-date equipment.

The first 14 chapters of the book are directly concerned with the architect's problems and cover the planning of the modern kitchen as to its location, construction, flooring, walls and principles of efficiency. A chapter is devoted to the ideal pantry, and another to "Bakery and Butcher Shop Layout." The fourth chapter is on "Efficiency in the Storeroom." The dish- and silver-cleaning departments are described in the fifth chapter. Hospital and institutional architects will be especially interested in the chapter on "Diet and Service Kitchens," and "Transportation and Communication" present problems which should be studied by architects in all cases. Ventilation, modern refrigeration, and lighting are all subjects which are of great importance in securing maximum efficiency and production from the kitchen plant, and each is covered here in a chapter. Studies in fuel and power give much information and many suggestions in laying out electrical and cooking equipment, and three chapters are concerned with the various kinds of equipment and descriptions of various machines and devices that may be used in an up-to-date kitchen and for which space should be provided by the architect in making the layout.

At first thought it might seem that the remainder of the book, which is devoted to problems of actual management and kitchen routine, would not concern the architect, but if the architect is to give the best possible service to the owner or operator it is important that he be familiar with all the processes and operations that are to be carried out in the kitchen in order that he may be in a position to provide a plant that will be fitted in the highest degree to the purposes it is to serve. The book is interestingly written and is illustrated throughout with cuts from photographs, with plans, and with drawings, and in addition the appendix at the end of the volume has a large collection of plans showing successful layouts for kitchens in some of the leading hotels, restaurants, hospitals, clubs, and institutional and industrial buildings. One invaluable detail is the inclusion in the appendix of bibliographies concerning every phase of the problem.

KITCHEN MANAGEMENT. By J. O. Dahl. 364 pp., 6 x 9 ins. Price $5. Harper & Brothers, New York.

ARCHITECTURE. By A. L. N. Russell 266 pp., 5½ x 8 ins. Price $3. E. P. Dutton and Company, New York.

SO much of a technical nature has been written for the student of architecture, that the average individual is likely to think an understanding of the subject is almost beyond his reach. Mr. Russell in this book aims to break down the barriers of technicality and show in a simple way how the forms of buildings, or what we call the "historic styles," were evolved from the materials the people had at hand, the purpose of the building, or the conditions of the time. He also gives a picture of the gradual development, so that the reader may realize how one style is related to another. Due to the limi-

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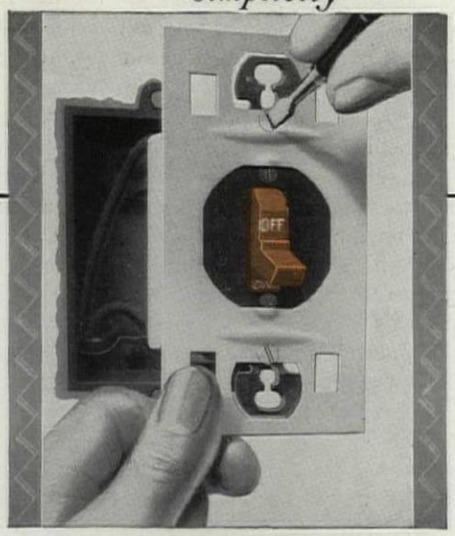

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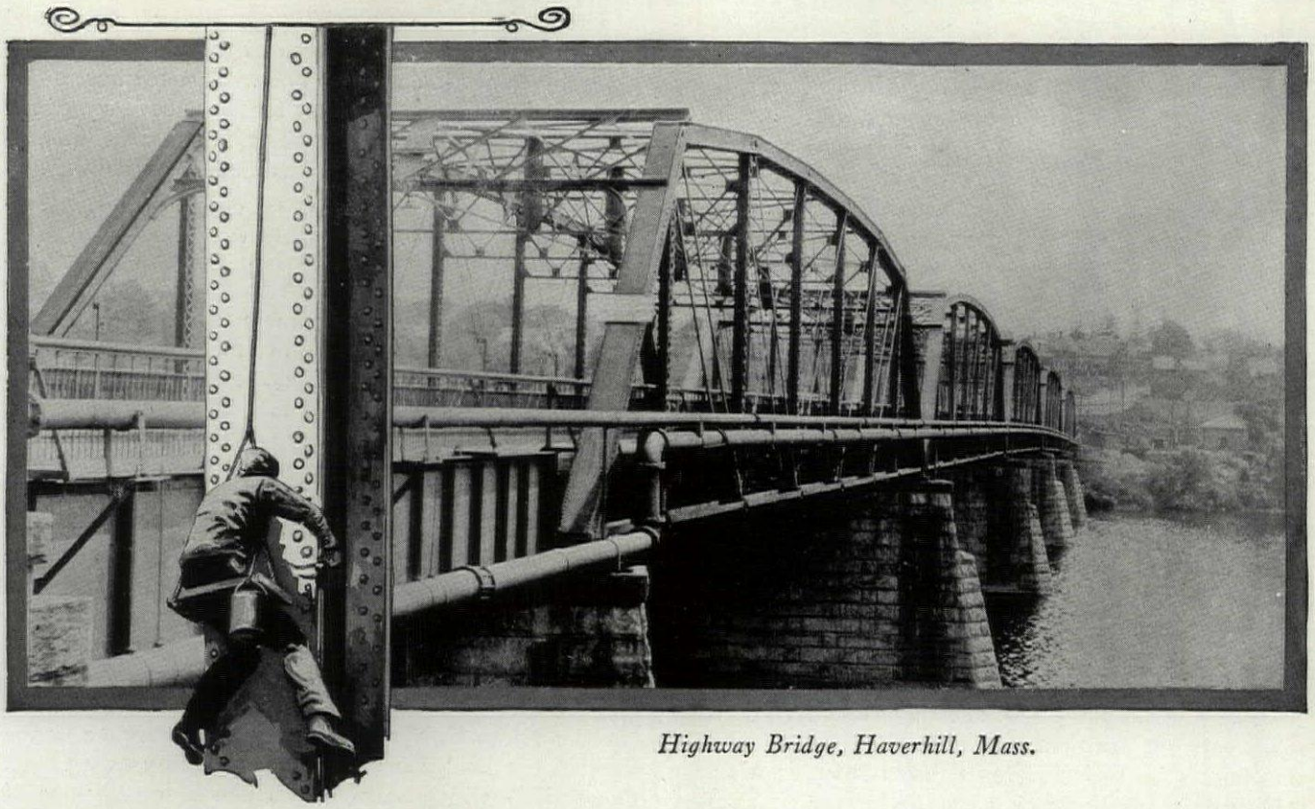
tations of the size of the book, the text discusses only architecture in those countries and periods which have a direct influence on the architecture of western Europe. Building in Mesopotamia and Egypt are described in the opening chapters,—how the people developed their structures from the materials of the country, in Mesopotamia with mud, reeds, straw and palm leaves, while in Egypt, stone from the valley of the Nile was used. The early attempts with the "post and beam" and the arch did not make much headway, largely no doubt due to the climate, where it was always mild out of doors, and where any ceremonies which required a large space could be held in a courtyard. The Egyptians concerned themselves largely with tombs, and the architects who could conceive the pyramids and the government that could carry them out must have been more than capable. The pyramids are examples of great building, but probably not of great architecture; they are indeed triumphs of engineering.

The Greeks' great contribution to architecture was the founding of the "Greek orders," Doric, Ionic and Corinthian,—which are still used, almost in their original form, all over the world. Their buildings were "sermons in stone," which served as a reminder of Greek rules of life and conduct. Logic, balance and restraint, with the rhythm of proportionate parts running through all design, were qualities of the Greek ideal. They introduced all sorts of refinements in the design of a temple in order to correct certain optical illusions. After a building had been made as perfect as possible, it was enriched by sculpture, not merely as an applied ornament, for each piece was designed for its particular place in the whole scheme. The Parthenon, built in 438 B. C. still ranks as the most perfect building of all times. The Romans, once their interest in Greece was aroused, developed a passion for everything Greek. They borrowed the Greek orders, preferring the Corinthian, and developed it. The feature of Roman work which was to have an important effect on what came after was in the use of arches. Aside from the buildings, the streets were adorned with triumphal arches and gateways. We have today no buildings or institutions that can compare with the Roman baths. They included formal gardens, tennis courts, running tracks, open air theaters, accommodations for games and gymnastic exercises. In the center was the bath proper, with walls and floors of colored marble, and the ceilings decorated with paintings, mosaics and gilded bronze. The rooms contained statues, bronze screens, grilles and furniture of all sorts. There were private baths, lecture theaters, colonnades, where news of the day was read. Eleven aqueducts supplied Rome with water, and three are still in use today.

The structure of a Gothic cathedral is explained in detail by the author of this work,—how every portion of the structure is in constant action. The weight of the roofs, which is flung sideways by the thrusts of their vaults, is met by pressure in the opposite direction. The aisles and side chapels push against the nave and choir, while the thrusts too high for them to deal with are met by the zigzag of the flying buttresses. With the opening of the fifteenth century in Italy, the Gothic impulse had run its course, and then came the dawn of the Renaissance. The cathedral at Florence stood unfinished because no one knew how to roof an octagon 138 feet



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across. It remained for Brunelleschi to solve the problem by building a dome in two shells with massive buttresses to join them. The height was to be increased by raising the dome, resulting in a magnificent structure.

Inigo Jones returned to England from Italy full of Italian inspiration. His work meant the beginning of the English Renaissance. Another architect, Christopher Wren, designed St. Paul's and other churches and public buildings. With no precedent to work from, he conceived architectural effects new for that day. In houses, his work is called "Queen Anne." The eighteenth century received much inspiration from Rome. Architecture was taken up as a branch of scholarship, which resulted in artificiality and imitation of foreign styles. The four Adam brothers introduced the "Adam style" with its refinement and delicacy. They not only designed the house, but the furniture and fittings for it. The widespread knowledge of classical works and rules of proportion led to a high standard of taste. In France, the completion of the new facade which completed the palace of the Louvre, marked an architectural event, and the palaces and gardens built in the seventeenth century served as models for all Europe.

Dealing with architecture in America today, Mr. Russell points out our debt to McKim, Mead & White for showing us by their buildings that Italian Renaissance could supply the inspiration needed for the problem of modern building design. The very sizes of our structures helped architects to free themselves from superfluous decoration, which spoils so much modern work. The architect was forced to rely on proportion, shape, and mass of the building, the effect of light and shadow, and generally to work on broad lines. Due to present-day zoning laws, various new forms for the setback skyscraper suggest themselves to the architect, creating an interesting new development, which has endless possibilities.

MANHATTAN, THE MAGICAL ISLAND. 108 Pictures of Manhattan with Prelude and Descriptive Notes. By Ben Judah Lubschez. 8¾ x 12 ins. Price $15. Edition de Luxe, $30. Press of The American Institute of Architects, New York.

ALONG with the development which has brought photography to what seems to be almost perfection there has gone growth of good taste in its use. Photography ceased years ago, in fact, to consist merely in pointing a camera at something and then pressing a button, and there are many commercial photographers and hosts of gifted amateurs who have made of the making of photographs literally an art. Until one sees photographs of so many of them collected, it might not be realized that New York, notwithstanding its commercialism, possesses so many buildings which are beautiful, —beautiful individually and in themselves, that is, though scattered widely, for there are miles of dreary ugliness between St. Paul's Chapel or the fine old house at 7 State Street and the University Club on Fifth Avenue or the Washington Bridge far up town; but beauty exists, even though it be widely scattered. There is scarcely one of these 108 views which shows a structure not already well known, but the taste and skill shown in making the photographs supply ample justification for their publication.

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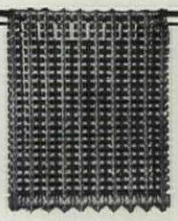

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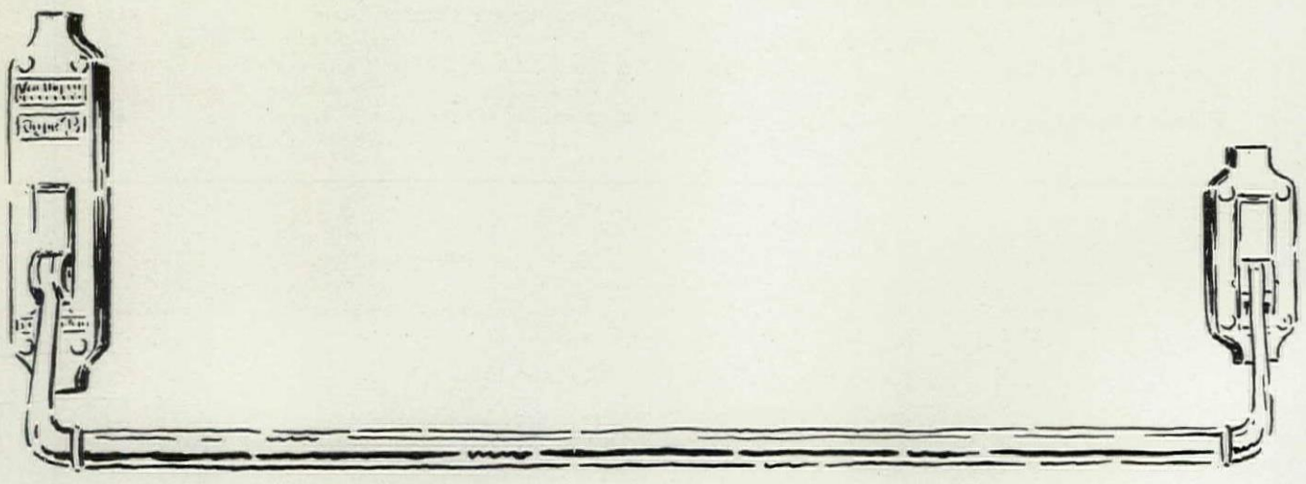


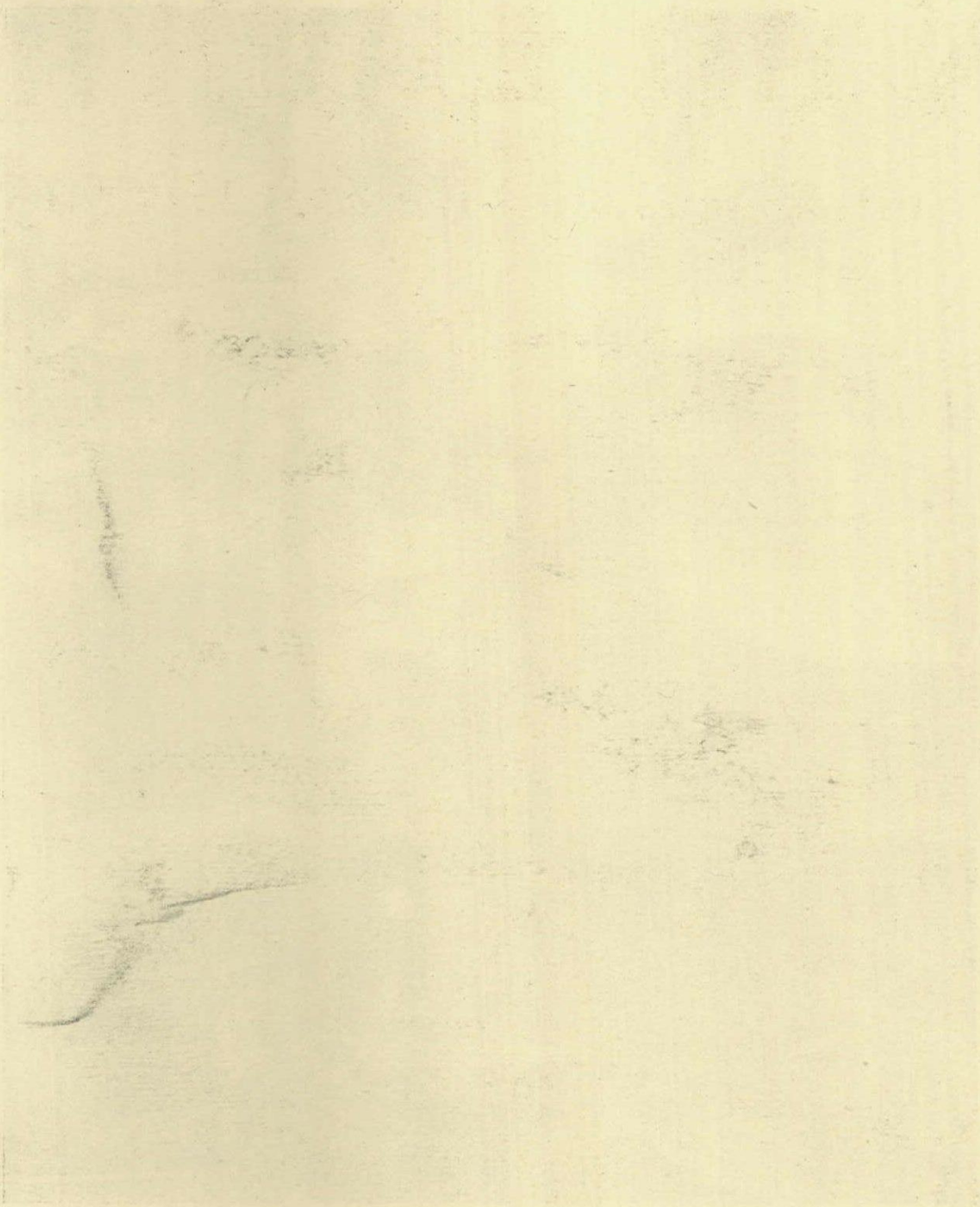


Photo. Milo Alexander Guild

A COUNTRY HOUSE IN THE MAKING

PHILIP RESNYK, ARCHITECT

THE
ARCHITECTURAL
FORUM

VOLUME XLIX NUMBER THREE

SEPTEMBER 1928

NEW STRUCTURAL FEATURES OF THE COUNTRY HOUSE

BY
TYLER STEWART ROGERS

THE very nature of a country house project implies quality and permanency of construction as primary requisites. Clients build country houses usually as a luxury rather than as necessary shelter. They demand quality of construction in all details,—first, in order to reduce maintenance and depreciation costs, and, secondly, in order to protect the costly furnishings and decorations which the houses usually contain. Whatever the architectural style may be, and whatever attention is paid to decorative elements, the structural framework must possess qualities of strength, durability, resistance to the action of time and weather, and usually a considerable measure of resistance to fire.

In this article we shall give consideration to the structure of the country house primarily from the point of view of the changes and improvements which have become possible through use of modern materials and methods of construction and the changing trend in design influenced by these factors, rather than merely summarize the structural features in the manner of a check list of elements which require consideration by the architect and owner. Looking at the problem from this angle opens up some very interesting matters for discussion, for in spite of the general impression that there is little new in the way of structural materials, the fact remains that the last decade,—and in fact the last two or three years,—have witnessed some important new developments which are definitely influencing the structural design of country homes. In this discussion it is impracticable to treat of the relative merits of various structural systems and materials, because individual factors surrounding each project, including the availability of materials, the topography of the site, the shape and size of the structure, its architectural style, and the type of exterior wall surfaces and roofing materials to be employed, all influence,—in fact may govern,—the choice of structural elements. It is quite sufficient, therefore, to mention the materials and structural systems adaptable to country house architecture, discussing only their individual merits and characteristics and leaving the choice entirely to the architect.

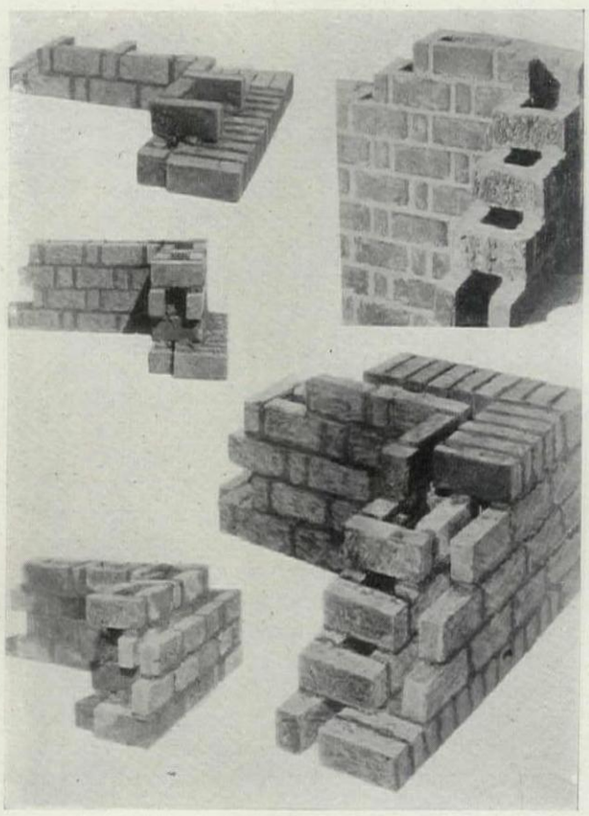
Foundation Materials and Sub-surface Construction. The usual foundation materials,—local stone, brick, reinforced concrete and concrete blocks,—have undergone little change for many years. The choice between these materials is almost wholly governed by local factors, for each of them is fully adequate for the purpose and produces foundations of ample strength and permanency; nor is it necessary to discuss materials for footings, including piling and mass or reinforced concrete, for these materials are employed in accordance with the load-bearing capacity of the soil. A relatively new factor worthy of attention is the development of basement areas for service and secondary living accommodations. Heretofore sub-surface space has been largely neglected, and basements have been provided under entire structures simply on the old theory that they were necessary to keep the ground floors dry and warm. They have been utilized solely for heating plants, fuel and other types of storage, and some of the less-used service functions. Today, the great volume of hitherto wasted basement area has been developed for practical usage of many types, from secondary living rooms and recreation rooms to highly developed service areas, such as fully equipped laundries, storage vaults, and spaces for the accommodation of mechanical equipment such as automatic refrigerating plants, water supply pumps, water softeners and purifiers and highly developed heating and ventilating plants with automatic stokers or oil or gas burners.

This trend has brought about the necessity for absolutely waterproof construction of basement walls and floors. Drainage of the foundations and footings merits first attention and should never be neglected wherever there is a satisfactory outfall for the drainage lines which are laid just outside of the footings, somewhat below basement grade. In a level country, and where heavy soil conditions make this method of protection unsatisfactory, the walls and floors must be made watertight through the use of membrane coatings on the exteriors of the walls or through the employment of some of the relatively new integral waterproofing compounds employed in the cement mixtures in reinforced concrete construction or in a cement mortar coat on the exterior or interior surfaces of stone, brick, or concrete block foundation walls. Going one step further, the utili-

zation of certain parts of the basement for living purposes requires that some means be employed to overcome condensation on the masonry foundation walls. This may be accomplished by introducing an air space near the inner surface or by furring out the inner wall and applying plaster to a suitable base which can withstand the effect of moisture without deterioration.

One method which has been successfully used to prevent the collection of condensate on the floors in basements is worth describing. When the walls are completed and before the concrete floor is laid, a board about 1 inch thick is laid completely around the walls at floor grade and the finished floor is poured up to this board with a pitch from the center of the floor to the walls in all directions. After the floor has hardened, the boards are removed, leaving a 1-inch channel into which any water which may condense on the walls or the floor finds its way. The outside drainage lines at the level of the footings take care of this water as it seeps through.

Structural Frame. There are five basic types of structural framing adaptable to country house problems. The first employs wood members throughout, using either dimension lumber in an ordinary manner with solid corner posts and studs or employing old-time timber framing of heavy, solid, structural members. The second type employs masonry walls of stone, brick, hollow tile, or cement block, with or without an exterior facing in the form of a veneer, and with structural floors of wood or steel members or of reinforced concrete. The third type, deserving a separate classification, involves the use of reinforced concrete for the structural frame, and the fourth employs structural steel fireproofed with stone or cinder concrete and faced with veneered walls or masonry walls of non-load-bearing character. The fifth type, which is just now being developed to the point where it may be considered a definitely established method of construction, employs a light steel framework throughout, distinguished from the structural steel frame by the use of what may be termed steel studs, functioning like wood studs in ordinary wood frame construction and by the omission of masonry fireproofing for each steel member.



Brick Hollow-wall Construction

Several new developments have occurred which pertain to structural framing and are worthy of special notice. Looking a little into the future, wood frame construction may soon take on new importance through the development of a successful chemical treatment of relatively low cost which makes wood highly moisture-resistant and which protects it from rot and the attacks of insects, including termites or white ants. This new treatment, which is something more than merely preservative, is an absorption process that may be applied to structural members as well as to finishing woodwork, including trim, doors, windows and window frames, flooring, paneling, and similar elements. It is interesting to consider the possibility of applying this treatment to genuine half-timber construction, for if the structural members can be made free from expansion and shrinkage, warping and twisting due to the absorption of moisture and subsequent drying out, it will be possible to use masonry fillers and stucco between exposed half-timbers or solid timbers and still have a weathertight wall at all times. This matter is still so new that the application of the chemical treatment for this purpose is yet to be tried out; nevertheless, tests already conducted are so satisfactory as to make the suggestion worthy of consideration where genuine timber framing in the old manner is desired.

The only other really new development in structural framework is the light steel frame already mentioned. Rolled steel shapes of relatively light weight are used for intermediate studs with light weight structural steel corner posts, beams and girders. The elements are usually bolted together after being cut and fabricated in standard units under shop conditions. Field welding of the structural frame is also being used and will undoubtedly be an important factor in this type of construction. The erection of this frame is exceedingly rapid, once the foundations are ready and the material arrives on the ground. Steel may be used for every structural member including walls, floors, major interior partitions and roof. The exterior of the framework usually consists of a coat of stucco applied over metal lath or a special stucco reinforcing base which has a waterproof backing attached to welded wire mesh. The stucco coat may constitute

the exterior finish or it may be used as a backing for a veneer of stone or brick. The interior face of the steel members is plastered over a similar reinforcing plaster base, leaving the steel framework protected on both sides by a highly fire-resistant wall. Structural use of this system promises a number of advantages, including permanency, a high degree of fire resistance, ease and speed of erection, and probably lower cost than reinforced concrete construction, fireproofed structural steel framing, and possibly lower cost than heavy, solid, masonry walls.

Types of Structural Floors. The common use of wood joists for structural floors needs no mention, nor is there need for an extended discussion of the use of structural steel and reinforced concrete in their various systems, for no changes have taken place in the employment of these materials recently. The only important new development in floor construction has been the successful introduction of steel joists as floor members, a matter fully discussed in an article appearing in the April, 1928 issue of THE ARCHITECTURAL FORUM. This type of floor, employing light steel joists laid on structural steel framework or masonry bearing walls and having a thin concrete structural slab above and a metal lath and plaster ceiling below, is particularly well adapted to country house construction where a high degree of fire resistance is desired. The cost of this method of floor construction is relatively low. It is undoubtedly the least expensive type of fireproof construction.

In country house work architects are frequently faced with the problem of developing really soundproof floors to separate sleeping quarters from the living rooms below, so that guests may not be disturbed by entertainments and social activities after they have retired. Practically no floor construction is entirely soundproof unless there is a physical separation between the lower and upper surfaces of the floor, for it has been proved that practically all structural materials transmit sound vibrations from one surface to the other and that only an air space between two separate surfaces is wholly effective. This type of construction can be economically accomplished with steel joists in this manner. The structural floor above is built in the usual way, spacing steel joists at the proper distance to provide adequate load-bearing capacity. Between alternate joists a second set of steel joists is installed in such a position that their lower chords are approximately 1 inch below the level of the lower chords of the trusses supporting the floor. To these wider-spaced secondary steel joists the metal lath and plaster ceiling are applied, using furring channels if necessary. An intermediate layer of sound-deadening material of soft, flexible type may be installed if desired to form a continuous layer running under the lower chords of the floor joists and over the upper chords of the ceiling supports. In this way the ceiling is independent of the floor above, and sound transmission may be entirely eliminated, because vibrations from the floor above cannot be directly transmitted to the ceiling below, nor can there be a reverse action. Wood joists have been successfully used in this system of staggering the joists and using the upper set to support the floor and the lower, separate set for the ceiling.

Whether or not fireproof construction is used throughout the house, there is a marked tendency today to make the first floor over the basement fireproof, because it has been well established that the great majority of fires in residences originate in connection with the furnaces or in fuel storage spaces. Steel joist construction may be employed advantageously in conjunction with wood frame for the rest of the building. Light reinforced concrete first floor construction is being used in many instances to prevent the possible spreading of basement fires. This tendency to use fireproof construction for floors has introduced another problem of use of finished flooring materials that may be applied over a concrete base. Several new developments in this field are worthy of special mention. Where wood finished floors are desired, two systems may be employed. The first and newest is the use of chemically treated wood floor blocks laid in a plastic cement directly over the concrete structural slab to form parquetry effects in genuine hardwoods, such as are frequently desired. The same chemical treatment which has been mentioned in connection with wood framing assures a permanent wood floor not subject to warping, shrinkage, and cupping. This type of floor can usually be laid more rapidly than strip or

Brick Veneer Over Cement Tile

narrow faced hardwood flooring and is undoubtedly the most economical type of wood floor over a concrete base. Where strip flooring or wide plank flooring is desired over concrete, sleepers may be introduced into the structural concrete slab in light steel joist construction, or they may be applied over the structural concrete floor in reinforced concrete and steel frame construction, using a cinder concrete fill between the sleepers or various types of sleeper-clips without fill. Here the chemically treated flooring possesses many advantages in economy, rapidity of laying and freedom from defects encountered in untreated hardwoods when laid over concrete and subjected to the moisture and condensation always apparent in a concrete slab.

Concrete floors may be finished with various types of hardeners to eliminate dustiness, and to give the floors more pleasing colors. They are also particularly amenable to surfacing with tile, stones of various types such as slate, marble, Caen stone, and similar materials, artificial stones, and resilient composition flooring materials, including cork and rubber compositions. The latter materials have come into wide use, not as substitutes but as floorings of distinctive character, possessing qualities not found in other materials. Rubber compositions are usually laid in tile form directly over the concrete base, employing special cements developed for the purpose.

One detail must be noted,—that the use of these cements demands a perfectly dry concrete floor to get permanent adhesion. Cork composition flooring includes cork composition tile and linoleum in sheet forms. These materials have been so perfected that they may be utilized in any part of a house, and they possess to a high degree, like rubber compositions, great resilience and comfort under foot, and marked durability. Cork composition tiles and linoleum are also laid in a plastic cement over the concrete slab, and the same precautions should be taken to have the slab thoroughly dry. Both cork and rubber composition materials are available in many colors and in variegated forms resembling marbles, and they can be used effectively to introduce color and pattern in flooring. The preparation of the concrete structural slab to receive these materals is inexpensive, consisting of securing a smooth, level surface in the slab itself without the usual granolithic finish and expensive troweling and floating.

Wall Construction. Mention has already been made of the newest type of wall construction involving the use of stucco and brick or stone veneers over a steel frame. There has been a marked trend within recent years toward the use of combinations of masonry materials as compared with the former predominance of solid masonry walls of one substance, such as brick or stone. The advantage, if any, has been that of lower cost, for there is probably no wall superior to a well built solid brick wall or one of well laid stone,—at least from a purely structural point of view. Relatively new materials, including hollow clay tile, stone and cinder concrete blocks, have come into quite general use. Clay tile has been developed in certain forms which permit its use as a facing material, but more often it is employed as a structural material with either a brick or stucco facing. Concrete blocks have also been successfully used alone by employing those having a specially prepared face, but more frequently they are employed as a backing material for a veneer of stone or brick or for a coating of stucco. Cinder concrete blocks are coming into general use in certain territories where their production has been developed, but their porous nature adapts them more particularly as a backing material, and they are rarely or never used without a supplementary facing.

It has now become universal practice in better quality construction to dampproof all types of masonry walls. The thinner the wall the greater the necessity for this treatment, for it is now known that driving rains will eventually penetrate masonry walls up to 12 inches in thickness, due to the porous nature of the mortar joints and sometimes of the masonry material itself. It has also become standard practice to furr out the inside surfaces of all masonry walls for two reasons,—one, because of the natural condensation of moisture on the inner surface, and, secondly, for the insulating value of the air space. There really is a third reason also,—that of sound absorption, for it is proved that plastering directly on a hard masonry wall creates unpleasant acoustical conditions that are very difficult to overcome.

Insulation has been receiving a great deal of attention within recent years, and many new materials have been introduced which are designed to eliminate or lessen heat losses. Old theories have been upset by tests, and ample proof has been developed indicating the effectiveness and value of an adequate layer of efficient insulating material within the walls. These materials are of four basic types:

1. Board forms, consisting of fibrous or porous materials compressed into sheets.
2. Mineral and vegetable fibre in flexible sheets.
3. Mineral and vegetable fibers or powders used in loose form and poured or lightly packed between the structural wall and the inner plaster surface or between floor joists for floor and ceiling installation.
4. Solid mineral insulators which are cast in place, consisting of powders which when mixed with water are poured into the wall or floor spaces, where they set in a highly porous form.

The use of these insulating mediums is usually worth while in country houses, for their effectiveness is great enough to offset their relatively low cost even when employed in high quality construction. Mention might also be made of the growing use of veneer construction over wood frames, consisting of brick, stone, or stucco. In this system the wood frame is designed to carry all loads and is arranged to take care of normal expansion and contraction of wood members in a uniform manner in order to obviate development of cracks in the plaster walls after the house is completed. The veneer has no

load-bearing function and simply becomes a decorative and protective element. When wood floor joists are used with solid masonry walls, there is tendency for the floor members to shrink as they dry out, and there is also a marked tendency for interior bearing partitions made of wood members to shrink, causing a development of plaster cracks along ceiling lines adjacent to the masonry exterior walls (which do not shrink in a similar manner). This is another difficulty that is overcome by using light steel and concrete as structural materials which are worthy of special attention in the development of country homes.

Veneer construction over both wood frame and in conjunction with structural masonry materials has grown in popularity primarily because of its relatively low cost. No limitation is imposed upon design features by the use of veneer. Common brick is extensively used to get Old World texture effects, and all types of bond can be developed without difficulty in a veneer wall, including Flemish bond and the so-called "skintled" brickwork. Face brick is almost always employed as a veneer, backed either by common brick or other masonry materials, or it may be employed over the sheathing of a wood frame. Stucco is in itself a veneering material, and its use is so well established that no special mention is necessary. Cut stone—particularly limestone—is now manufactured in relatively thin slabs for veneer construction of fine residences.

Interior Walls. Along with the trend toward use of fireproof construction has come increased attention to the use of fireproof partitions within the country home. The types commonly employed in fireproof commercial and industrial buildings are adaptable to residential construction where the supporting framework is adequate to carry the dead load which they impose. Common brick may be employed for a 4-inch wall over moderate spans and for reasonable ceiling heights and will take plaster directly on both sides without furring. Hollow tile has been extensively used in this manner, and gypsum block because of its lighter weight is highly suitable.

Where interior partitions are made of wood or metal studs, fireproof construction demands the use of some type of metal lath as a plaster base. Wood lath is not used as much as formerly for quality construction, and its place has been taken by metal plaster bases and to a certain extent by various types of plaster board. The latter type of material has grown in use for moderate-cost homes, but where expensive decorations are to be applied over the plaster, architects have shown definite preference for metal lath and wire mesh because of the mechanical bond they provide and because of their function as a plaster reinforcement as compared with the simple adhesion of plaster to wall boards. Another new material, recently developed, is a form of plaster finish especially designed for application over wall boards and insulating boards. While this material is a finishing material and for that reason is outside of the scope of this article, its use is designed to permit the employment of plaster boards and insulating boards for interior wall construction to a greater extent than has heretofor proved practicable. Tests indicate that this new plaster finish has successfully solved this long-standing problem.

In country house development there is need for soundproof walls as well as soundproof floors in certain areas. Much attention has been devoted to this subject in recent years, and some progress has been made. There has been a tendency to advocate the use of insulating materials for soundproofing purposes, but this is sometimes only partially effective if there is a physical connection in the form of a stud between the two adjacent wall surfaces. It is found that the wall moves as a whole, functioning as a vibrating diaphragm, and that filling the air spaces with a soft and porous material goes only part of the way toward the desired end. The ideal construction involves a double set of studs in staggered position with one wall surface applied to the first set and the other wall surface to the second set. Another way of solving this problem is by the use of a solid and substantial wall, such as brick, tile, or gypsum block and employing a soft plaster on either face. Under this plan reliance is placed upon both the sound-absorbing qualities of the soft lime plaster and the rigidity of the wall core. A third method of soundproofing,—which is applicable to ceilings as well as walls,—involves the employment of certain new materials developed for their acoustical and sound-absorbing properties. One type that has been long used with a high degree of success for correcting acoustical defects in auditoriums, theaters, restaurants and hospitals, consists of a thick layer of hair felt with a fabric coating upon which decorations may be applied as over plaster. This material is soft to the touch and for that reason is not extensively used for wall surfaces, above a wainscot of reasonable height. Nevertheless, its employment in this manner for the upper wall surfaces and for the entire ceiling area is effective in absorbing sound, so that little or none is transmitted through the wall or the floor above.

Other acoustical materials of a harder type, consisting of compressed and felted fibers, may also be employed for soundproofing purposes. Their effectiveness is based upon the principle of absorbing the sound within the space in which it originates, as in the case of soft lime plasters. The attention that has been paid to insulating exterior walls and roofs against passage of heat has called attention to the advantage of insulating some interior walls between rooms where a considerable difference of temperature may be maintained during part of the day. This occurs, for example, between dressing rooms which are kept warm during the night and bedrooms or sleeping porches in which the windows are thrown open even during extremely cold weather. It also occurs between various types of storage rooms in the basement, in unheated fur closets and similar units.

Roof Construction. Considered in its structural

aspects, there has been little development in roof construction except the introduction of steel to a greater degree. Steel members are handled like any other type of structural members and are adaptable to hip and pitch as well as to flat roofs. They are obtainable with wood nailing strips attached to the top chords to facilitate the employment of a plank roof surface, or they may receive a thin reinforced concrete slab, as in the case of fireproof floors. The general employment of tile, slate, and other heavy roofing materials calls for special attention to the load-bearing capacity of roof members and to their rigid bracing. As all of these materials, as well as composition and wood shingles, are almost universally attached with nails to the roof surface, the employment of wood planks even in otherwise fireproof construction is commonly followed. However, sleepers can be installed in a concrete slab as in the case of floor construction, if desired, and these sleepers in turn carry the necessary nailing strips to which the roofing material may be conveniently attached. Here again insulation has become an important factor, for it is now known that a considerable percentage of the total heat lost from a building passes through the roof, and conversely that the heat of summer suns drives down through most roof surfaces and makes attics and upper bedroom floors almost uninhabitable in extreme weather. Where there is an unused attic, insulation is frequently employed in the ceiling of the upper floor, using insulating substances in loose form, such as fine powders or gypsum or fibrous materials that can be packed lightly between the attic floor joists. Where the attic space is used for servants' rooms, recreation space or other living purposes, it is essential that this insulating material be made a part of the roof structure itself.

Many of the relatively new materials that have been mentioned in this summary were primarily developed for use in other type of buildings, and their adaptation to country house planning has frequently been quite slow. This indicates the importance of being constantly familiar with new materials and new methods in order that the architect's office may be prepared to bring to its country house clients all the advantages which modern developments offer.

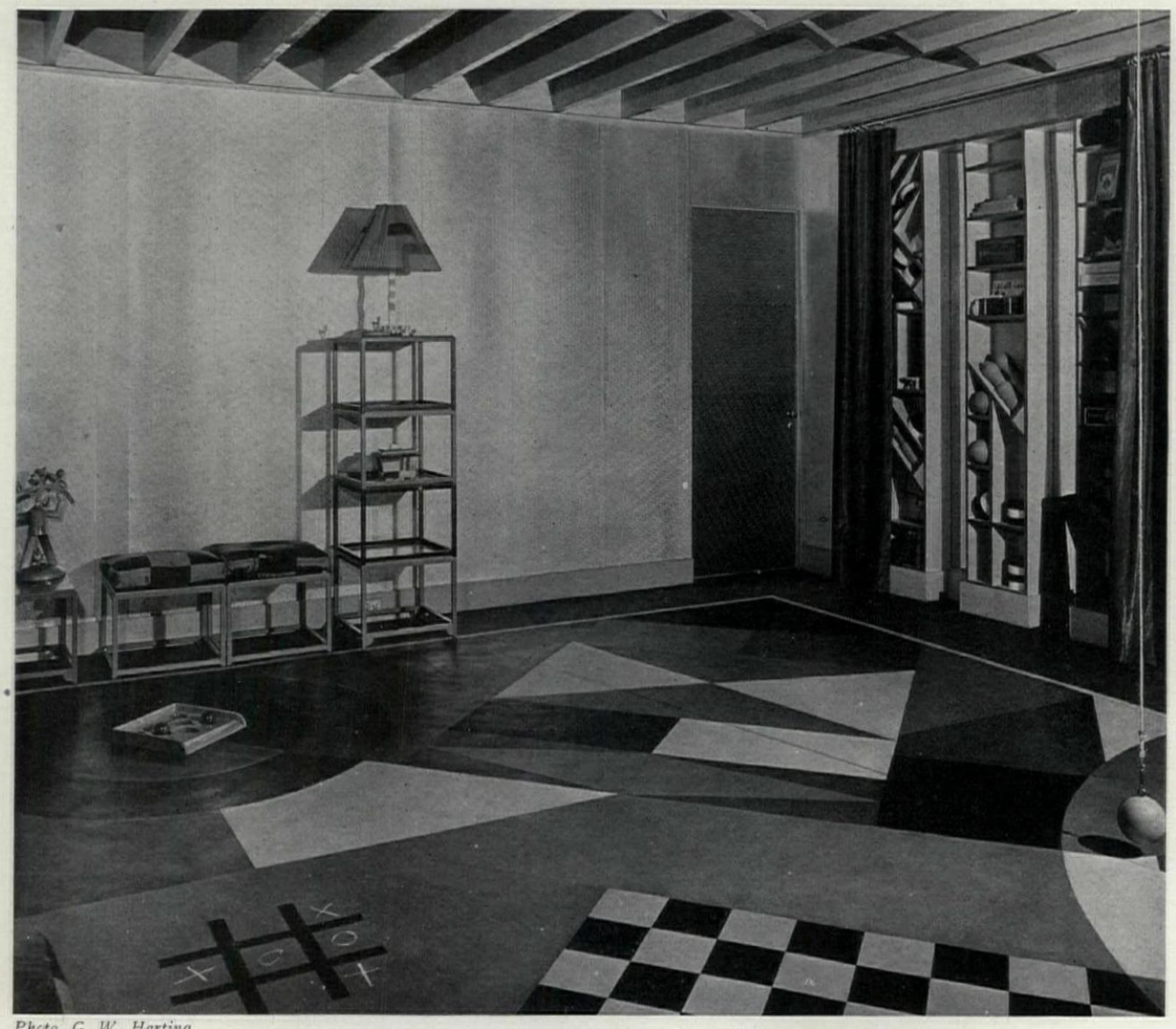


Photo. G. W. Harting

Game Room Floor of Inlaid Linoleum Over Concrete

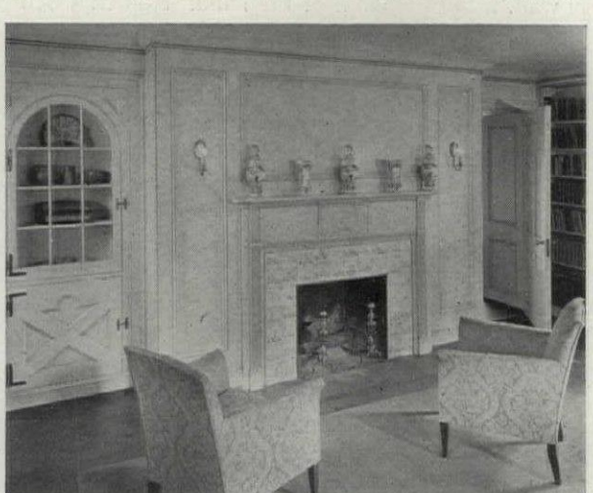
MATERIALS FOR THE INTERIOR FINISH OF THE COUNTRY HOUSE

BY
PENROSE V. STOUT
ARCHITECT

IN the earliest days, primitive man built himself a shelter to protect him from the vagaries of the weather and from the attacks of his enemies. As man has developed, the purpose of his house has become more complex, and civilized man must have beauty as well as comfort in his immediate surroundings. The interior of the house has become as important as the exterior. How is this beauty to be obtained? In approaching this problem the architect is faced by two primary considerations,—the personal and the economic factors. The atmosphere of the house must be in keeping with the manner of life of its owner. The stage must be set with thought of the action,—shall it be a simple setting for real rural existence, the broad hearthstone and a self-contained life, or shall the style of the house reflect a grander style of living and form a background for social gaiety and a great complexity of interests? The economic factor determines important limits and chains the flights of fancy to solid earth. Limits are great blessings. Without limits, design is impossible, and in the absence of real limitations, the artist is forced to create his own. In architecture, as in every other field of art, it is not the cost of the object which makes it beautiful. The simple, inexpensive house may be, inside and out, as complete and charming an entity as the most pretentious.

It is very important to distribute the building appropriation thoughtfully among the various rooms. The main living rooms which have most use should have proportionately more spent on them. Necessary economies may be cleverly made in less used rooms. This does not mean lack of consistency throughout the house. If the appropriation is small, the materials should be inexpensive and the treatment should be simple throughout. The problem of interior work should be approached with one question in mind,—how can the greatest beauty and adequacy be attained without the sacrifice of simplicity? The artist with Spartan fortitude should bravely eliminate every unmeaning detail. The value of successful country house architecture is not so much in its immediate appeal as in its lasting qualities of beauty. The test comes with time, and it is important that time should find both design and material good. To know well the good work of the past and how to interpret it in terms of modern life with modern means is the work of the architect. The so-called "modern" movement in art, revolting as it does against precedents, has caused much interest and agitation. It is an effort to express modern life, and as such it has much merit for the architect. The new art should not be shunned nor should it be unreservedly embraced. The wise designer will find much of value in the new ideas, but he will not discard the invaluable heritage of the past. A healthy growth in art, as in nature, must come through evolution rather than revolution.

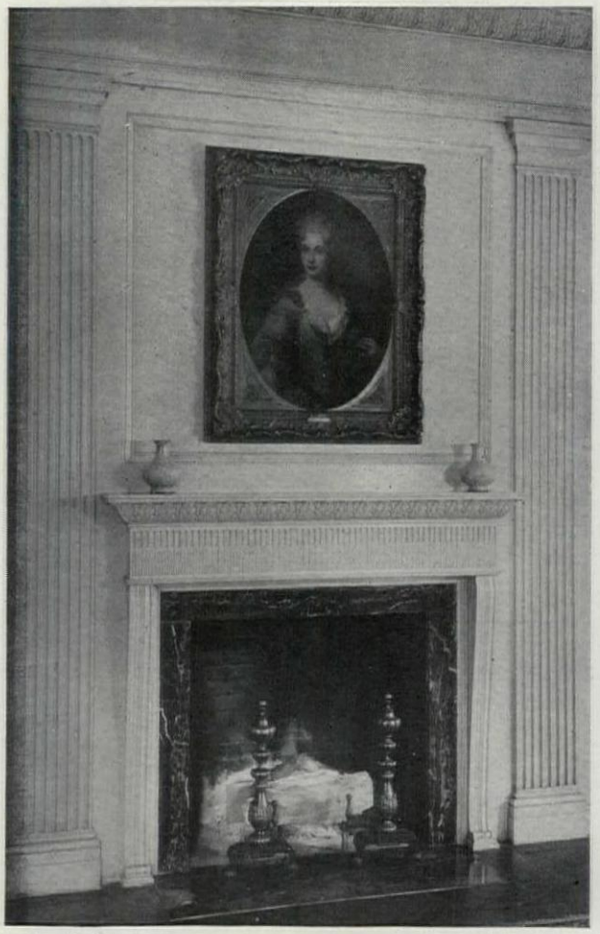
In the earliest days, the architect could use only the direct products of nature,—wood and stone,—and he was further limited, by lack of transportation, to the use of the kind of wood and the kind of stone in the vicinity. Later, the magic of transportation made the natural products of the whole world available to those rich enough to buy them. But never has the architect enjoyed such freedom of choice as at present. He has at hand an almost unbounded variety of materials with which to realize his vision. Science and manufacture have combined to refine the ancient products and to create a wealth of new materials. This vast array of riches brings its own dangers, and the temptation to use too many different finishes is ever present. Too great differentiation makes for restlessness and confusion, and the greatly desired simplicity is sacrificed. Too wide a diversity



Photos. Nyholm

This simple painted wood paneling is well proportioned for the low ceilinged library

American pictorial wallpaper adds interest and a sense of spaciousness to this dining room



Photos. Nyholm

The painted woodwork of this living room is carefully studied. The delicate carving is emphasized by a light glazing coat, wiped off. Facing and hearth are marble

The contrasts are here reversed. Stained walnut is used for the wall, and the marble facing of a lighter brown reflects the background colors of the painting above

in color and finish should be avoided in rooms which have a physical kinship,—for instance, living and dining rooms which open into each other in smaller country houses. If these rooms are finished in different styles or materials, the scale of the house is diminished. Treated alike, they tie together and the house seems larger. Difference in sizes and shapes, in hangings and furniture will give each room its own individuality while preserving unity of scale.

Plaster. When primitive man first needed something to hold the stones of his hut together, he used mud for cement, and ever since that time man has been perfecting his binding compound. He next used it for filling up the cracks and making the inside of his house smooth. As he developed and began to think of beauty as well as of necessity, he used plaster, decorated and in relief, for his ornamentation. He was forced to mix his own compound and often made mistakes, but today we have perfected and standardized products which give dependable results. No matter how good this plaster product, it is wasted on an improper foundation. It is no economy to save on the lathing. The best lath is a necessity for permanent plasterwork and goes a long way toward eliminating the cracks which disfigure walls.

For ornamental purposes, plaster may be modeled on the surface itself, or the decoration may be pre-cast and the finished plaster worked to it. The admirable parging of the early English homes was worked directly on the wall or ceiling, and the background plaster was worked as smooth as possible on the wall, using the palm of the hand. It is expedient today to have the ornament pre-cast on burlap sheets and applied to the wall. To avoid any doubt of the result, it is possible to obtain hand-finished plaster, also cast on burlap. This soft, smooth and irregular surface can be shellacked and glazed with excellent effect and makes a perfect background for old furniture and hangings. Plain plaster cornices are better run directly in place. If ornamented, it is better to have them pre-cast and laid up in sections. In houses where the softness of old hand-finished plaster is desired, and economy is necessary, it can be closely approximated by using textured plaster or composition materials, applied with a trowel and wet brush or with the brush alone.

There is a wide variety of other effects of texture and color which may be obtained by the studied use of these materials. They lend themselves to being modeled on the wall and afford a good base for glaz-

Palm-finished plaster is here used appropriately. The peacocks worked in flat relief were designed to help frame the portrait above the fireplace

This fireplace is of old roofing tile which, laid herring-bone, forms an interesting pattern. The carving on the oak lintel enriches the fireplace

ing. Color may be mixed in, and painting and stenciling done in relief. These finishes should be applied with a smooth, inviting surface, and the wall should never be left, as it often is, with sharp, forbidding projections. These rough-textured surfaces should not be used indiscriminately. Because of their novelty and cheapness, there is a prevalent tendency to use them in unsuitable places. A room in a simple Georgian type house, which would be dignified and charming with plain painted walls, is garish and exaggerated with heavy textured composition. It is well to observe that the most prevalent cause of annoying wall cracks in plaster is too quick drying. The room should be kept practically closed for a week after each coat, to insure its proper set. Sgraffito, used extensively in Hollywood, is a most interesting, permanent and inexpensive means of decoration. Thin layers of cement or plaster in contrasting colors are applied one over the other, and before it receives its final set, the design is scratched on. If the top surface only is scratched through, the color of the undercoat shows, and if this undercoat is scratched in places, the color of the next coat appears in the design. The fact that sgraffito is an Italian name for a process formerly used in Italy extensively, is no reason why the process should be limited to the expression of Italian ornament exclusively. If the character of the design conforms to the spirit of the room, it might well be adapted to almost any style with great interest and charm.

Wood, formerly one of the primaries of construction, is still the architects' greatest friend. In its variety and adaptability it is unexcelled as a medium of decorative and structural expression, and it supplies the essence of beauty in many a room. With its richness, softness, and mellowness, it has no equal for the intimate sitting room or library. It is the perfect frame for tapestries, or panels of exquisite needlework or for shelves of vari-colored books. Moulded by machine or carved by hand, it has a direct and irresistible appeal. Here again fitness to the particular problem in hand must determine the kind of wood and its design. Pine is too humble to frame rare tapestry in a stately hall, but properly treated it offers a soft and friendly background for rooms less formal. It is most satisfactory when selected for wide-flowing grain and small, tight knots. It appears best when mellowed by age or lightly stained and waxed. The pine room has recently become a fad; no house seems to be complete without one.

Photos. Nyholm

Vertical pine boards with moulded edges frame this simple and appropriate mantel

Hand-hewn timbers in this carpenter-built staircase express ruggedness and simplicity

There is no good reason for this monotony, since many other woods are as beautiful, as readily available, and often more appropriate in the setting. Oregon cedar is easily worked, is of very good color, and is usually less expensive than white pine. Chestnut, although rapidly disappearing from our forests, is still plentiful in the lumber yards. It has a beautiful grain and good working qualities. Oak, the old reliable, is medium priced and is essential for some period rooms. There are many, perhaps, less well known woods which have character and distinction of their own,—for instance butternut, cherry, birch, gum, and pecky cypress can be used with good effect at medium cost. Among the finer woods, walnut,—American, French and Circassian,—must be mentioned. Mahogany, often ruined heretofore with red stain and glossy varnish, is susceptible to most beautiful carving and is a fine, dense wood of decorative figure. There is good reason to believe that it will shortly have a new vogue with more sympathetic handling.

It is well to bear in mind that all large wood panels should be laminated to stand the expansion and contraction caused by our dry, heated houses. It is also important to heat a new house enough to dry out the walls before setting any wooden trim. Irreparable damage is frequently caused by the absorption of moisture by new woodwork in a house with plaster not properly cured. Wood which is to be painted should be easily worked and non-warping. Its grain must not rise, and any tendency for the sap to stain the paint should be retarded with shellac. Among the good woods for painting are varieties of white pine, soft pine and whitewood. In using random width plank flooring, highly satisfactory results have been obtained by using oak fumed in potash. This process gives the floor a uniform brown color, which prevails all the way through the wood. It therefore has less tendency to show wear than stained floors. Use of the process also obviates any tendency to swell or buckle.

Painting is a subject on which everyone considers himself an expert and in which everyone has dabbled at some time in his life. Although painting seems so simple, it is one of the chief efforts of an architect to obtain workmanship and materials of a consistently good character. It is no longer necessary or advisable to mix one's own paint. A skilled painter well trained in his trade may produce an excellent result with his own mixture, but there is no assurance that the same painter will be on the next contract. Thousands of dollars have been expended in the laboratories of manufacturers to perfect their paints and varnishes and to test their results. It is the part of wisdom to enjoy the benefits of their scientific research and to be assured of a consistently good product, thoroughly adapted to the case in hand. The architect thus can know beforehand the result of his specification. Labor is the chief item of cost in a paint operation, and it is important to buy quality paint rather than material made down to a price.

There is a product on the market for finishing

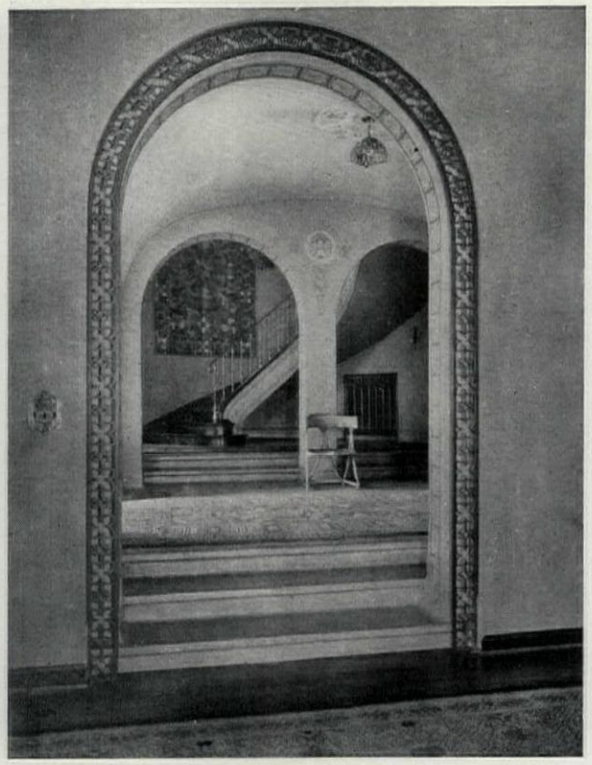
This floor is of waxed slate; the door of battened oak; the stair of polished black composition, and the walls of textured plaster

Here the floor is of black and white marble. The stairs are painted, the balusters of painted wrought iron with cast brass caps and bases

floors in two operations which gives a very desirable effect. After scraping and sanding, the floor receives one coat of this product. It is allowed to stand for about two hours, and the surface wiped off. After 24 hours the floor is polished, and thereafter maintained with wax, as usual. Where wear eventually shows in passages and at thresholds, a new application of this product very quickly corrects the damage. It has been found highly desirable for use in apartment houses where the floors have to be refinished for each new occupant. It has good color, transparency and finish; it has remarkable penetrating qualities, and is also a good preservative. It saves the laborious and expensive operation of clearing the floor to the natural wood and rebuilding the surface. The recent advent of quick-drying lacquers opens up new possibilities for good paint effects. Lacquer produces a tough, tenacious surface of good texture, and a feature of frequent importance is its quick-drying characteristic. It is not a cheap product, but this is largely compensated for by its good covering capacity. It is frequently applied with economy as a spray, where large and uninterrupted surfaces are to be finished. It will be found excellent for stencil work where several colors are used, and when it is costly and tedious to wait for the drying of one coat before the next is applied. For obtaining a natural wood finish, one of the larger paint manufacturers has recently presented a product which makes it possible to obtain a very good finish with two coats. The first coat is a stain and filler combined, of good body and transparency. It is necessary only to add the finish coat, whether this be of dull finish varnish or wax. It has been found that great economy can be thus obtained along with highly desirable effects.

Where means permit and a handsome paint finish is desired, it is wise to first cover plaster with muslin. This produces an excellent surface upon which to paint, and it prevents hair cracks from later marring the finish. When the walls themselves are to be decorative, rather than a background for other color and design, wallpaper plays its part. There is an endless variety of designs to choose from, and the result will be no better than the choice. The durability of paper may be increased and the color tones of many improved by the application of an especially prepared sizing recently perfected. If the paper is to be used in bathrooms, it should be sized with this preparation and given two coats of spar varnish. Paper treated this way is attractive for bathrooms, as decoration is practically limited to the wall surfaces. On bathroom walls, below the wainscot line, waterproof surfaces are imperative. The most economical treatment for the walls is the use of Keene's cement finished with a good grade of waterproof enamel. Where this is used, it is important to have a 2-inch strip of tile set flush with the plaster immediately above the bath tub or other horizontal projection which will need frequent washing, or the enamel will soon be worn away. Tile from floor to ceiling, or to wainscot height, in plain or contrasting colors, is well worth the added expenditure. Our bathrooms,

Sgraffito is used in this mantel in delightful harmony with its surroundings



An original use of wrought iron for trim. The arched soffits are stenciled

until recently gleaming white as snow houses, are now decorated with tile, heavy slabs of glass, marbles and mirrors, and made into shrines of luxury. Tile for the kitchen walls combines æsthetic pleasure with perfect cleanliness and saves constant repainting. It has long been used for bathroom floors and has proved its practical value, but only recently has thought been given to its use for color and design. It makes a highly appropriate floor for the breakfast room or loggia. Where a resilient floor surface is required, as in the working part of the house, linoleum or rubber, in sheet or tile, colored, embossed or marbleized, may be used to advantage. Long life and good appearance may be increased by waxing.

In stately rooms without carpets, floors of oak, walnut and teak are appropriate, and their richness may be enhanced by inlays of rare woods. Teak mellows and becomes rich and beautiful with age. Veneered floors of random-width oak are serviceable for rooms which are formal but less stately. Random-width oak planks, with wooden dowels, where cross-scraped, take on a softness of texture and an appearance of wear. This type of floor is becoming to the informal room. The charm of our early American farmhouse floors may be obtained with white pine in varying wide widths face-nailed with hand-wrought nails. They are charming when stained or painted. Now that comb-grained pine has increased in cost to that of oak, it seems wise to furnish oak floors for all bedrooms. Economy may be effected by using flooring with a predominance of short lengths, and in rooms where large rugs or carpets will be used, the short lengths may be distributed in the center and the long lengths used for the more exposed side sections. There is no thing more certain to cause trouble and annoyance after the completion of a house than floors which warp or shrink and expose cracks. It is a good principle, when floors are important, to have them furnished, laid and finished by a reputable flooring specialist, wherever one is available. The grace and elegance of marble for the stair hall has long been recognized, and it is unexcelled in an appropriate setting. For a Colonial hall, diagonal squares of Belgian black and a cream marble have given excellent results. Marble gives dignity to the mantel, and there is no other material which so adequately fulfills this function. It may be had in any color or graining to harmonize with the decorative scheme.

To gain familiarity with available materials, to study their characteristics and know something of their possibilities and their limitations is as essential to the architect as his historical study and æsthetic training. This familiarity stimulates the imagination. It is surprising to see the innumerable examples of excellent results that can be obtained with the simplest and least expensive materials when they are rightly used. The material that is used frankly for what it really is and for its own qualities is much to be preferred to one that is made to imitate something more expensive. The sham shows its shallowness, while the genuine grows old gracefully.

SANITATION OF THE COUNTRY HOUSE

BY

A. R. McGONEGAL

MEMBER AMERICAN SOCIETY OF SANITARY ENGINEERING

THE sanitary provisions in the country houses of today are receiving more and more attention. The living rooms, dining rooms and others may be designed in much the same way as they have been for the past five hundred years, but the bathroom, with its necessary conveniences, presents a comparatively new problem in design.

For comfort and convenience, each guest room should have a complete bathroom in addition to those provided for the master and mistress, although in quite large houses with an elastic guest list it may be deemed sufficient to provide a number of smaller rooms with a bath between each two. Servants, too, are critical people, and while it is not customary to supply private baths generally in the servants' quarters, it will be good policy to provide liberally for them. Many a well trained and otherwise desirable servant has been lost solely on account of insufficient or poor sanitary provisions. By reason of the different forms of service to be rendered, each of these types of bathrooms requires different fixture layouts, and as we are becoming educated beyond use of the stereotyped three fixtures in cold, white equipment, there is a selection of fixtures suitable for each, and we may fit and furnish each of our bathrooms in harmony with the chamber it serves.

The bath of the hostess comes first in consideration, and there is slight limit here on the designer's skill if the budget is elastic enough. One is no longer limited to the glaring white pottery of a decade ago for the fixture selection, as potters have learned the use of metallic coloring in glazes. Solid colors in blues, greens, and browns are obtainable, as well as many artistic shades to blend with almost any room's color scheme. Some potteries are also producing pleasing mottled effects, and much hand retouched, delicately veined ware has recently made its appearance. This colored ware is every bit as sanitary as the dead white; it does not show temporary dust, or interior fixture soiling, which it is not always possible to avoid, and it offers a relief from monotony by making possible the shifting of fixtures from room to room with each annual or periodical redecorating of interiors. Some manufacturers have recently placed on the market modern examples of the marble slab lavatories of a generation ago, beautiful to the eye when newly built of black and gold, or of delicately veined Etruscan marble or of onyx, but absorptive, nevertheless, and subject to possible failure where the parts are joined together. The veins in the marble pattern as well as the joints between the basin and slab may absorb water. Keeping pace with the advance in the art of pottery making, the brass worker now produces faucets, brackets, and metal trimmings in period designs, in two-color finishes, in all platings, and in widely varied selections. Chromium, cadmium, and other hard metals are now plated on so as to give a practically everlasting finish, and even gold and enamels are extensively used in pattern work. Some of the newer showings are colored by firing the harder finishes.

In the matter of wall and floor finish for master baths, we are somewhat similarly situated. Time was when finishing a bathroom meant simply using a more or less absorbent cold, white-glazed, earthenware, rectangular tile up to a height of 4 or 5 feet, with perhaps a colored stripe and a quarter-round nosing or ogee cap to finish, and a plain white or tinted enamel-painted wall above. Today, though we no longer use unvitrified material, we are still using tile for a waterproof finish, and we have a wide selection. Few if any other materials give at the same time such a practically non-absorbent wall and such an opportunity for pleasing design. Marble, though capable of fine effects, is too absorbent to be considered a fully sanitary material, and cast opaque glass, so much used a few years ago, was found to be subject to temperature cracks, and the joints could hardly be made permanently watertight. The manufacture of vitrified tile has advanced to a point where a non-absorbent, even product is the rule, and it is furnished in unglazed, mat or full-glazed finishes, and in practically any color or tint and in standard and special shapes. The use of faience and body tile in selected or random tints allows the designing ability of the architect full sway, and it makes possible the tiling of a bathroom that is in keeping with its purpose and at the same time inviting and restful to the user,—an architectural credit to the house, and yet thoroughly practical and water-tight. In the use of faience and special tiles it is usual to carry the tiling to 6 feet, 6 inches or 7 feet, or even to ceil the room over if so desired, and paving tiles in harmony with the wall work are used on the floor. Except in special cases, however, or in large bathrooms, tiling the ceiling has an oppressive visual effect and tends to accentuate small noises and splashings, and it will usually be found better practice to finish the upper parts of walls and the ceiling in some harmonious contrast in oil to give a lightening effect to the whole. Resilient floors of composition tiles, cork, linoleum and rubber are also frequently used in bathrooms, and they are made in many colors and designs, some in imitation of quarry tile or of marble.

Fixtures. In the matter of fixtures, the tub comes first, as it typifies the room. Some makers show free-standing tubs away from all walls, but perhaps as outweighing appearance there are the more diffi-

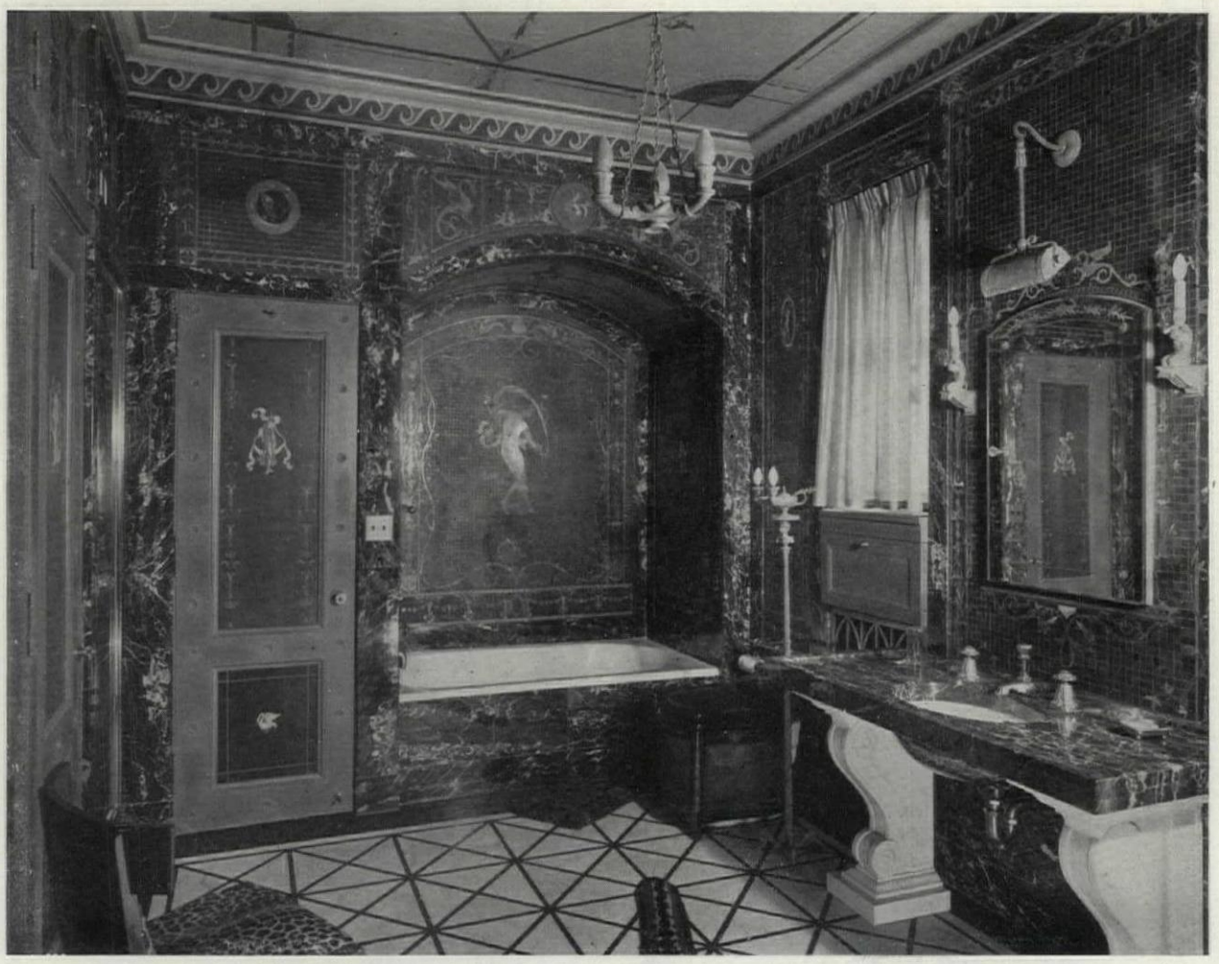
Photo. Keystone

A Commodious and Well Appointed Bathroom, Completely Tiled, Including a Built-in Shower Bath

cult plumbing connections to manage, and the two not unimportant considerations of occupancy of space which might better be given over to unobstructed room for dressing, and a wall for substantial attachment of handholds, to assist the bather into and out of the tub. Sometimes one is not as athletic as once, and perhaps not as slender, and a helping handhold is very gratefully appreciated. In the present state of the matter, enameled cast iron is a superior material for tubs, as vitrified earthenware, of which the other fixtures are made, usually cannot be had in such large pieces. This presents some difficulty in the use of colored fixtures, as the enamel on iron cannot always be made to match the metallic color glazes on the high-fired vitreous ware; but a solid tint can be selected in a built-in type which will harmonize with the slightly mottled tones of the rest; or what is perhaps best, a rim type with a lighter inside tint can be selected, and the ends and front can be blocked and tiled in with the same tiles and treatment as the rest of the room. The bottom and sides of the tub should be insulated from the floor and from the wall construction with mineral wool and rubber blocks or with other suitable water- and vermin-proof material to minimize the transmission of sound.

Showers. The wall type of tub lends itself most readily to use of the shower, especially if it be built into a recess, as a shower can be at shoulder height with a diagonal stream discharge. A shoulder-height shower permits a quick cold rinse after a tubbing without drenching the hair and getting water in the eyes, and it allows also a complete and comfortable hot or cold shower standing in the tub. If one wants to wet the hair, it is easy enough to bend over slightly. While the shoulder type does not splash as much as the overhead type, a curtain is still a necessity, and here again the recessed tub gives opportunity for a straight curtain rod across the recess. Rubberized silk curtains can be had in a sufficient variety of colors and patterns to harmonize with the room and its fittings, and an especially effective touch is to have towels of a tint that fits in with the color scheme of the room.

The shower fixture should be of the concealed piping type with a removable face, ball-joint rainhead, and an equalizing, non-scalding shower valve. One or two valves on the market have this equalizing feature built in, but it can be had as an added appliance on any shower valve equipment, and it prevents any change in temperature of delivered

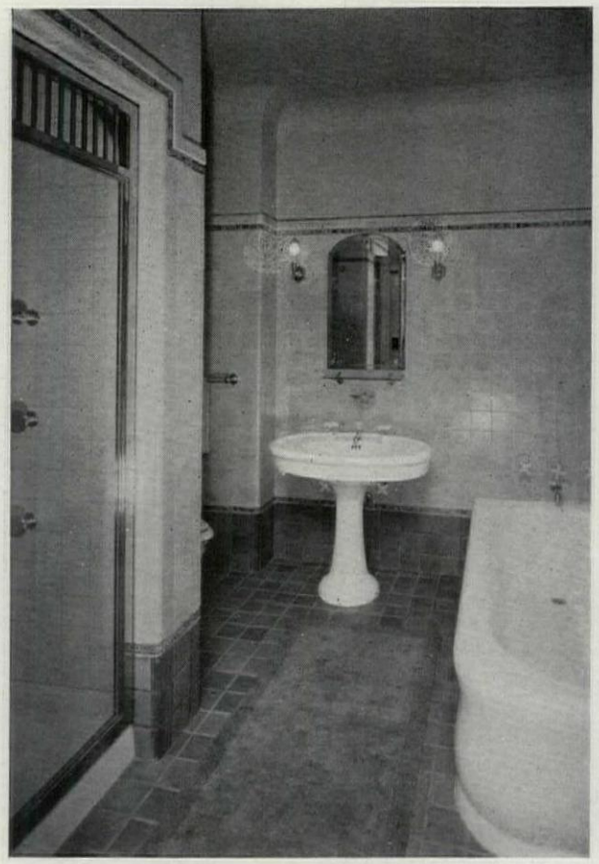


Decorations, Fixtures and Fittings May be of a Period Style as in this Modern Pompeian Bathroom

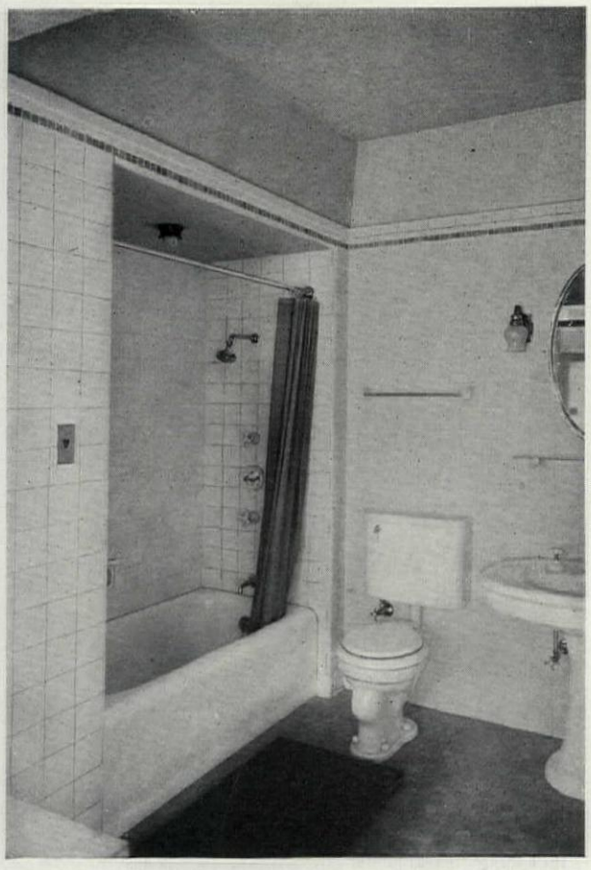
water after once setting, which might be caused by slight momentary variations in pressure between the hot and cold supply lines, due to temporary usage of one or the other elsewhere. So as to prevent occasionally leaving a cross connection between the hot and cold supplies, the operating handle of the non-scalding valve should be the only valve handle present in the bathroom, the control valves and the checks on the supplies being located in a closet or panel at the end. The handles of the mixing valve, the supply sprout for the tub, and the bath faucets can be had to match the basin faucets and other hardware in pattern and finish. The supply to the tub should be a spout from the wall and above the rim. Spouts through the sides or the ends of tubs and bell supplies may permit direct cross connection between the sewer and water supply, allowing body-waste water to get into the water supply.

Water Closets. Unfortunately, water closet bowls have never been designed so that they will give a satisfactory flush and at the same time be absolutely noiseless. The flushing efficiency of a closet depends on its siphonic action, and the breaking of that siphon occasions a slight "chug-chug" at the completion of operation. Several tank-operated closets on the market are, however, noiseless except for that one feature, and if the tank is objectionable in the room and out of harmony with the design, it can be placed in a closet opening from an adjoining room, and the flushing handle be extended through the wall. One make of noiseless closet has the tank and bowl all in one piece and has a distinct sanitary advantage,—that of air break in the supply line to prevent possibility of the contents of the bowl or tank being siphoned back into the water supply. A way to provide all closet tanks with this feature will be found, and will be probably made a code requirement in the future. Flushometer valves of satisfactory performance are on the market, but on account of the impossibility of operating them without accompaniment of some noise, they have not been universally adopted.

The Bidet. As a complement to the water closet, a bidet fixture is quite often installed in the modern bathroom. This fixture has been used in Europe for many years, but its popularity here has not been very great, owing perhaps to lack of education in its many advantages from therapeutic and personal cleanliness viewpoints. The bidet, however, should be installed with separate overhead supplies, feeding



Built-in Tiled Shower with Ventilated Plate Glass Door

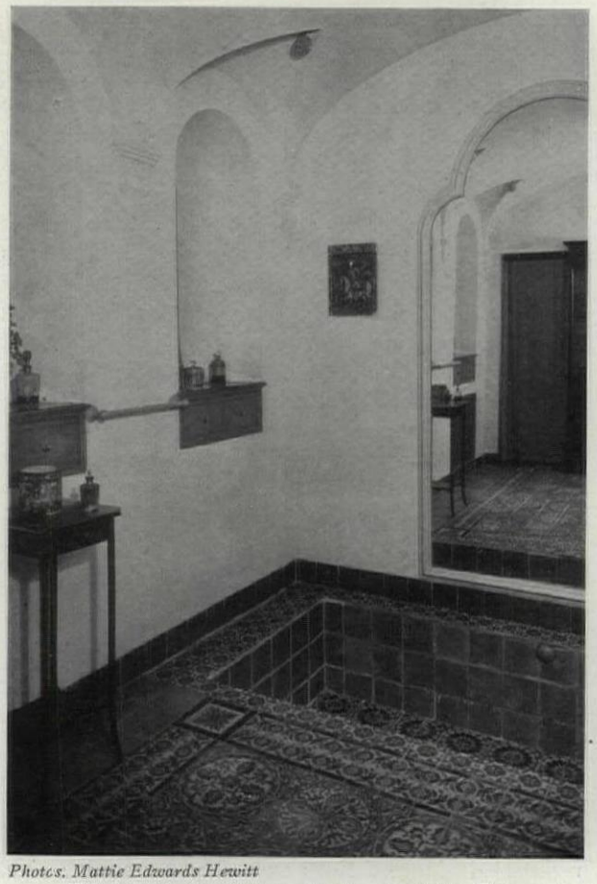


Recessed Tub with Built-in Fixtures and Shower Lights

both hot and cold water down from a point at proper pressure above the fixture,—or with a downfeed and vacuum valves at the turn, so that siphonage of bowl contents back into the water supply is not possible. It is also well to install a non-scalding valve and equalizer on the douche connection, for obvious reasons. If a bidet is not provided, a hidden cabinet immediately at and above the closet is a desirable feature. Such a cabinet may be finished like the rest of the wall with a counterweighted tile door in brass strip frame, operated by a suitably located button and spring. A foot bath is a desirable additional fixture in a fully equipped bathroom, and by installing a sitz bath fixture of the hospital type with a douche connection, the functions of the sitz bath, the foot bath, and the bidet may be combined, as it may be used for all, with the continuous hot spray feature added. The douche supply must, however, be protected as in the bidet fixture.

Lavatories. For hand basins, there is an almost infinite variety to choose from, as the potters are continually turning out new designs. In the best work, a not overlarge lavatory is chosen, with a dressing table to match. When a lavatory is used also for general toilet purposes, even the larger sizes are likely to be unsightly in use on account of the multiplicity of combs, brushes, manicure aids, and cream jars left thereon. Like the tub, and for the same reason, the lavatory should have the water discharge into it from *above* and not *below* the rim. The faucets, brackets, legs or trimmings should match other plumbing hardware, and as already said, may be had in a wide variety of finish and design. The combination fixture having one outlet for water is a distinct advantage, as it provides water of any temperature for those who wish to wash in running water. As a companion to the lavatory, dental basins are being used quite extensively. They are made with flushing rims and gooseneck spouts, relieving lavatory basins of mouth washings when brushing teeth, or gargling the throat, such uses of the basins meant for ordinary purposes being repugnant to many. In addition to a small mirror over the lavatory and a winged triple mirror over the dressing table, a full-length mirror is not out of place in a fine bathroom. A metal framed couch covered with waterproof fabric is useful for rest or rubbing. The metal frame can be enameled to harmonize with the room finish, and the covering could harmonize with the shower curtains and hangings.

Bathroom windows should open to the outer air to get the benefit of the germicidal power of the sun's rays, but in addition every bathroom should have a local vent of some sort. Time was when the locally vented closet bowl was in vogue, but its disadvantages in installation and its liability to create



Photos. Mattie Edwards Hewitt

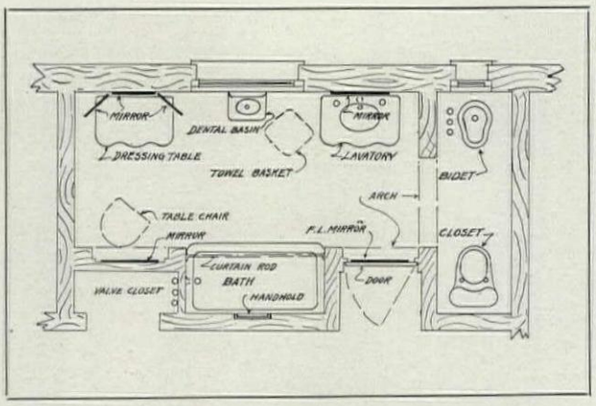
Tiled Bath Set Below the Level of the Floor

Convenient Tile Shelf Built Around the Tub

in a short time exactly the unsanitary conditions it sought to eliminate, prevent its use now in high class work. Humidity to the point of saturation occurs during hot or warm baths, and this as well as fixture odors must be balanced. This can generally be done by means of a small metal duct with a register near the fixture level and another at the ceiling, the duct leading to a ventilator at the roof. For the ordinary bathroom, 1 square inch of duct for each square foot in plan will be found ample, but it will not operate unless the lower panel of the door is louvered or unless there is some other satisfactory way of letting air into the room. A much smaller duct can be used if a very small electric ventilation set be installed, as has been done in much recent high grade work.

The bathroom of the master's chamber may be as fully equipped as that for the mistress, except that the dressing table will probably be omitted, the winged mirror put over the lavatory for shaving, and the full length mirror be left out. The tiling and color scheme will probably be more severe, and the plumbing hardware more substantial and less ornate in appearance. The master may, and probably will, prefer that the shower be a separate fixture, in which case the best practice is to place it in a tiled enclosure with a metal framed, plate glass door. These frames, of special anti-splash construction, can be had from all manufacturers of high grade plumbing, and can be built into the tile enclosure on the work. The enclosure should be constructed with a curbing at least 6 inches high in front, and the drain should be of the corner pattern, draining the bath from the floor and wall curbing so that waste will not be stopped by the bather's feet or by a wet towel carelessly left lying over it. These drains can be obtained with double drainage features and flanges to lock to the lead pan or other waterproofing member under the shower floor. If sons' and daughters' bathrooms are to be provided they will, in general, have a similarity to those of the master and mistress of the house, with changes dictated by users' ages, tastes, and similar considerations.

In the main, regarding the guest rooms, consideration being given to the fact they will frequently be occupied by couples, the baths should partake more or less of the character of the master baths, first described, except that space may be more or less constricted. There will be no room for couches, and if a bidet is included, the foot or sitz bath may be omitted. In these rooms the tub and shower are best combined. The lesser or "expansion" guest rooms, to take care of week-end parties and special gatherings, may be provided with the more ordinary three-fixture equipment with combination tub and shower such as we find in our best hotels; usually one bathroom to two such guest rooms will be found



Plan of a Well Arranged Modern Bathroom

sufficient. The servants' bathrooms should be ample to give privacy, and in general probably they would be equipped in the same way with the same class of fixtures as the lesser guest rooms, although tubs might be omitted and showers used in men's quarters.

Pools. Few country houses of any extent today are built without their swimming pools for recreation and entertainment. The principal pool, and quite often the only pool, is usually in the grounds, near enough to the house for convenience, yet at a sufficient distance to be screened somewhat in the landscaping and to muffle the splash and occasional shouts of noisy bathers. Where an outdoor pool is provided, it is an advantage to have a smaller indoor pool as well, if room for it can be conveniently had, and if the budget will permit. An indoor pool can be heated so as to be available for general use during cooler weather, and it may be on occasion of most distinct therapeutic value in connection with an electric cabinet in the treatment and relief of overtired muscles or strain after sports.

The construction followed for both pools is similar, and it is generally a concrete basin lined with a finishing material to add smoothness, light, and sometimes decoration. In times past, marble slabwork was used extensively for pool lining, but the absorption of the material, and the cracking at the joints, introduced by ever so slight a settlement or by expansion and contraction, have caused it to be discarded generally for construction of either specially formed brick or of small encaustic tile with mosaic border. The tiles used are flat hexagonal or ¾-inch cubes laid in two-coat work over a waterproofing coat on the inside of the concrete walls and bottom, the setting plaster being rich cement and sand mixture with just enough lime putty added to work it. Ordinary glazed tile cannot be satisfactorily used in swimming pool work, on account of crazing, nor can the standard glazed brick be worked well. Brick for pool linings are specially made for the purpose and come in shapes for locked corners and edges and with formed, graded, scum gutters with necessary outlet sections. Generally, the pool lining should be white, so that one may be able to see the water condition at all times. Any warmth in color or decorations should be in the borders above the water line and the setting, or in the room if it is an inside pool. The concrete basin for the pool lining must be designed for the weight of water, and the walls and bottom must be reinforced to take the load. Its structural features must be as carefully figured as those of any other part of the building construction work, or it may crack and cause leaks or ruin the appearance of the lining. Once the lining shows definite evidences of a structural crack, it is very difficult, if not impossible, to repair the lining so that it will present a smooth and satisfactory appearance.

Piping. It is of course, most important that the piping equipment and the general plumbing design be in accordance with standard sanitary practice. Practically all cities and many states have plumbing codes which prescribe definitely the general manner in which the work must be piped, but too much care cannot be exercised in the planning of details and in supervising the installation of the work. It is much better to have all pipes relieved and graded, all joints straight and well made, and all hidden materials of permanent lasting quality, than to tear out expensive tiling and decorated walls from time to time to relieve stoppages, repair breaks, and replace rusted pipes. With sewers from a point 20 feet from the building and all stacks and main vents of extra heavy cast-iron soil pipe, and all small wastes of brass pipe with either cast-iron or cast-brass recessed drainage fittings and all water supply pipe, both hot and cold, of red brass (Class A) with extra heavy red brass, Navy Standard pattern fittings, one will have, with proper installation, a piping equipment to last a century. However, less costly piping may be provided that will give excellent results.

Water Supply. It is presumed that the water supply question has been carefully gone into and that it is ample, clear, and free from organisms. If not obtained from some city or community system under pressure, the question of pumping and storage becomes of moment. If the supply has to be raised from wells, it is good policy to use two pumps, one to pump to a cistern at well head level, and another to put it under pressure. This gives opportunity to use an air lift from the well itself with the advantage of thorough aëration of the water, the surplus air escaping from the still water in the cistern. From the cistern the water can be placed under pressure in suitable cylindrical underground pressure tanks with heads exposed in the cellar or in the pump house. The tank heads should have gauge glasses and gauges, and the tanks should be absolutely air-tight with no openings into the tanks above the normal water line other than the top gauge glass connection; all inlets, outlets, and cross-connections between tanks should be at the bottom. These pumps should be automatically-operated rotary or centrifugal machines which minimize the noise as much as possible, and they should have either adjustable "snifter valves" on them to provide a supply of air to the tanks or a separate automatic air pump should

be provided. The air lift pumps are practically noiseless also. In some respects, having single pumping and elevated tanks is good practice, but as such tanks have to be placed high above the top fixture supplied to give good service, the tank structure disfigures the landscape and makes it objectionable.

There is a further advantage in use of the double pump system on account of its elasticity. A well of fine water may have a capacity without seriously lowering its pumpage level great enough to cover the 24-hour needs many times over, and yet still be unable to stand peak load delivery requirements without lowering the water table to a point where sanding and foot valve fouling will occur. The well pump may be comparatively small for continuous duty and the pressure pump large enough to care for maximum requirements, the cistern acting as the intermediate balance. For good, noiseless service, the velocity in the pipes must be kept low, say not more than 10 to 12 feet per second, and this means large mains and branches. In general, no supply over 5 feet long should be less than of ¾-inch and not more than two fixtures on that, four on a 1-inch, and similar large capacities. Shock absorbers with vibration diaphragms should be placed on all dead ends; all soil, waste and water supply pipe should be wrapped so that it will not touch structural parts, and every precaution should be taken to make the system quiet, by preventing noise as far as possible, and by preventing transmission of what little is made.

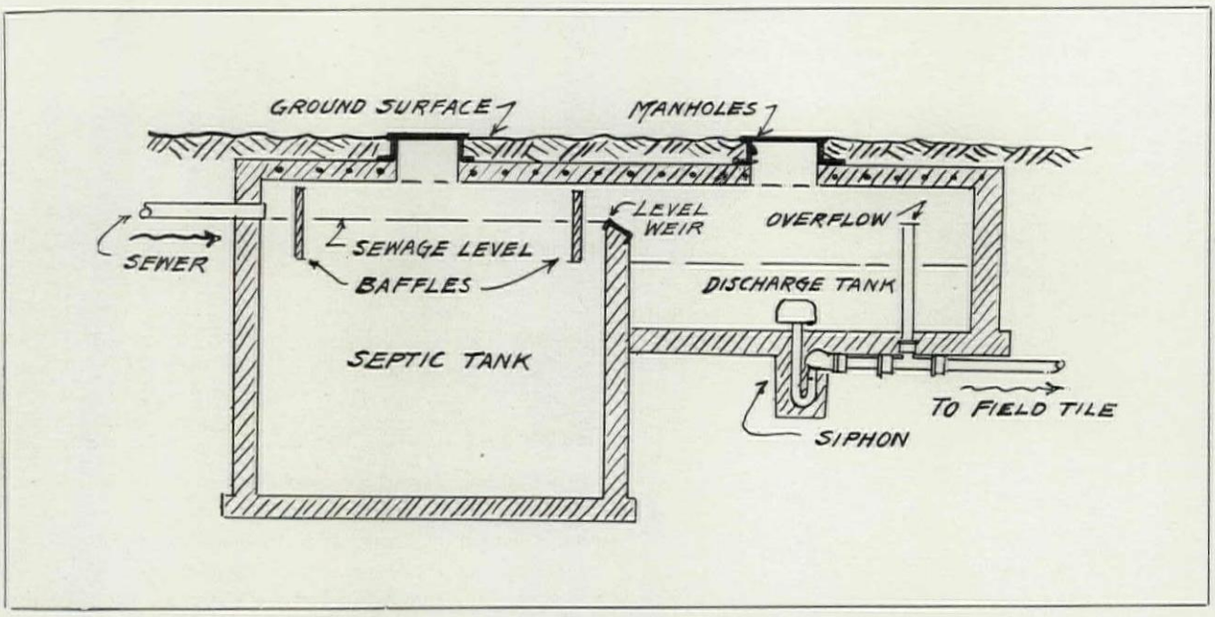
If the country house is by the sea, it is often desirable to have a complete hot and cold sea-water supply system to the bath tubs. If the showers are also to be provided from a sea-water source, it is better to have entirely separate shower fixtures, placed on opposite walls of the same enclosures, so that there is no liability of cross-connection of the two kinds of water. This, of course, means separate pumps, tanks and heating units, and it is good practice to paint the exposed pipes in basements in different colors to distinguish them from the potable water lines and fittings.

Sewage Disposal. If there is no municipal or other proper sewer system to which connection can be made, then the problem of sewage disposal presents itself, as it is rare that raw sewage can safely be discharged into a river or estuary. It is sometimes run directly into the sea, if there is no beach, but it is never safe to discharge directly into the soil for ground absorption. The usual successful disposal system is based on the "septic tank" idea, which means a combined settling tank and bacterial reduction chamber. The common form is a rectangular settling tank of sufficient depth and so shaped in plan as to facilitate slow movement of the sewage through it. This tank should be designed to hold the anticipated average daily flow, figured at about 100 gallons per person or a little over. One drawback to these simple rectangular tanks rests in their failure to reduce the sewage properly if they are either underworked or overworked for any appre-

Architectural Treatment Possible in Larger Bathrooms

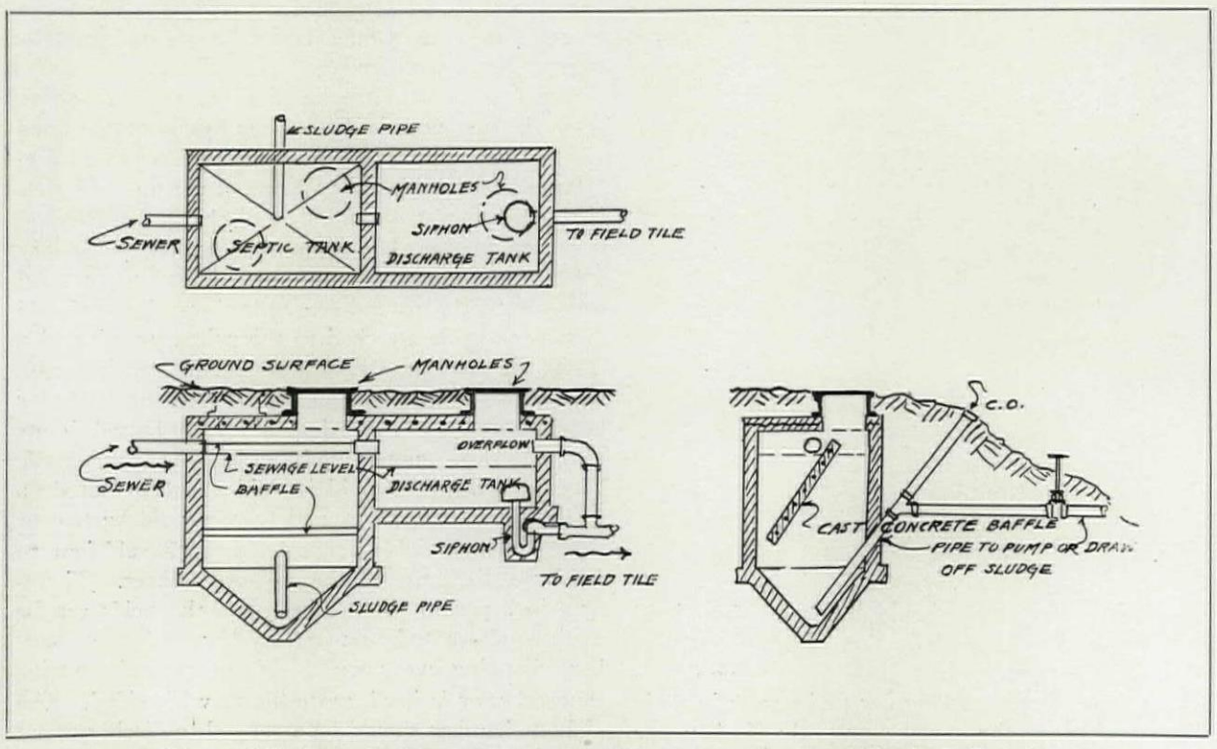
ciable length of time, and this is a condition likely to prevail if there is a very elastic guest list. If the daily quantity estimated for often and repeatedly falls to a discharge which will occupy much over 40 hours in passing through the tank, the sewage will become stale, the liquid will not give up the matter in suspension and solution, and the outfall lines or the secondary system, whatever it will be, will clog, and the system may give off odors. The same thing will occur when the passage through the tank is hurried, as the sewage has not sufficient time to properly liquify. This condition can be to a great extent offset by substituting for the rectangular tank, a special shape on a modified "Imhof" design, which, while much more expensive, is smaller, and capable of giving very elastic results. Normally, it can be figured for a minimum use by a skeleton household, and it will digest sewage for twice as many for a week or more at a time, and four or five times its normal for a week-end.

The treatment of the liquified sewage as it comes from the first tank is dictated by the ultimate means of disposal. If the effluent is to be discharged into a large river, no further treatment will be necessary if the dilution at the point of discharge is a million or more to one, but if less than that, secondary treatment is necessary, and sometimes even a third process. If the ground nearby is absorptive, a siphon chamber can be attached to the primary tank and a drain tile field can be constructed in trenches with the drain tile surrounded by broken stone, coke or large gravel, the tile being laid with butted joints covered with copper-mesh screen or special tile covers. The tile should be laid about a foot deep to the top of the pipes, and there should be two or three separate fields constructed, each sufficient to hold the discharge of the siphon chamber. Three- or 4-inch porous tile are best, and the fields can be made to alternate by a manually-operated gate chamber, changing every week. If the ground contains much clay or is hard, more tile may be added. The siphon chamber should be arranged to discharge not oftener than once in four hours, even under the



Longitudinal Section of a Simple Rectangular Single Chamber Septic Tank

heaviest usage. Hard ground can be improved by underdraining the first field drain tile by alternate lines of smaller drain tile between and below the others and leading these off into a secondary field, or the underdrain can be turned into a stream with a dilution of 1000 or more to one. The drain tile system of taking care of the discharge from the septic tank is very generally used, although there are other secondary processes which may be more applicable to a given condition, most of which require some periodical care in the operation. Sand beds with underdrains are sometimes used, as also are time lock contact filters, sprinkling filters, chemical "fish-ladders," and electrical treatment works. The amount of sewage to be cared for, the presence of chemicals in the sewage, the availabiilty of watercourses, the character of the ground, the degree of purification sought, and many other considerations enter into the problem, which requires the closest study by the architect and his engineering assistants.



Plan and Sections of a Septic Tank of a Modified Imhof Type, Very Elastic in Capacity

ELECTRICAL EQUIPMENT FOR THE COUNTRY HOUSE

BY
NELSON C. ROSS
ELECTRICAL ENGINEER

THE electrical wiring and equipment for the country house will be influenced largely by the type and construction of the building, the character of the service available, and the extent of the domestic and electrical equipment desired.

In planning the layout, the type of construction and the available service must first be determined, as they affect the distributing system as well as the materials to be used. In frame buildings, concealed knob and tube wiring is permissible in dry places. Service wires, however, must be in conduits, and all basements must be wired with conduits or with "BX" armored conductors. While knob and tube wiring, properly installed where kept dry and where the wires are not subjected to mechanical injury, is fairly safe, it has little to recommend it other than cheapness in first cost. The use of "BX" flexible armored conductors will insure a more flexible wiring system throughout wooden buildings, since the conductors are protected from mechanical injury. The armor permits of a satisfactory bond and ground; splices occur only in steel outlet boxes, and the conductors are continuous from outlet to outlet. Armored conductors on new work are clipped to the beams and studding. Where used on old work, the armored conductor permits of concealed wiring with the conductors "fished" in the construction and with the minimum cutting of walls and floors, while metal raceways or mouldings are used in existing buildings for extensions of circuits or for use where it becomes impossible to conceal wiring. Concealed wiring, properly installed, is always to be preferred to any type of exposed work. The latter should not be considered except for garages and other service buildings. Where granolithic or tile floors occur in certain sections of a wooden building in which "BX" is used, circuits must be in rigid conduits in these floors.

The use of armored conductors, while safer and more expensive than knob and tube wiring, is less expensive than wiring in rigid conduits. Its disadvantages are that it is difficult to replace, in case of trouble on the circuits after the building is completed, without considerable cutting, and the armor is not proof against injury from nails. Trouble experienced on electrical circuit wiring is, in general, due to lack of care in the installation of the wires, and to improper splicing and to the crowding of the wires in the outlets. It is therefore advisable with the use of armored conductors on new work to provide the standard 4-inch outlet box (as used for rigid conduits) at all outlets, equipping these with the proper plaster rings and switch covers. Where armored wires enter the outlets, each should be fitted with approved galvanized box connecters of the clamp type, and these should be clamped to the armor and secured to the outlet boxes with lock nuts. Similar outlet boxes should also be used on knob and tube construction (where safe work is desired), each wire of the circuit entering the outlet box encased in a flexible loom tube extending from the fixture connection to the first knob on the circuit. Where old work does not permit the use of 4-inch standard outlet boxes, a type should be selected that will permit the armor to be securely clamped to the box, forming a satisfactory bond and preventing the loosening of the armor from the box or plate. With first class construction, the use of rigid conduits is obligatory, and these conduits are cast in the slab, built in walls, run behind furring and in concrete beams, or in some cases, run exposed. Expense warranting, rigid conduit should be used for all classes of construction, as the conduit forms a steel pipe raceway, giving perfect protection to the circuit wires and permitting the removal and replacement of defective wires at will.

Lighting Requirements. A room or space must be provided in the basement, adjacent to the location of the entering service cables, for the mounting of the service switchboards and meters. All circuits throughout the house, service buildings and estate will be mastered from the service switchboard. From the service switchboard feeders will be run to the panel boards, and branch circuits will distribute from the panel boards to the lighting and domestic outlets. The panel boards may be conveniently located in the basements, in service corridors, or in closets on the different floors. One or more panel boards may be required, depending on the size and type of the building and the volume of the load. It is well, however, to so locate the panel boards that the length of branch circuits will not exceed 60 feet.

In planning the circuit wiring, lighting outlets must be spaced to meet the required lighting conditions and also with reference to exposed beams, wall paneling, and fixed furniture. In general, not more than eight lighting outlets or more than four receptacle outlets should be connected to a branch circuit, and where receptacle outlets are to be used with portable equipment of high wattage (such as radiant heaters in bathrooms, table grills, etc.), such receptacles should be fed from a single circuit of two No. 12 wires from the panel board. Separate circuits should be employed for lighting and for receptacle outlets so that the opening of a fuse due to the overloading of a receptacle circuit will not interfere with the lighting service.

Local switches may be of the flush push-button, toggle or rotary type, as desired, and may be had with plates of any color or finish. The toggle type is usually preferred in country houses. A sufficient

number of switches should be provided for the adequate control of the lighting. Switches may be set where they are convenient to the doors entering the room, and where there are two or more entrances to larger rooms, three-way switch control should be considered. It is at times desirable to use double circuits for chandeliers, permitting the use of a part or of the whole of the lighting at will. Three-way switch control of corridor and stair lighting is very desirable, permitting the control of corridor lighting from two or more points and of the stair lighting from switches on different landings.

Receptacle or convenience outlets may be placed in baseboards or set from 12 to 18 inches above the floor. Convenience outlets should be used generally throughout the building, allowing for one receptacle outlet to each 20 feet of wall space. Where possible, the location of furniture should be determined before bracket outlets and receptacles are permanently placed, particularly in reference to bedrooms where fixtures are to be used at beds, mirrors, dressing tables, etc. Provision may be made for electric clocks, with receptacles at mantels or at other desired locations. Where fans are to be used, the outlets may be set 7 feet, 6 inches above the floor, using a combined receptacle and hanger. Fans may be under switch control, or may be operated at the outlets. Where paintings are to be lighted, the receptacles may be set 8 feet, 6 inches above the floor, in readiness for the reflectors. Such outlets should be under switch control.

Provisions for radio will include a master receptacle outlet at the location of the set, with similar outlets in rooms where loud speakers or headphones are desired. Receptacle boxes and conduits with rubber-covered wire will be required as in a lighting service, using standard radio jack receptacles at outlets.

Lighting Fixtures. In general, the lighting fixtures throughout the service quarters, basements, laundry, kitchens, and out-buildings may be of the conventional type, employing an enclosed radiant with ceiling collar, chain or rigid hanger. Lighting fixtures throughout the house proper, including ceiling chandeliers, brackets, floor lamps and portables, will be selected by the owner in consultation with the architect, and will correspond in design with the surrounding furniture of the rooms.

Suggested Outlet Locations

Entrance. Ceiling and bracket outlets; provision for outside fixtures; convenience receptacles; local switches; switches controlling outside lighting; public and interior telephone.

Corridors and Stairs. Ceiling and bracket outlets, three-way switch control; convenience receptacles; fire alarm station and gong.

Closets. Ceiling outlets under door switch control; panel boards as required.

Service Corridor. Ceiling outlets, three-way switch control; annunciator; burglar alarm annunciator; interior telephone; panel boards; burglar alarm switch.

Living Room, Dining Room, Library, Lounge, Etc. Chandeliers with double-switch control; brackets; floor receptacles at tables; annunciator receptacles at table; convenience receptacles for floor lamps; heater receptacles; annunciator push-buttons; clock and radio outlets; electric fireplace logs; public and interior telephone.

Chambers. Brackets and receptacles at beds, dressing tables, and mirrors, switch control; annunciator push-buttons; radio outlets; public and interior telephone if desired; brackets each side of mirror in bathroom; annunciator push-button in bathroom, heater and convenience receptacle in bathroom.

Billiard Room. Ceiling outlets over tables, switch control; convenience receptacles; push-button to annunciator, radio and clock outlets; interior telephones; fireplace logs.

Kitchen. Outlets for electric range, broiler, and oven; ceiling outlets; outlets over sinks; receptacles for refrigerator; convenience outlets; outlets for water heater; outlets under range hood; clock outlet; interior telephone; switch control, etc.

Laundry. Outlets for electric washer, water heater, extractor, flat work ironer, and electric irons; convenience outlets; ceiling outlets for general illumination; drop cords at flatiron stands; switch control and interior telephone.

Basement. Ceiling outlets in storage rooms, and for general illumination, under local switch control. Convenience outlets in boiler room; interior telephone; storage battery for burglar alarm and fire alarm and interior telephones. Distributing power panel boards, etc.

Motors. Small domestic and portable motor-driven equipment has been developed and standardized with 110-volt, single-phase motors for operation on lighting circuits. These motors seldom exceed ¼ horse power in size, and are designed to plug into a standard receptacle. Motors exceeding 1 horse power in size should, if possible, be operated from the power circuits, and where single-phase only is available for power, such motors should operate on a separate feeder from the service switchboards. Where there are a number of motors, it is desirable to provide a separate power panel, centrally located in the basement, and fed from the service switchboard with branch fused power circuits leading from the panel to the different motors. For the elevator, the circuit should terminate in the elevator machine room in a fused safety switch, and be left in readiness for connection to the controller. Circuits for the operation of portable farm motors may terminate in fused safety switches and high wattage receptacles, from which portable cables may extend to machines. The circuits, switches, and receptacles should provide for the value, 20 horse power.

Where use of oil burners is contemplated, a separate circuit must be run to each burner, terminating in a safety switch. Circuits for shop motors in garages and farm buildings should terminate in safety switches, with the circuits extended, and connected to

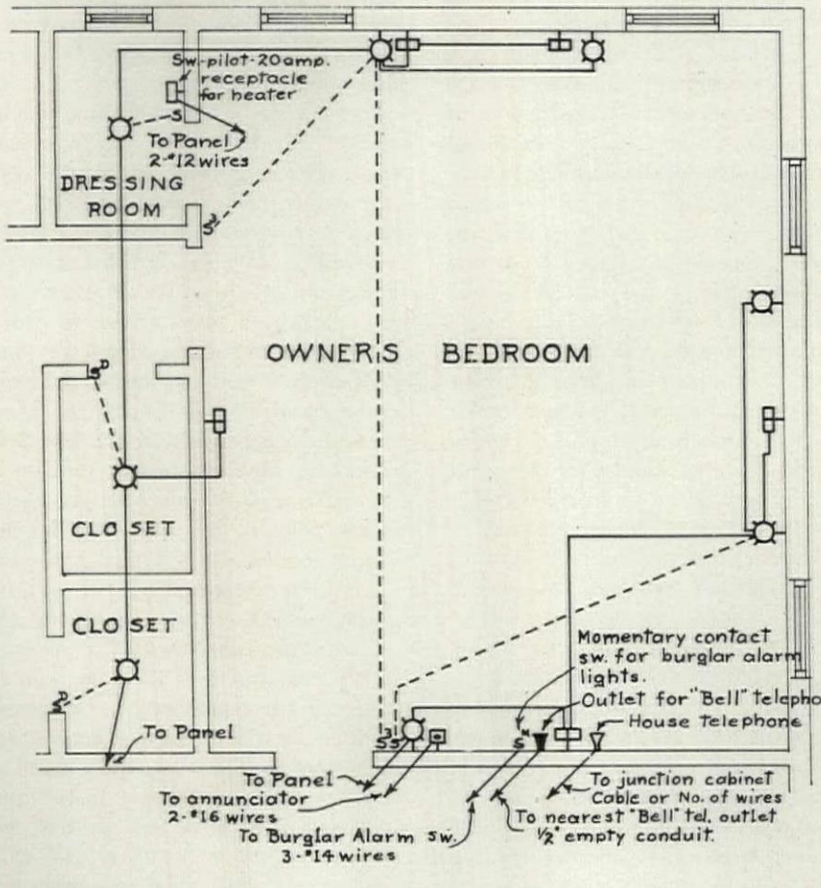
the motors and equipment. These shop motors seldom exceed 1 horse power at each motor outlet. Plumbing equipment may be housed at the water supply, and may be automatically controlled, this fed from either pole lines or with underground cables from the nearest point of service. Such equipment may be in duplicate to guard against breakdown, the size of the cables depending on the distance run and the capacity of the equipment.

Refrigeration. "Portable" refrigerators may be fed from a single circuit and receptacle, the receptacle usually set 7 feet above the floor. Where a "built-in" refrigerator plant is used with "walk in" cold boxes, provision should be made for from 3 to 5 horse power in the refrigerator machine room for the operation for the compressor and pumps. Waterproof lighting fixtures must be provided in the cold boxes, with switches and pilot lamps at the doors.

Water Heating. Self-contained electric water heaters are available of either the storage tank type, with the heating element immersed in the tank, or of the circulating type where the element is separate from the tank, as with gas. Standard tank sizes range from 10 gallons to 52 gallons, with the current demand of from 1000 watts to 5000 watts respectively. Either type may be fitted with automatic thermostatic control. Large installations may require special storage tanks and should be designed to meet conditions. The feeding circuit should not be less than three No. 8 wires.

General Heating. Electric toilet equipment, including curlers, hair dryers, massage equipment, lamps, etc., will operate from the convenience receptacles in bedrooms and bathrooms. Portable heaters, of not exceeding 1000 watts, may connect to the heater receptacles in the bathrooms or to any receptacles controlled from a separate circuit from the panel board. Where "built-in" electric radiators are desired, in bathrooms or elsewhere, provision should be made for 3000 watts at the outlet, and this should be fed with three No. 10 wires. If electric fireplace radiators are desired, provision should be made for not less than 4000 watts at each fireplace, with 30-ampere receptacles and three No. 8 wires. Single circuits should connect to the floor outlet at the dining table, and also at buffet, etc., to provide for electric percolators, grills, toasters, or other table equipment. Where small grills are to be used in serving rooms or in pantry, provision for 3000 watts should be made at outlets with three No. 10 wires.

Cooking. Electrical cooking equipment may include a range and oven in the kitchen, as well as electric broiler and such minor cooking equipment as may be operated from the kitchen receptacles. Ranges



Typical Layout for a Master Bedroom

are available in either the household type, with the connected current demand of from 8,500 to 13,800 watts, or of the heavy duty type with the connected current demand of from 22,000 to 30,000 watts. Both types are fitted with the back shelf and oven and may be operated either on single-phase or on three-phase wiring and from either the lighting circuit or power circuit. Cutouts and controlling switches, etc., are provided as a part of the ranges in readiness for the connection of feeder cables. Conduits and cables may extend from the basement to terminate in the range connections. Feeder cables should not be of smaller than No. 2 wires for the smaller and three No. 00 wires for the larger range. Where separate broilers are desired, provision of from 4000 to 8000 watts at the outlet should be made with not less than three No. 8 wires.

Laundry. The electrical laundry equipment may include one or more household washers, a motor-driven extractor, an electric ironer, and the usual equipment of electric flatirons with ironing stands, including also, if desired, an electric water heater, and storage tank. Feeder wires to the water heater should be not less than three No. 8 wires. All of the laundry equipment, with the exception of the water heater, may be operated from receptacles conveniently located, the cords from the machines plugging into the receptacles outlets. The use of a heater combination, including receptacles, switch and pilot lamp, is a convenience, as the lamp indicates when the heaters are in circuit. Each receptacle should be fed with two No. 12 wires.

Communication. Low-tension equipment will include an annunciator in the service quarters, with push-buttons at the entrance doors; flush floor push-button receptacles under tables in dining room; push-button stations in bathrooms, bedrooms, guest rooms, etc., and elsewhere, as desired. Two or more annunciators may be used if required by conditions and may be connected in multiple so that any signal will register on all annunciators. Switching may be so arranged that any annunciator may be cut out of circuit. Thus, with an annunciator in the kitchen or service room, with a like annunciator in the corridor of the servants' quarters, switching may be arranged so that the signal will register in the service room or kitchen during the day, and in the servants' corridor during the night. Where desired, the system may be made "return call," with a button pad as a part of each annunciator and with the combined buzzer and button in each room, etc. Whoever receives a call on an annunciator may, by pressing the corresponding number of the pad, notify the sender that the call has been received. The combined buzzer and push-button is set flush with the walls in the rooms, etc., and resembles an ordinary flush push-button plate. Annunciator wiring should be of rubber-covered No. 16 wire, in conduits; current for the operation of the system may be taken either from local batteries or from low-tension transformers. Annunciators may be of the flush type and are made up in wood in any finish, in metal, or in cast bronze as desired. Push-buttons, where exposed to the weather, as at entrance doors, etc., should be of bronze and of the waterproof type.

Inter-communicating House Telephones. The house telephone equipment may be of the local inter-communicating type, with instruments separate from the public service lines, or it may be a combined public and inter-communicating system. The local inter-communicating system has no connection with the public service line, but is used wholly for interior work with extensions to dependent buildings. House instruments may be of the flush wall type or of the desk type, and may be finished as desired. Instruments in general are located in certain bedrooms, kitchen, serving room, pantry, corridors, laundry, garage, service quarters, and dependent buildings. Wires and cables are preferably installed in conduits, and where cables pass underground to dependent buildings, etc., these wires must be sheathed with lead and installed in conduits or protected with steel tape armor of the "Parkway" type. Where the local system is used, provision should be made for use of one or more independent public telephone instruments, as may be desired. Where, however, it is desired to talk over the public service lines from any of the telephone instruments, the combined system may be used as provided by the telephone company. When each instrument is fitted with a series of push-buttons corresponding to the local stations, and with one or more trunk stations connecting with the central office, local calls may be made between the house stations without calling the central office, and the central office may be called from any station by depressing the "trunk" button. With this system conduit only is provided, as the wires and cables, instruments, etc., are furnished and installed by the company under a rental arrangement. The telephone service lines will be provided by the company and terminated on the public right of way convenient to the property. The trunk lines may be run to the house either on poles or underground; a conduit should be provided between the house and the service pole. This conduit may be of fiber or of galvanized iron, and should be laid with long bends and not less than 15 inches below grade. Manhole pits or splicing boxes should be provided not more than 300 feet apart.

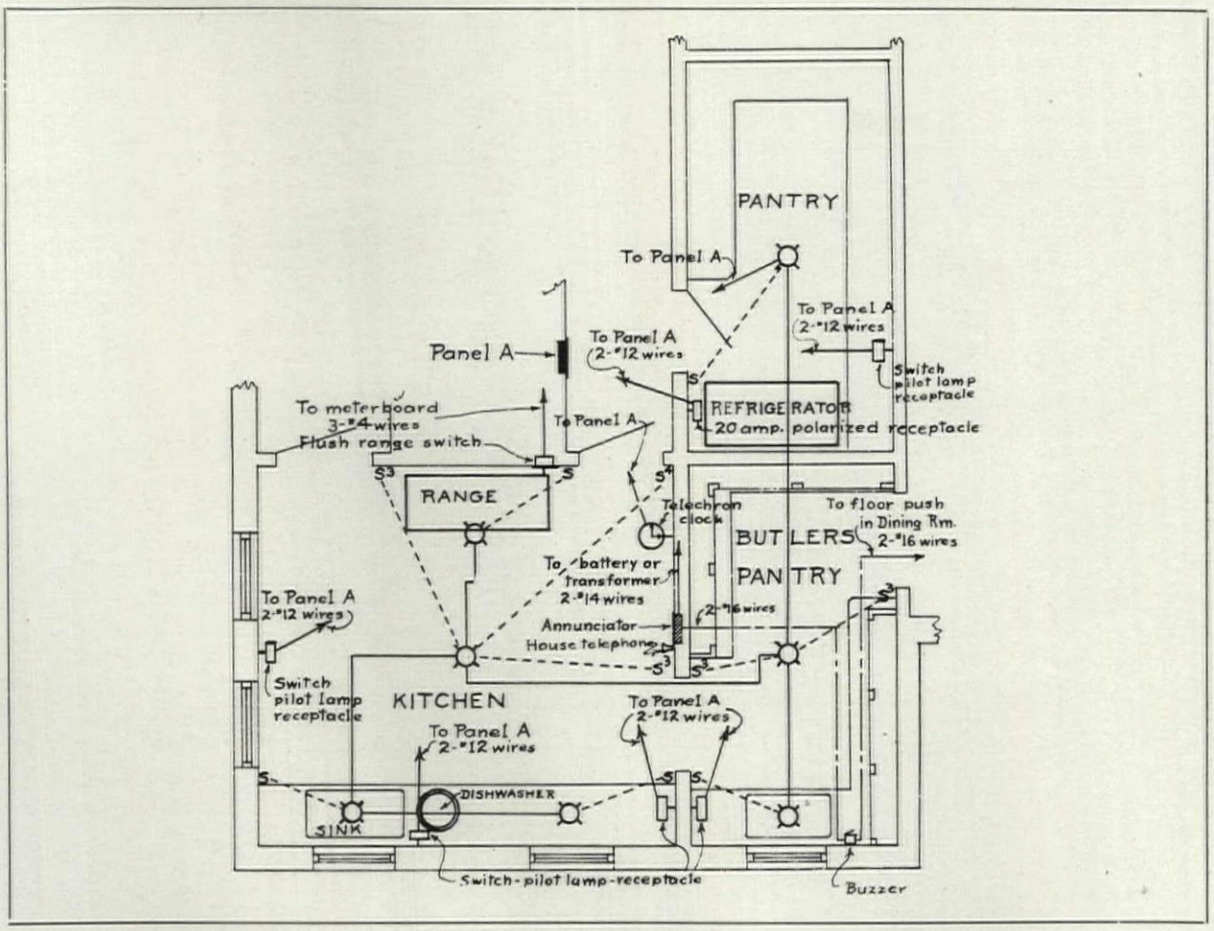
Fire Alarm. This detail of the equipment of the country house may be of the open-circuit type, wherein the gongs are rung from a battery from the lighting service, or it may be of the closed-circuit type, wherein the gongs are tripped electrically and are rung by means of a spring-wound motor in each gong. Of the two systems, the closed-circuit is to be preferred in many cases. The system is operated by the breaking of a glass with a small suspended hammer in any one of the stations, and the system is supervised so that in the event of accidental breakage of any wire, a "trouble bell" will ring until the circuit is restored. The automatic system, in which the heat of the fire itself sets off the alarm, is much

used also. Gongs should be placed on each floor, and not more than 75 feet apart. Stations, as a rule, are placed one under each gong at approximately 5 feet above the floor. Gongs are also placed in dependent buildings to summon help in the event of fire. The code wheel of each station is so cut as to deliver a certain signal, and the location of the station from which the alarm originates is at once determined by the code signal sounded on the gong. A fire alarm system should operate by storage battery rather than from the lighting service, as the operation of the system is thus assured even though the lighting lines are out of order. Fire alarm wires should be run in conduit, and where installed underground between buildings they should be sheathed with lead and installed in conduits, or lead-sheathed wires should be protected with armor of the "Parkway" type.

Burglar Alarm Systems. The "house" burglar alarm, in general, consists of one or more gongs which are automatically rung upon the closing of a circuit ("by the opening of any door or window protected by the system"). Gongs may be installed in dependent buildings, from which help may be summoned, or in the house, as desired. Concealed switches are located in the doors and windows to be protected, and the system is so wired that the opening of any door or window so protected will close the circuit and operate the gongs. The system may be rendered inoperative by the opening of a master switch at some convenient point. An annunciator may be used in connection with the system, which will indicate the location of the door or window from which the signal is given. The wires of the system should be rubber-covered No. 16 wire in conduits, and where they are underground they should be sheathed with lead and either run in conduits or protected with tape armor. The system should be operated by storage batteries rather than from the lighting circuits, as this insures the operation of the system in the event of trouble on the lines. A further protection is afforded by the system, in that during storms, the closing of a master switch will indicate on the annunciator the location of any door or window which may be open.

Dependencies

Stables. The wiring of stables should be in rigid conduit, and as a rule "exposed," using receptacle fittings of the conduit type with lamp bulb and guard. Lighting should be under local switch control and mastered from a service switch at a convenient point. Provision should be made for convenience outlets permitting the use of portable equipment. Provision should be made for outside lighting with



Typical Layout for a Country House Kitchen

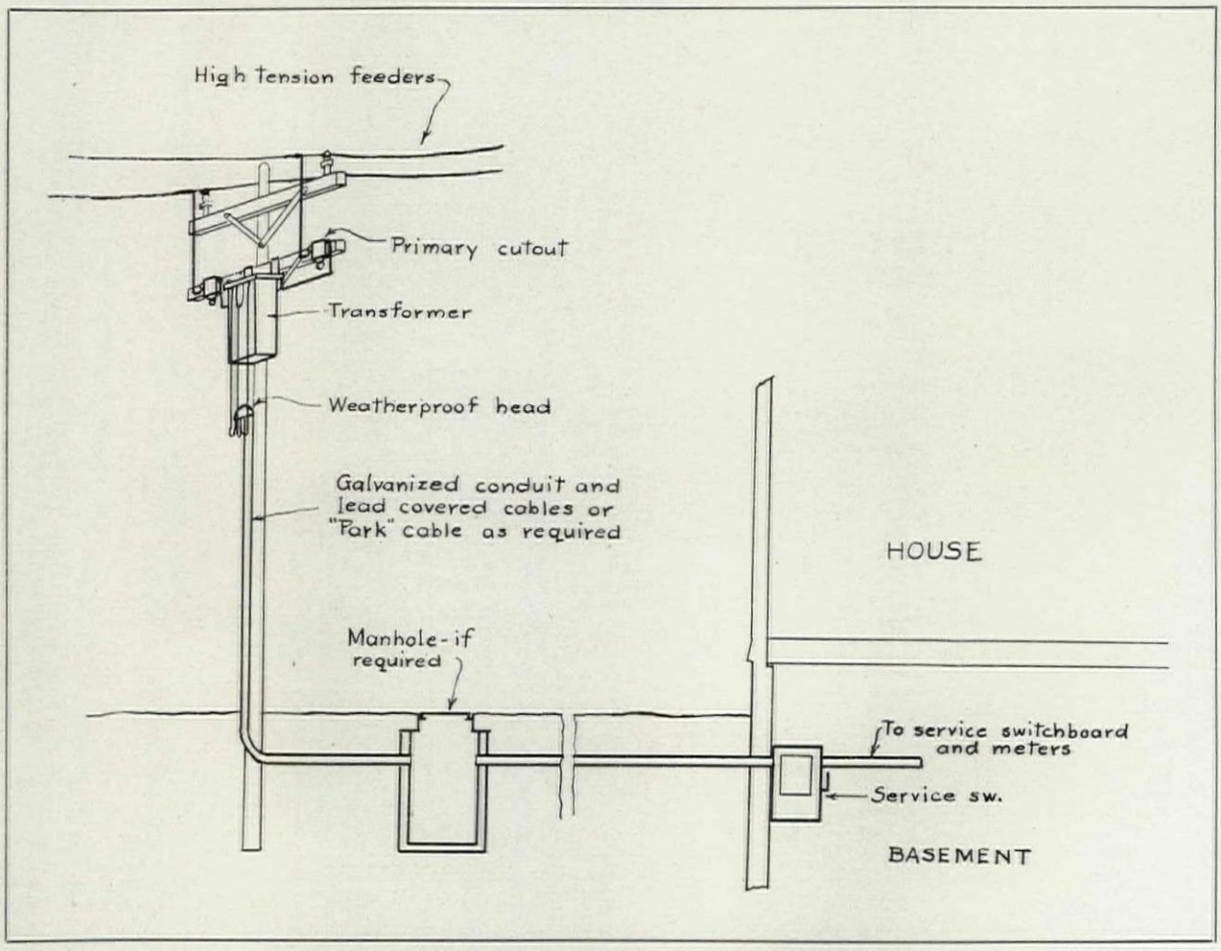
brackets at the entering door. The wiring of the stable should include provision for a fire alarm as well as for a local telephone. Connections with the main service should be by underground cables.

Garage. The wiring of the garage should be in rigid conduit, and should be equipped with lamp receptacles and guards, including outside lighting by means of brackets at the doors. The wiring will include ceiling outlets at the front and rear of each car, convenience receptacles for use of portable lamps, and power outlets for lathe, grinder, air pump, storage battery charger, etc.

Farm Group. Such a group will, as a rule, require a separate service, with its transformer vault, as these buildings require a heavy motor load in addition to lighting requirements. The wiring of the dwelling house of the farm group will be concealed, and will provide for general lighting and equipment with convenience receptacles and with high wattage receptacles for possible use in electric cooking. Provision also should be made for public and local telephones, as well as for the gong of the fire system.

The barns and farm buildings proper are preferably wired with exposed galvanized conduit, using ceiling lamp receptacles with guards. Lighting outlets must be so spaced that there will be adequate light for all purposes without the use of lanterns. Three-way switch control should be considered for the lighting of lofts, cattle barns, storehouses, and other large areas. Provision should be made for the lighting of the laying houses of the poultry section as well as for electric incubation and brooding. Convenience receptacles should be provided for the use of portable equipment and milking machines. Power should be considered for the use of portable motors, for the sawing of wood, and the cutting of silage as well as power for the repair shop and for the possible pumping of water. The buildings should be equipped for a fire alarm, and the larger structures should have both public and private telephones.

Lighting of Grounds, Entrances, Etc. The lighting of grounds may be with any one of the many types of posts and standards. These may be spaced from 100 to 300 feet apart (along the drives) depending on the location of the shrubbery. The standards may be connected with underground cables of the "Parkway" type. The standards at the entrance gates and on the main drive may, if desired, be separately controlled and independent of the general ground lighting. The circuits may be fed from the house service, and be controlled manually from push-button controlled switches, or from "time switches" which will automatically switch the lighting on and off at certain hours. Ground lighting immediate to



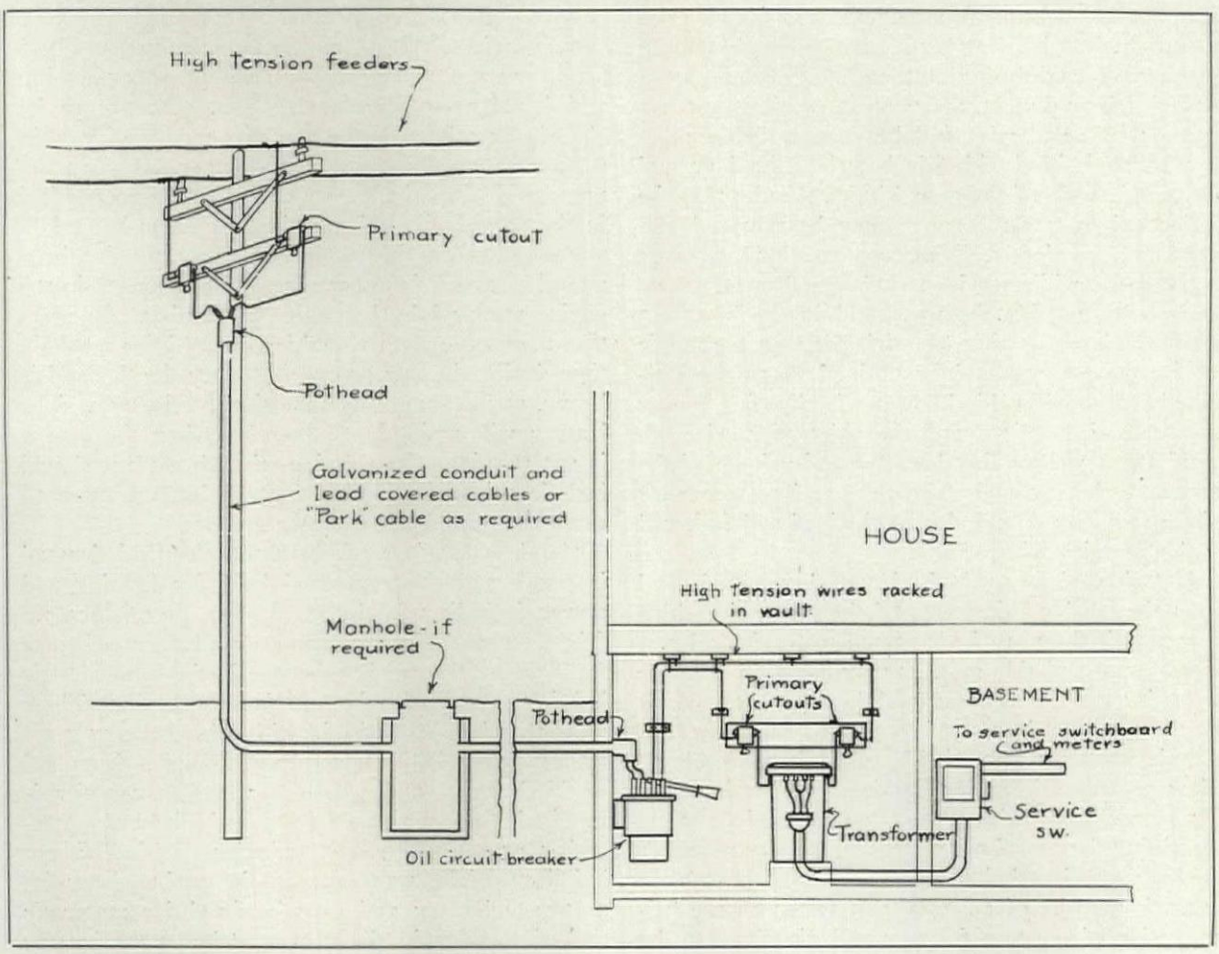
Underground Service with Transformer on a Pole

the farm group may feed from the farm service under either hand or automatic switch control. Ground lighting immediate to the farm may be developed on poles, with fixtures secured to buildings.

Underground Cables and Distribution. The least expensive form of construction for the cable system is with poles and overhead wiring. Where poles are carefully selected and painted, and where conditions permit them to be installed at boundary walls and fences, there may be no objection to their use, or certain sections of the system may be on poles with the remainder by underground cables. The best form of construction, however, expense permitting, is with underground cables either in conduits or with cables of the "Parkway" type. This applies not only to light and power but to telephone and to low-tension equipment as well. All underground cables must be sheathed with lead in addition to the insulation.

With the use of underground conduits, splicing pits are required, approximately 300 feet apart, and the conduits must be laid to grade and in straight lines, to permit the drawing in of the cables. When a lead-sheathed cable is served with flexible steel tape armor, it is termed "Parkway cable" and may be installed in a shallow trench without further protection. "Parkway cable" is usually less expensive than underground cables in conduits; splicing pits are unnecessary, and the cable may be obtained and laid in single lengths of from 1000 to 2000 feet, depending upon the size. The cable is laid approximately 15 inches below grade and may follow the contour of the ground, avoiding rocks, trees, etc., without difficulty. Where splices occur, they are made under lead and protected with cast-iron splicing boxes.

Service Connections. A small private lighting plant may furnish direct current in conjunction with a storage battery. While standard lamps and heating equipment of the proper voltage will operate equally well on either direct or alternating current, motors must be selected for the voltage and current on which they are to be used. The public service company in general will provide single-phase alternating current for lighting and heating at 110-volt, two-wire service for small installations, and at 110-220-volt, three-wire service for large installations. The three-wire service is to be preferred, as it is more economical in the use of copper. Power may be delivered over a two-phase service generally at 220 volts. Where two- or three-phase service is not available, however, the company will provide single-phase service for power. While single-phase service is satisfactory for lighting and heating, and for the operation of small domestic motors, where large motors are to be used, particularly for the operation of elevators, two- or



Underground Service with Transformer in a Fireproof Vault in a Country House

three-phase power service should be obtained where possible. In general, the company will terminate its lines and transformers on a service pole located on the public right of way adjacent to the property. Secondary service wires from the transformers to the building may be on poles, or underground in conduit, or in a trench with "Parkway" cable.

Service wires and cables on private property, whether on poles or underground, must be provided at the expense of the owner. Where the distance from the service pole and transformer to the center of distribution does not exceed some 300 or 400 feet and the load is not heavy, the transformers may remain on the service pole, and the service may be delivered to the buildings at the secondary voltage. However, where the distances are great and the load is heavy, supplying power, heating, cooking, etc., with dependent buildings, a transformer vault should be considered at the buildings or at the center of distribution, and the current should be delivered to the transformers in the vault at the "primary voltage" of 2300 volts, as this permits the use of small copper for the service lines and provides for almost unlimited extension of the service at small expense. The vaults are constructed at the expense of the owner, as are also the service cables on the property. Transformers are furnished and maintained at the expense of the public service company. A transformer vault may be in the basement of the main building or in an adjacent dependent building, or it may be of the subway type, outside and flush with the ground. Vaults must be of brick or cement, approximately 36 square feet in floor area and with full headroom. They must be ventilated, fitted with 6-inch curb at the door, and with Underwriters' doors and locks. Vaults must be so located that transformers may be removed and replaced conveniently. Primary connections are made in the vault, while service switches and meters must be installed outside the vault and in the basement space. Before planning the wiring layout, the public service company should be notified as to the estimated connected load in kilowatts for lighting, power and domestic services, and the point of service determined as well as the character and voltage of the current to be supplied. The rules and requirements of the company should also be obtained and followed in the planning of the work.

Metering. The method of metering will depend upon the local requirements of the company, which may permit the use of a common meter for all services at an equitable rate, or may establish separate rates for power, lighting, and heating, etc., which may necessitate the use of two or more meters. In planning the service switchboard it is advisable to allow separate risers for lighting, for heating, and for power, each with a separate meter loop, thus permitting the use of one or more meters as required. Where dependent buildings are scattered over large areas, it may be of advantage to meter on the primary side of the transformers and distribute to the different buildings at high voltage.

Power Sources. Where possible, the electric service should be obtained from the public utility companies' lines, as a constant source of power is thus assured, and the capacity is practically unlimited. Where this is not available, power may be obtained from a private plant on the premises, operated by steam, oil engines, water power, or by the small gasolene-operated generating sets with storage battery, such as have been developed for farm lighting.

Steam Engines. While steam engine-driven generators combined with storage batteries may be developed for residence lighting, etc., such a plant is scarcely practical for work of this character, as it requires a high-pressure steam boiler, and a skilled fireman or engineer who must remain on duty in the boiler room when the engine is in operation. In many sections a licensed engineer is required by law.

Water Power. Where water power or water right is available, and where there is sufficient head and water storage to supply the demand, a small hydroelectric plant may be developed by the use of a water turbine, regulating and generating equipment, together with storage battery as auxiliary to the generating plant. The development of such a plant, however, would prove expensive, and its successful operation would depend upon the electrical demand, the distance between the residence and the dam, and the available water storage facilities to carry the service over the dry months.

Oil Engines. Where the electrical demand and load are heavy, and where cooking, baking, water heating and laundry equipment, elevators, etc., are to be electrically operated, the use of an oil engine with storage battery, will prove satisfactory. These units may be obtained in almost any size, are economical in the use of oil, and may be located or housed at any location on the premises. They require little attention, and it is unnecessary to keep watch in the engine room while the engine is running. In practice, the engine plant would be operated for a certain time during the day or evening when the demand is heavy, at the same time charging the battery. The battery will maintain the service when the engine is not running. The design of such a plant should include an engine and a battery large enough to carry the peak demand on the system.

Gasolene Engines. Where the electrical demand is small, and the connected load for lighting and power, including flat irons, toasters, percolators, refrigerator, and like equipment, does not exceed some 6000 watts, the small self-contained "farm electric lighting plants" will give satisfactory service. These units may be operated with either kerosene or gasolene, may be obtained in capacity ranging from 800 to 1500 watts, and where the greater capacity is required, two or more units may be hooked up together, or separate units may be installed in different buildings. The units operate in conjunction with a storage battery and may be fitted for automatic operation, wherein the generator keeps the battery charged, and current is supplied by the battery.

HEATING THE COUNTRY HOUSE

BY
P. E. FANSLER
ASSOCIATE EDITOR, THE HEATING & VENTILATING MAGAZINE

THE matter of heating equipment for the country house revolves around considerations of bodily comfort for the occupants rather than about considerations of low first cost. Daily, by telephone and by letter, I am being asked for recommendations regarding heating plants for new houses or for installation in some beautiful old home, and almost invariably the request is followed by: "I don't care what it costs,—I want the best equipment in the market." And my rather intimate contact with this particular field leads me to the conclusion that this condition is only now beginning to develop, and that American standards in the air conditioning of homes will rise rapidly until what we now accept as satisfactory will appear crude and unscientific. I have used the term "air conditioning," because the mere supplying of warmth to the home during the heating season will not satisfy the exacting requirements of the home owner of tomorrow. Research has determined the proper quality of air for optimum comfort, and no man who spends his days in an office where properly conditioned air is furnished and who sends his children to modern schools will be content until his home likewise provides every facility for bodily comfort.

Radiant Heat the Elementary Form. Primitive man utilized heat in the form of radiant energy;—that is, he built a fire and warmed his body from its radiance. This would be important only as an historical item were it not for the fact that British research of today suggests the use of radiant energy as the most efficient means of heating the modern house. This is contrary to present-day practice, but the finger of scientific research points, and it cannot be ignored. The home of today is heated by filling it with warmed air. There are two ways of raising the temperature of the air,—direct and indirect. The former uses the "hot-air" furnace, and the latter a boiler and radiators. The term "hot-air" really is a misnomer, as air excessively heated is objectionable. In the modern warm-air system the air flowing from the register is merely tempered, and the code of the National Warm Air Heating Association sets 175° Fahr. as maximum permissible register temperature. Where a boiler is used, water is heated or turned into steam which is piped to the different rooms, where in radiators its heat is transferred to the air, largely by convection, heating the air in the rooms.

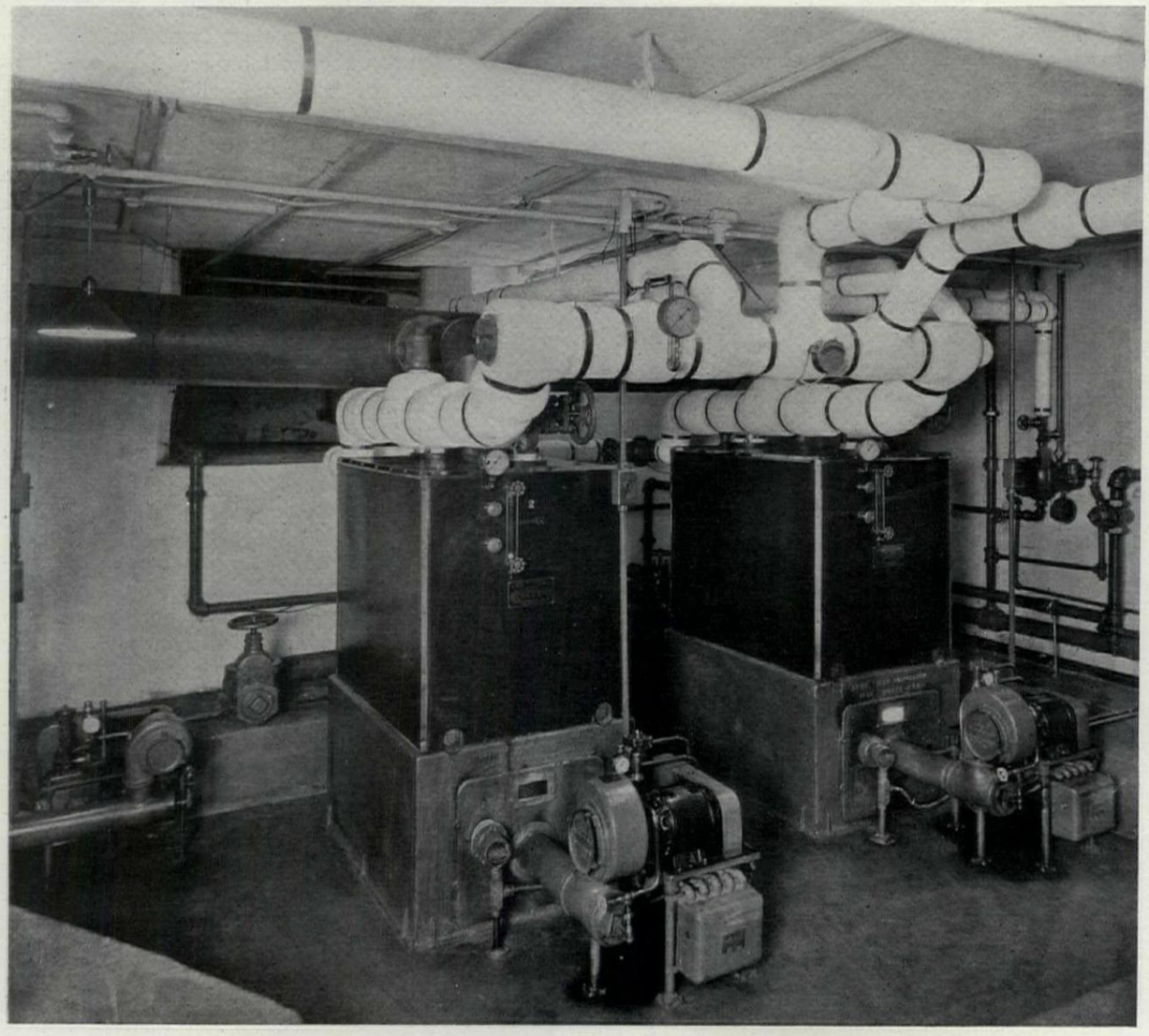
Warm Air Heating For The Large House. In the past, warm-air heating has been used, almost without exception, in the small house, and even here its application has not been any too successful. This was due almost entirely to poor engineering. Furnaces were little more than glorified stoves surrounded by sheet-metal jackets, with "efficiencies" of the order of 25 per cent. Those who installed warm-air systems probably knew little or nothing of the engineering principles involved and, from the technical standpoint, duct systems were faulty, inadequate and improperly disposed. Then, too, such systems operated entirely on the basis of the tendency of warmed (and hence lighter) air to flow upward, and the infiltration of cold air into certain rooms effectually counteracted the emission of warmed air from the registers, so that these rooms were almost always cold. Admittedly this is a gloomy picture, but it represents actual conditions in many homes.

A few years ago, however, the industry centering around the manufacture of warm-air furnaces and equipment awoke from its lethargy, and presently there came a new regime that, even now, threatens to encroach upon the field hitherto held sacred to the application of boiler-and-radiator heating, for even the largest and most costly homes. Two factors alone almost entirely account for the changed conditions. About four years ago the National Warm Air Heating Association appropriated funds with which to build and maintain a research laboratory at Urbana, Ill. This is a typical medium-sized American home, and in it, since its completion, there has been carried out a continuous scientific and engineering study of warm-air heating. Professor A. C. Willard, head of the School of Mechanical Engineering at the University of Illinois, was selected to direct the lines of research, and it is not too much to say that he has become the Moses who has led this industry out of the wilderness and to the high technical plane that it is now beginning to enjoy. Results of the injection of technical and scientific knowledge into this field are already evident. Furnaces are being designed with due regard to engineering principles, and it is not too much to anticipate equipment with efficiencies as high as those representing the best practice in the boiler field. Design of duct systems is rapidly being improved and standardized, and furnace installers are being schooled in refinements hitherto unthought of. The second factor in developing warm-air heating, especially in its application to large houses, is the introduction of small electric motor-driven blowers to force the warmed air through the ducts regardless of wind or weather conditions on the outside of the houses. The oil-burner, vacuum cleaner, washing machine and electrical refrigerator each helped to prepare the public for acceptance of a similar small motor in the warm-air heating system. Now, instead of the air's circulation being left to chance, it is under definite pressure and control, and that cold northwest room gets its full quota of heat even in

the most extreme weather. I have gone into this seemingly extraneous subject at some length because the architect who specializes in large and costly houses has many times had a contemptuous attitude toward warm-air heat and, if my deductions are correct, he should revise his estimates (in the light of this new engineering development in the warm-air field) and be prepared to give his client the benefit of the most improved equipment.

Another point is that manufacturers of warm-air furnaces have, almost without a single exception, adopted a rating code, developed by the National Warm Air Heating Association, and their products are marked with guaranteed capacity ratings determined by a technician employed by the Association. This is in marked contrast to the situation in the boiler-heating field, where the manufacturers have been wrangling over ratings for more than a quarter of a century, and thus far, for commercial reasons, practically refuse to adopt a uniform rating code. As a consequence, heating contractors are completely at sea when it comes to determining the actual capacity of a given boiler, or to comparing performances of one with those of another.

Practically there is no limit to the size of a house that can be heated with warm air where a blower is used. As an example, a residence in the outskirts of Indianapolis is 130 feet long and has 24 registers. Two furnace units are fired with oil burners; there are two sets of ducts, one conveying warmed air from the furnace jackets to the various registers, and one returning the cooled air to the furnaces. The return ducts to each furnace are fitted with a motor-driven blower which provides such a circulation that an 80° temperature can be maintained in every room in zero weather with a 35-mile wind. The introduction of the blower has solved the problem of distributing warm air through the long or large house. Without a blower it is customary to introduce the warmed air into the room along the windward side, so that the excessive infiltration due to winter winds would tend to distribute it through the

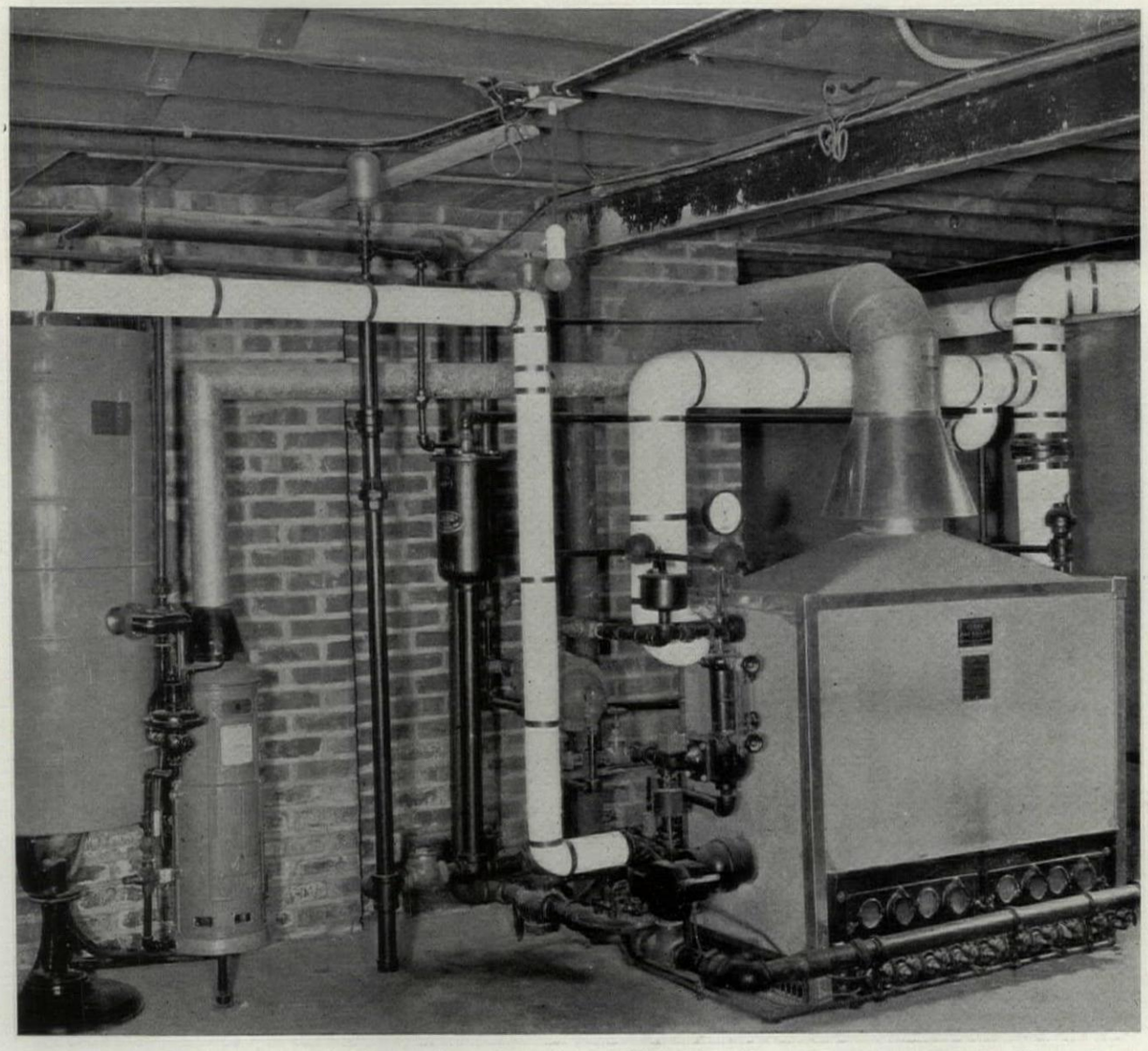


The Installation of Two Boilers Permits Operation at High Efficiency Under Varying Weather Conditions, and Provides Against Breakdown of Service

house. But high winds and shrinking window sash defeat this purpose, as the natural force producing air flow is small indeed. With a fan installed in the heating system of the house, as was just described, the furnace could be located in the extreme southern end of the building and the flow of air to the northern extremity would be definite and sufficient all the time.

The Basis of Successful Air Conditioning. Research, conducted over a period of more than five years by the American Society of Heating and Ventilating Engineers, in coöperation with the Bureau of Mines and the U. S. Public Health Service, has determined the atmospheric conditions under which human beings are most comfortable. It is not sufficient that a person be warm enough. It is essential that the air be within certain extremes of temperature; that the humidity be properly related to the temperature, and that a definite air movement, in rate related to the other two factors, be maintained. These three variables can be so plotted as to define a "field of comfort," through the approximate middle of which passes the line of greatest comfort. Thus a definite humidity and rate of air movement go with each degree of temperature, and the proper combination, for a temperature of 60°, results in a more comfortable atmosphere than where the temperature may be 70° and the humidity too high or too low, with little or no air movement.

Having this knowledge of the conditions under which atmosphere is most comfortable, it becomes a problem in air conditioning to have these conditions automatically maintained in the country home. It then remains to see just where each type of heating equipment fits into the general scheme of things in producing the desired atmospheric condition. Where all of the air is heated in a central unit, it becomes a simple matter to provide for the introduction of water vapor to the desired extent, and this is one of the strong points of the warm-air system. The commonly accepted method is to incorporate a pan, with large surface area, in the jacket design, with



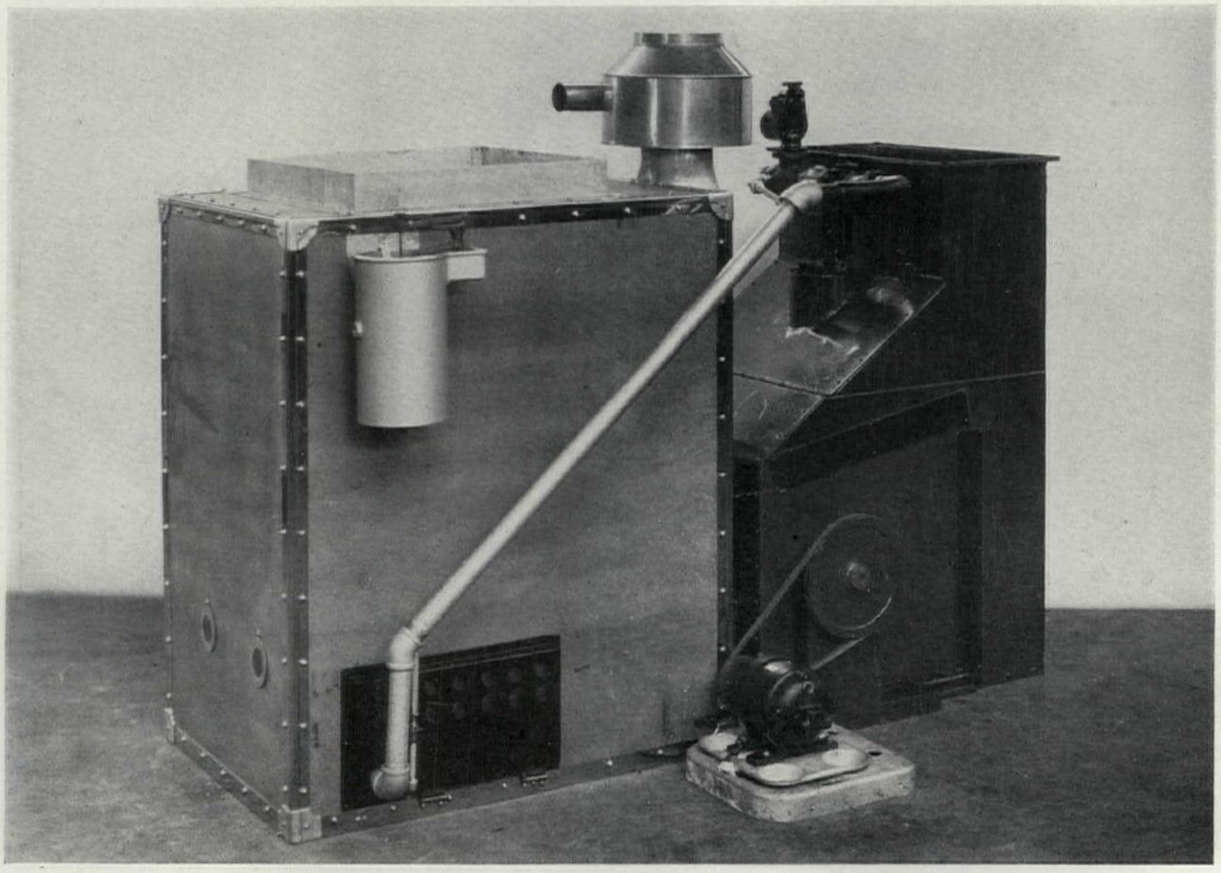
The Gas-fired Boiler and Domestic Water Heater in a Country House Comprise an Excellent Installation Where Clean, Automatic Operation is Desired

a water supply from the street with mains automatically fed to the pan and maintained at a fixed level through a float valve. The pan is so placed that the heat in the combustion chamber raises the water to practically the boiling point, and the air, passing over the surface of the water, picks up the water vapor and thus provides the requisite humidity. This scheme is not entirely satisfactory, even in small units, because it is difficult to evaporate at a sufficient rate properly to humidify even a six- to eight-room house. With the fan-blast system, however, it is not difficult to introduce a spray device that will raise the humidity of the air to the proper degree.

The Air Washer. Another reason for the increasing importance of the warm-air system is the ease with which the air being circulated throughout the house can be cleaned. Dirt is one of the bugaboos of the best built houses. If it can be removed from the air flowing to the fan and furnace, the air coming from the registers will be clean, as well as warm. There are several kinds of dry air-washers adaptable to the house with forced-air circulation.

The last item in the category of warm-air attributes is that of providing for the definite air movement required to meet ideal conditions. With this kind of circulating system, the air can be removed at just the proper rate to provide at once for the heat loss in any room and for the desired air flow that prevents the air stagnation found in many houses. So it will be seen that, by virtue of the changes that have come about in the warm-air industry, this form of heating is, in many ways, admirable for the large country house. The chief objections are prejudices resulting from observance of the inferior warm-air installations of the past and the feeling that these plants are "cheap" in the accepted sense of the word. While speculatively built houses are frequently equipped with trashy warm-air equipment built for competitive selling, the architect will find furnaces built to the highest standards and adapted to homes of almost any size and value. This whole field is so new to the architect who does not specialize in small commissions that he is likely to look askance at it; but the points that I have brought out are sound, and warm-air heating is destined to make its appeal to the owner of the large country house.

Heating With a Boiler. The "heating industry," so-called, has drawn a clean line of demarcation between boiler and furnace heating. The former class of installations is put in by a steamfitter; the latter by a sheet-metal worker. These two classes of artisans being separate and apart, and the metal-worker usually also being the local tinsmith and plumber, the two groups have grown up apart and almost hostile. This situation is illogical, and within the last few months a definite move has been initiated to segregate the trades involved in the so-called "com-



A Gas-Fired Blower Type, Warm-air Furnace Automatically Provides Proper Temperature, Humidity and Circulation of Cleaned Air, Giving an Almost Perfect Atmosphere

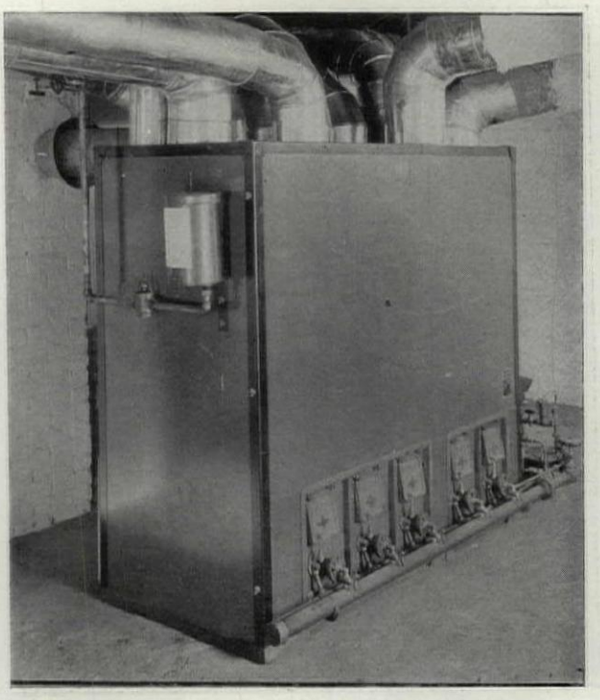
bination shop," as they do not really belong together.

The earliest boiler heating utilized steam as the medium of heat transfer from boiler to radiator; the hot-water system was a later development. For many years the use of steam involved practically a one-temperature medium, for water boils at 212°, at atmospheric pressure, and at a but slightly higher temperature with the pressures used for heating in systems other than the "vacuum." This was the chief objection to the early steam-heating installations,—radiators were filled with steam at the same temperature in October and May as they were in December and January. It was almost impossible to prevent overheating in the early and late days of the heating season.

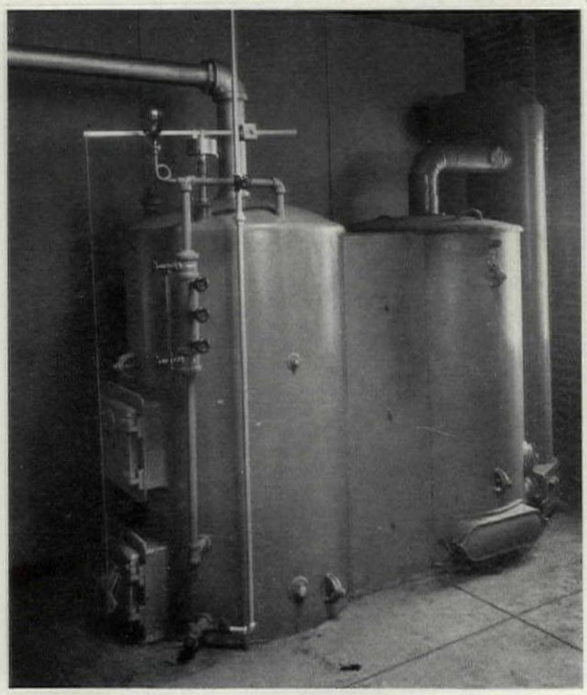
Water systems possessed one admirable attribute; they could be operated at low temperatures,—120° to 150°,—when the heat demand was low, and at maximum temperatures,—180° to 200°,—during the coldest weather, although, owing to the lower temperature of the heat transfer medium, larger radiators were required than with steam. They had also two opposing characteristics,—they were sluggish in starting up to respond to a sudden demand for heat, but, on the other hand, the system contained a considerable quantity of stored heat and consequently did not "pump" rapidly from hot to cold. One curious thing about a steam system is the psychological effect of a cold radiator upon a person coming into the room from the outside. If the radiator, through operation of a thermostatic control, has had the steam shut off for a few minutes, the average person entering a room at 70° will, finding the radiator cool, complain that it is uncomfortable.

Modern Multi-temperature Steam Systems. With the one-temperature characteristic of the old steam system admittedly against it, engineers developed various schemes to so modify steam-heating systems that they would not suffer, in this regard, in comparison with water installations. These schemes were all based on the principle that water under pressure requires a higher temperature to turn it into steam than when at atmospheric pressure, and that the boiling point is lowered by producing a vacuum, or negative gauge-pressure, in the boiler and radiators. A lower limit of about 100° and an upper limit around 240° (for a steam pressure of 10 pounds) afford a range considerably greater than that of a water system, and the pipe and radiator sizes can be materially reduced. On the other side of the ledger there is the necessity for providing and maintaining the equipment necessary to produce the desired conditions of vacuum and pressure.

The Problem of Maintaining a Vacuum. It is extremely difficult to install a heating system so that it will be absolutely air-tight. In a steam-heating plant, if the steam pressure is removed suddenly, a vacuum will be formed, and air will be drawn into the pipes and particularly into the radiators. If, at the end of an hour, the steam is restored, steam will flow from the boiler to a radiator and, because of the compressibility of the air in the radiator, steam will press the air into one portion of the radiator until a state of equilibrium is reached. But, as steam and air will not mix, one part of the radiator will remain cold and the rest, under the influence of the steam, will give off heat. If it had been a vacuum system, the air would have been drawn from the radiator as it slowly filtered in, and a definite vacuum maintained. Then, when steam was permitted to flow,



Simplicity and Cleanliness Characterize This Gas-fired Warm-air Installation

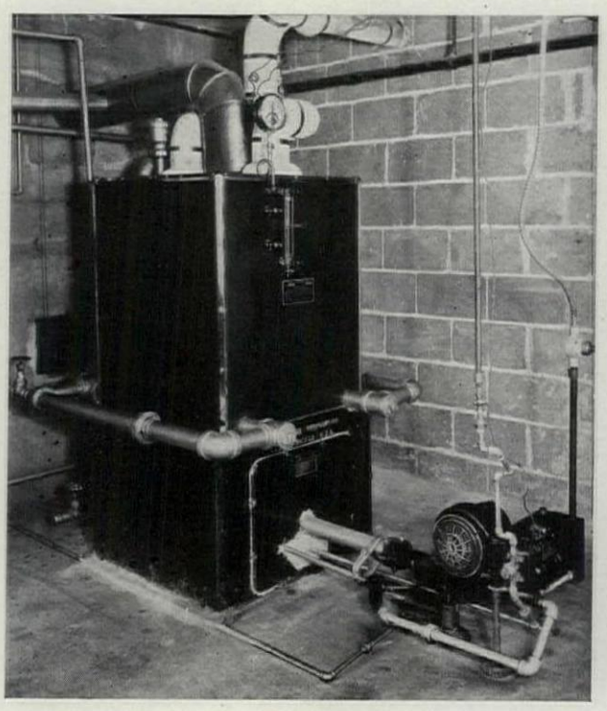


Combustion Chamber and Secondary Heating Surface Separated for Increased Efficiency

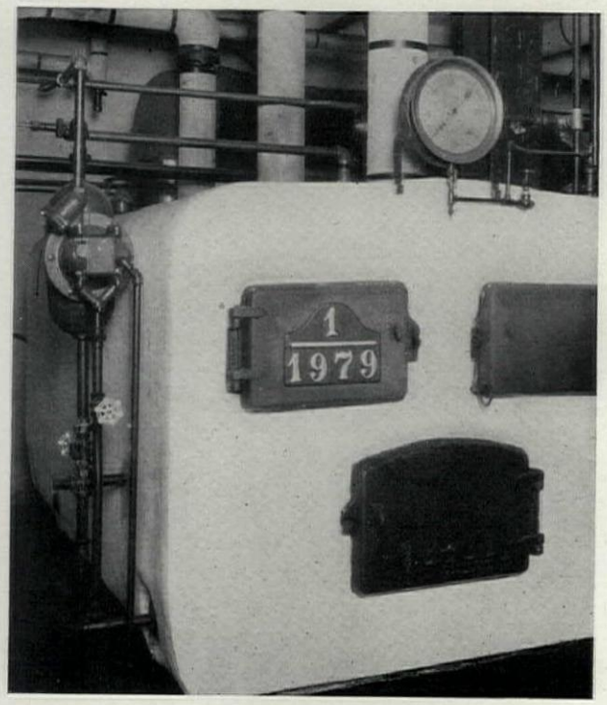
the radiator would have been completely filled with steam, and its entire surface have become effective.

There are two methods of producing and maintaining a vacuum. One involves the use of a mechanical device, such as a motor-driven pump that will return the condensate to the boiler and eject the air. Such a system is hardly suitable for the country house, and properly belongs in hotels, apartment houses, or other large buildings. Non-mechanical devices for maintaining a vacuum are many, and depend upon different principles for their operation. Properly made and installed, these devices entirely change the characteristics of the old basic steam-heating system, and produce systems of marked flexibility. It is but natural that a secondary advantage of using wide-temperature range systems is to produce real economy in fuel consumption. Although, as I have pointed out, economical operation is not the most important thing in the production of a uniform room temperature with a minimum of attention, no home owner will pay two dollars for what can be secured for one dollar. Consequently, while taking many statements of economy due to the use of advocated "systems" with a grain of salt, the architect should carefully examine the validity of such claims, in the interests of his client. As a matter of fact, after having developed wide-temperature range systems for the purpose of securing better operation when but little heat is required, engineers have taken the next step and produced systems designed automatically to generate and distribute a heating medium at a rate and temperature exactly proportioned to the existing differences in temperature between the outer and that desired in the home. Such a "differential" system would appear to be the last of the possible refinements in this regard.

Basing Heat Generation on Temperature Differences. It has been determined that, when the "daily mean temperature" as given by the U. S. Weather Bureau, is 65°, the datum line exists, above which no indoor heat is required, and below which heat is demanded. It would, at first thought, appear that this is too low a figure, but it simply means that at this temperature, which is the mean of the highest and lowest temperature during the 24 hours, the daytime temperature is sufficiently above that figure, so that the indoor air will be comfortable. Thus it is evident that the demand for heat can be measured by the differences between the existing daily mean temperature and 65°. If, for instance, the daily mean for a given day is 60°, we can say that the demand for heat during that day is (65°—60°) 5° times one day, or five "degree-days." Had the daily mean been 55°, the demand would have been ten degree-days. Had the daily mean been 60° for five consecutive days, the demand for the whole period would have been 25 degree-days. We then see that it is possible to so design the control equipment of a heating plant that heat will be produced when the outdoor temperature drops below 65°, and in proportion to the difference between 65° and the lower temperature. The supply is not strictly in proportion to the *degree-days,* which are based on *mean* and not instantaneous temperatures, but the principle is similar. Obviously, such a system operates best where a fluid fuel is used, street steam, electricity, gas or oil, because, in this case, the production of heat stops when the temperature is such that no heat is required. Where coal is burned in such a system, the production of heat is reduced to a



A Boiler Designed for the Use of Gas or Oil Fuel Only



Constant Water Level Is Maintained by Device at Left

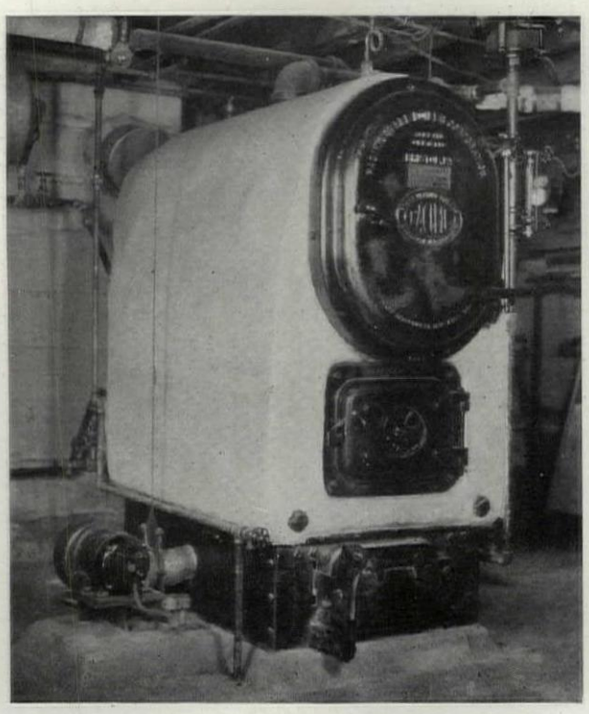
minimum; i. e., the fire is put in a "banked" condition.

So far as the actual production of heat is concerned, such a system is ideal, as it brings about the generation of heat only when it is required. The operation of a differential system would generate steam or vapor at a very low temperature,—around 100°,—when there was but a slight demand for heat, by causing the system to function at a high vacuum. If a cold snap were coming on, the vacuum in the system automatically would decrease as the outdoor temperature decreased, filling the radiators with steam at higher temperatures. If the outdoor temperature should approach the minimum for which the system was designed, the vacuum might be entirely removed, and steam be generated at positive pressures, so that steam at 220° could fill the radiators and cause them to emit heat at a maximum rate.

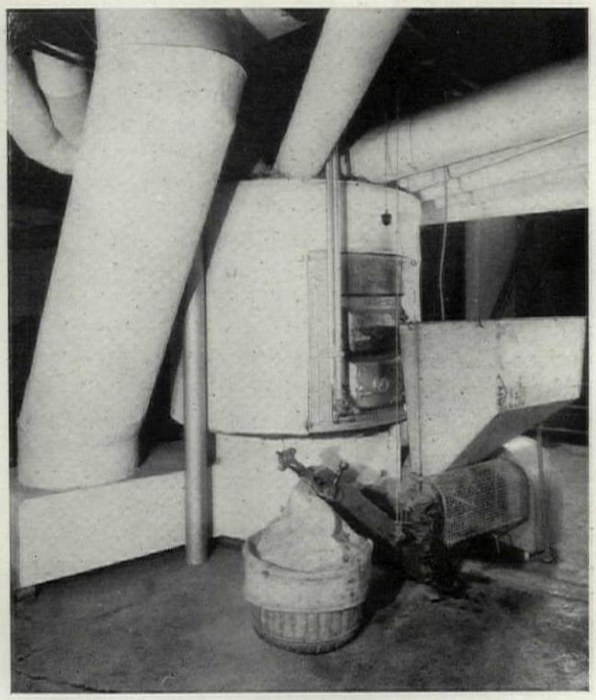
Boilers for the Large House. Fortunately for the architect interested only in large homes, there is not the cut-throat competition in boilers adaptable to his needs as is the case with boilers for smaller houses, particularly those of the round type, and in furnaces. For the large house the choice would lie between rectangular cast-iron boilers, steel boilers, and special types designed to burn gas, if the owner desired to use this ideal fuel. In considering the first two classes, the architect should select a boiler with a generous secondary heating surface or flue area, because of the increasing popularity of oil as fuel. It might be desirable to switch from coal to oil at some future time, and a boiler deficient in secondary heating surface is not the boiler to use with oil, for the reason that the oil burner is designed to generate heat intermittently, at a high rate, and the short travel of heated gases at high temperature simply means a high chimney temperature and consequent low efficiency. Gas heating is also coming into great favor, but it can seldom be used in a large house unless insulating materials in walls and roofs are used to minimize the heat losses, and weather stripping and storm windows are installed to cut down infiltration. Gas-heating boilers are comparatively easy for the architect to select because of the uniform rating code adopted by manufacturers of these boilers and because such ratings are certified to by the American Gas Association, in whose research laboratory in Cleveland tests have determined the ability of the boiler to carry its designated load as well as to function properly.

Steel boilers, in the past, have found more general use in hotels, apartment houses and schools than in residences, but the field has been rapidly extended to include domestic applications, and now the "bungalow type" of boiler, small enough to pass through a standard door, is available for the smallest house. These boilers have much to commend them,—high efficiency, quick-steaming ability, and unit construction. That they are encroaching upon the former domain of the cast-iron boiler is evidence of possessing inherently good qualities.

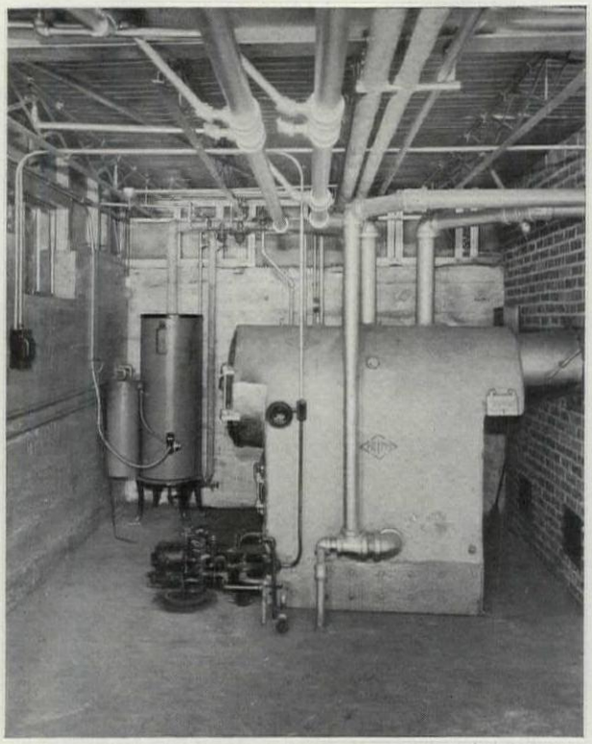
Boiler Protective Devices. Boiler operation in the large house usually involves different considerations from that in the small house, as it is in the hands and under the control only of servants. For this reason it becomes a necessity to provide against accident through carelessness. This is particularly true where steam is used, as there is constant danger of cracking a section or of burning the top of the combustion chamber because of failure to maintain the proper water level. A simple device to automatically assure



The Blower at Left Furnishes the Draft Necessary Where Small-sized Coal Is Burned



Automatic Stokers Lessen the Labor of Firing Coal Furnaces and Boilers in Country Houses



Steel Boilers Show High Efficiencies in Country Houses as Well as in Industrial Power Plants

a fixed water-line consists of a chamber in which there is a metal float that opens and closes a valve in a pipe leading from the water main. Developed from the crude device of several years ago, these feeders now provide against corrosion due to hard water, have self-cleaning valves, and such refinements as make for reliable operation. More and more is the home owner, with or without servants, coming to depend upon automatic devices to obviate the necessity of remembering to do certain things at definite times, and this is true particularly with reference to the heating plant. Both gas and oil have been used as domestic fuel for a quarter of a century, but it is only within the last few years that the completely automatic heating plant has been brought well nigh to perfection. These fuels, particularly oil, have cut into the sales of coal to such a degree that coal interests are alarmed, and coal dealers all over the country have been forced, for self-preservation, to begin the marketing of oil. One reflex to this tend has been the development of automatic methods of firing solid fuels.

Stokers for Domestic Applications. A provision for the mechanical feeding of coal to a domestic boiler or furnace, and in some cases for the removal of ashes, affords some small measure of relief for the owner of a small home, or for the servants in the larger house. There are really two considerations as regards fuels: the mechanical firing of common sizes of coal, and the ability to use, in the domestic heating plant, the smaller sizes of coal hitherto used only in large commercial or industrial plants. The rice, pea and buckwheat sizes can usually be bought for about one-half the price of the conventional domestic furnace coal, and where the annual consumption is 25 tons or more, the difference in fuel cost is appreciable. A more universally applicable benefit comes from the fact that these automatic firing devices make it possible to approach the higher economies obtaining with fluid fuels by adapting the firing rate to the heat demand. With a hand-fired plant under thermostatic control, the beginning of a sudden cold snap will be followed by the opening of the draft and closing of the check damper, but with a given supply of coal in the combustion chamber, the charge is liable to rapid consumption, even to the extent of almost complete reduction to ashes. With the stoker plant, the demand for increased heat is followed by a slow but uniform supply of fuel, maintaining the fire in almost ideal condition, regardless of the length of the excessive demand. In most cases, of course, it is necessary to fill the hopper by hand, in contrast to the industrial plant, where overhead storage makes automatic gravity filling a simple matter. Also, it is necessary to remove the ashes, although some of the devices convey it to steel cans, and the manual labor is limited to the removal of these cans.

After having dwelt at length upon the desirability of having properly conditioned air in the home as well as in the school, theater and office, it would not be amiss to point out that several forms of equipment for this purpose are already on the market. One of these is a single-unit, gas-fired, warm-air furnace, with an integral humidifying device, and it is automatic in operation. It occupies no more bulk than the conventional boiler for any given building. If desired it can be arranged to provide for the circulation of cooled, dehumidified air throughout the house during the summer. In truth such apparatus supplies ideal atmosphere for the home, summer and winter, making it actually more comfortable during the summer to keep the windows and doors tightly closed than to have them open. Naturally, the demand for this class of equipment will stimulate the ingenuity of engineers and designers, and it is not too much to predict that such unit plants will be common, even in small homes, ten years hence. The architect will do well to give serious thought to this question of air conditioning, as he will be faced by a demand for an ideal atmospheric condition in the home from men who are educated to its appreciation through enjoyment of what has been termed "manufactured weather" in their offices and in theaters and motion picture houses.

THE SERVICE EQUIPMENT OF THE COUNTRY HOUSE

BY
ELIZABETH C. CONDIT
PRATT INSTITUTE

HOW to provide convenient workrooms, adapted to the service to be done, is becoming a basic problem for the architect of country houses. Traditions no longer overbalance practical considerations in affairs that affect the business of the household and its management. The kitchens, pantries and other household workrooms should be large enough to facilitate the work to be done, but they cannot be as huge as the rooms in our grandmothers' houses.

Careful consideration of these several points will aid in planning an efficient kitchen and services for the country house:

(1) That the plan contributes to efficient work;

(a) that the services be arranged compactly for comfortable and convenient routing of work; and that they are

(b) completely equipped with useful, easily cleaned, labor-saving tools.

(2) That the materials used shall be easy to keep clean and sanitary, with all surfaces smooth and washable.

(3) That the service portions are attractive, comfortable places in which to work. This can be accomplished through wise choice of materials and colors, and an orderly arrangement.

The kitchen should be large enough to be a convenient place where food for family and guest can be prepared, but its exact size will depend upon the number of workers or people using the room, as well as upon the number to be served. A room 8 by 12 feet or 9 by 13 feet is convenient for one worker. A cook and assistant for a larger country house will need a larger room, and the efficient kitchen must be supplemented by a service pantry, servants' sitting and dining room, lavatory, and storage and receiving space. Where the kitchen must be used as a servants' living room as well as a workroom, it should of course be large enough for the dual role. A room constructed with an alcove to be used as servants' dining and sitting room, will give the staff a place out of the cook's way, thus avoiding trouble. If the entrance for tradesmen and supplies is made large enough to receive market products and groceries, with space for a table or counter with weights and the quipment needed for checking, the kitchen will be relieved of many disturbing occurrences. The housekeeper's food storage closet can conveniently open from this receiving room.

In planning the service portion, both the arrangement of the major equipment and the routing of the work to be done in the room must be considered. Windows, doors, chimneys and outlets should always be placed to conform with step-saving arrangements. In a well ordered, step-saving plan of work, the cook collects at the work-table the needed supplies from the refrigerator nearby and from shelves within arms' reach. The utensils and tools are also within arms' reach of the table; across the kitchen is the sink. Supplies collected easily are made ready for cooking at the table, which is only a few steps from the range. When the food is cooked it is placed on a shelf in a pass window to the serving pantry. The waitress in the service pantry places it on the serving dishes, adds garnishes,—and it is ready for the dining room. The cooking dishes are collected on the right hand drainboard of the sink, where they are washed and put back in their places near the work-table. Towels and holder and dish cloths are put in a clothes washer connected with the kitchen sink, where water and electricity cleanse them. The dishes from the dining room are washed in a dishwasher connected with the service pantry sink and are kept in closets over that work-table. Obviously, the work in the kitchen centers about the preparation and cooking of food and the washing of the dishes used in preparation, while that done in the pantry is concerned with the serving of the food and the washing of the service dishes. Since water is needed for both the kitchen activities, the sink is well placed on one side of the room opposite the range, work-table and refrigerator. In a large kitchen a work-table at the center of the room may be a convenience.

Storage Space. Enough wall cabinets, shelves, floor cabinets and closets to adequately care for the variety of equipment and supplies, make for orderly work. Portable or built-in, ready-for-use units can be procured, or a work-table and shelves be built as an integral part of the room. The essential factors are adaptability, arrangement, position and convenience. The cook should have supplies and equipment within arms' reach of the work-table. Wall shelves just wide enough to hold spice, flour, sugar, etc. containers are better than wide shelving. Compartments built like pigeon holes, suited in size to hold rolling pins, egg beaters and other equipment, are also conveniently placed against the wall, near the work-table. Well constructed sets of hooks under shelves where hanging things will not be knocked down or obstruct work, are practical and useful for many small tools.

As far as space and convenience will allow, it is well to arrange shelves and cupboards the height of the natural range of the eye. Closets under tables are difficult to clean and less likely to be carefully inspected. Built-in or attached containers, with spaces back of them, or with cracks and crevices where they slide back and forth, are to be avoided. A few crumbs or a little food left in a corner can cause untold trouble as harbors for germs or vermin. A closet for the pots and kettles can be narrow, ex-

The Use of Decorative Accessories Adds Much to the Attractiveness of This Kitchen

tending from floor to ceiling, placed near the range. Storage for mixing bowls and kitchen dishes is convenient in wall cabinets near the work-table or in a closet at the left of the sink. A linen closet, fitted with shelves close together for towels, etc., can be wherever there is space. The convenience of a separate closet for these things will do much to encourage cleanliness. An electric mixing machine can be placed opposite the refrigerator or quite near the work-table.

Over the work counter in the service pantry, closets protected by glass doors offer convenient places to keep glass and china, while a well constructed, built-in-the-wall safe, fitted with narrow felt-lined drawers for flat silver and large compartments for the silver service dishes, cares for the silver. These, with a linen closet, give storage place for things needed in the service pantry. Accessible markets and prompt deliveries make it unnecessary to buy large quantities of provisions, and a large, stocked storeroom no longer means economy. However, a small, well ventilated storeroom, opening from the delivery entrance, is useful. Wall and center shelving affords ample space to keep emergency and permanent stocks of foodstuffs. Cleaning equipment, reagents and supplies need not be housed in the kitchen, but in a well constructed closet in a place convenient to their use. In a large house it is convenient to have such a closet on every floor. Outlets to use for the vacuum cleaner may be needed in places where no other electric device is used. As a rule, the vacuum can be plugged into any light socket. Work-tables and closets can be made of well seasoned hardwood, constructed to leave no seams or cracks, or of metal. A smooth, firm table top gives a good working base. There is a variety of materials to choose from. Because of the work to be done, non-absorbent material,

Photo. Mattie Edwards Hewitt

Kitchen Cabinets Conveniently Arranged Are Aids to Efficiency

which is not affected by either acid or alkali and is easily cleaned, is desirable. The best is none too good and will prove economical in the end. There is a tendency to put in the kitchen poorly constructed labor-saving contrivances that are an extravagance because they are difficult to clean and make instead of save work. Bound corners, smooth surfaces and open, easily cleaned spaces are aids to cleanliness.

Refrigeration. The refrigerator near the work-table should be large enough to serve the family, and a size too large is better than a size too small. One with two compartments allows space to separate different kinds of food, or the family food from that of the servants. If there is to be a refrigerator in the service pantry, that in the kitchen need not be so large as when it is the only cold storage space. In these days of gas and electric refrigeration and available market facilities, large built-in storage refrigeration is seldom necessary, but it is often advisable to incorporate a standard refrigerator in its proper place with the cabinets and shelving. A mechanical refrigerator for salads and desserts can be fitted under the work counter in the service pantry, if floor space is limited.

Range. A range should be placed so as to follow the natural order of work. Many kitchens are equipped with coal, gas, oil or electric ranges, depending on available fuel, cost of maintenance and efficiency as determining factors. If an ash-chute is attached to carry ashes to the cellar, where coal is used, it is an aid to the cleanliness of the kitchen. A gas range with a smooth metal top provides cooking conditions more like that of the coal range than does one of the barred top variety. A continuous metal-top electric range prevents the water that boils over from affecting the electrical connections. Which-

Photo. Mattie Edwards Hewitt

Color and Decorative Design Are as Fitting in the Kitchen as Elsewhere

Photo. John Wallace Gillies, Inc.

A Well Planned Working Corner in a Kitchen

Lighting Units Are Arranged Properly for the Worker

ever variety of fuel is used, a range that is simple of design is more easily kept clean. A warming oven and a temperature control on the oven are useful additions, and are integral features of many of the best ranges. A two-oven range makes it possible to have food baking at different temperatures at the same time. A hood over the range to carry off the odors of cooking, or a flue from the gas oven, is a small matter when building, but it makes a large contribution to the comfort and pleasant atmosphere of the house. Another small detail of importance is the size of the service gas pipe. The usual 1-inch service pipe is often inadequate. A 2- or 3-inch service pipe means sufficient gas at all times, and assures the working of the oven temperature regulator.

Sink. A kitchen sink built with two drainboards and made of sanitary material,—porcelain, enameled iron or vitreous china,—should be provided with a combination faucet for hot and cold water and be placed under a window, opposite the work-table and range. It will be comfortable if it is set the right height, 35 inches from the floor to the working bottom of the sink for workers whose height ranges from 5 feet to 5 feet, 6 inches, or 36 to 38 inches from the floor to the rim of the sink, for a worker somewhat taller. Many a worker's discontent is the result of unnecessary fatigue from working at too low a sink or table. A small electric clothes washer under the right-hand drainboard of the kitchen sink and an electric dishwasher in the same position in the service pantry are labor-saving devices. Other electric conveniences such as toasters, percolators and plate warmers are used in the service pantry, where enough electric

Photo. Mattie Edwards Hewitt

Gas Range with Hood. Metal-topped Work-table and Sink

outlets should be provded over the work counter.

Incineration Garbage Disposal. The country house should be equipped with an incinerator to eliminate use of unsanitary and unsightly garbage cans. Small waste containers clamped to the drain pipe of the sink, swing out to receive waste from the sink drainer, to be burned in the incinerator. The incinerator can be placed in the kitchen or in the cellar. Gas, coal, oil and wood are the fuels used. A well constructed flue connection is absolutely necessary for the escape of odors and to produce combustion. This should be tested in all weather and winds, and, if necessary, provided with a fan. The opening where the garbage is put into the incinerator should be of a convenient height to receive the emptyings from the container.

Floors and Walls. The rooms where food is cared for are the most important to keep absolutely clean and sanitary. The kitchen floor should be smooth, grease-proof, easy to clean, resilient and non-slippery. Attractive floors can be provided in patterns of tile, linoleum or rubber. Resilient floors are usually preferred, as they are the least tiring to the workers. The walls may be painted with washable oil paint or enameled in better work to a height 6 feet, or fully tiled. Colored tiles are used with excellent effect. The baseboard and the wainscoting should be flush with the wall, without any dust-collecting ledge. A coved base between floor and wainscoting is more easily cleaned than sharp corners. Rounded door and window trim is also desirable for the same reason. Where waterproof walls and flooring are used, a floor drain facilitates a thorough flushing of floors and wainscoting with a

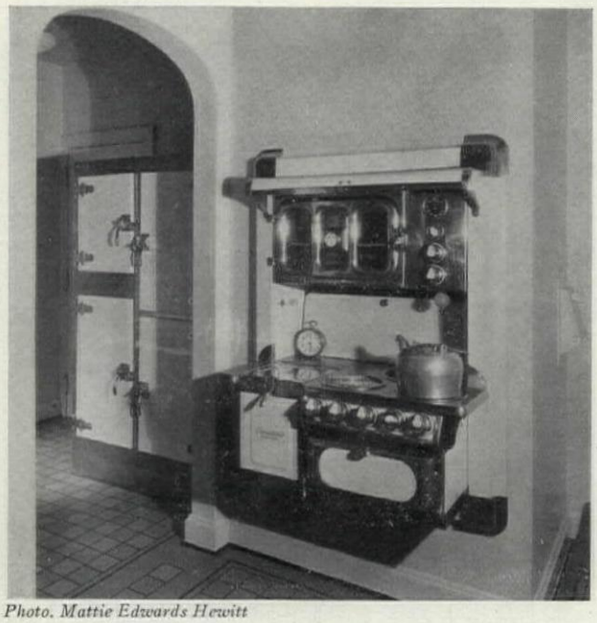


Photo. Mattie Edwards Hewitt

Modern Electric Ranges Have Many Automatic Control Features

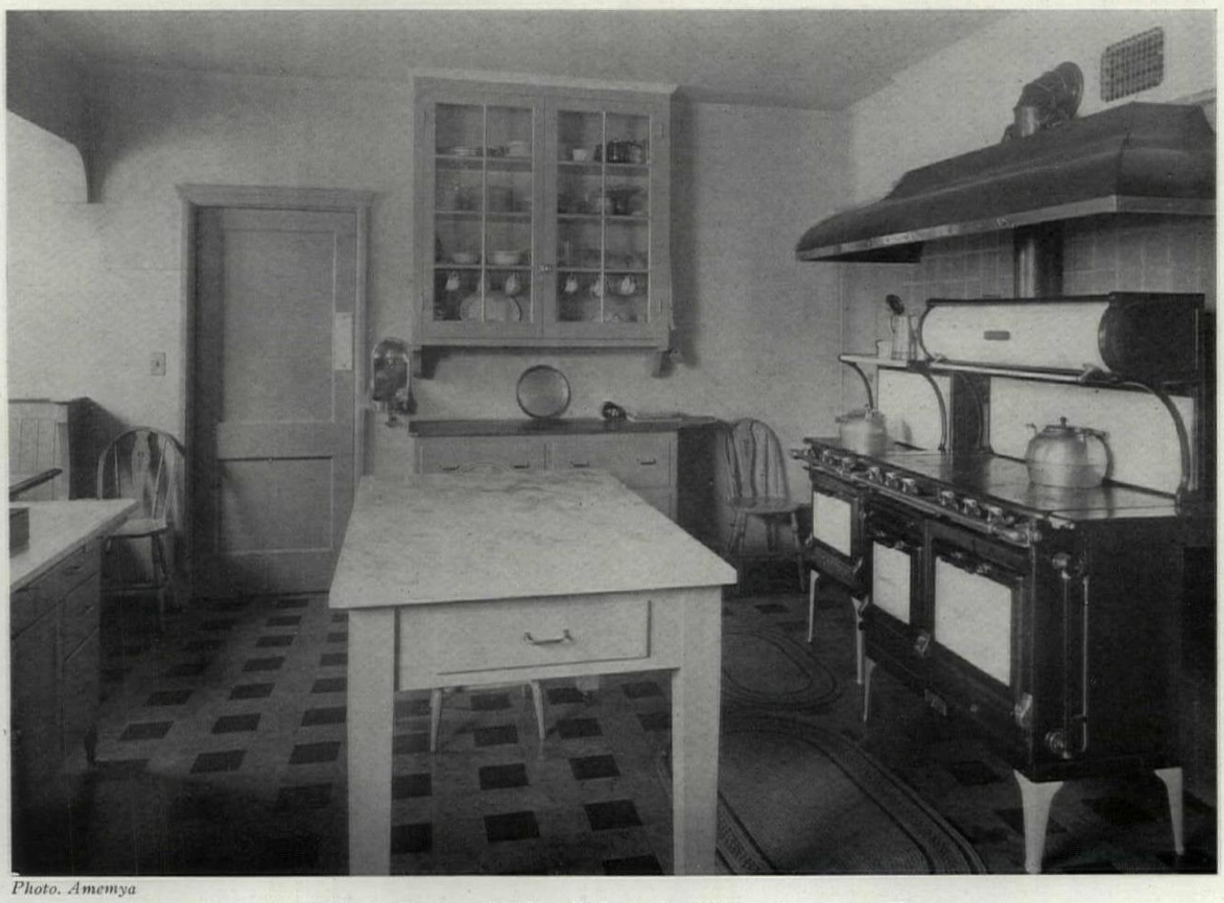


Photo. Amemya

Adequate Range, with Ventilation. Ice Water Faucet near Door

Photo. Mattie Edwards Hewitt

Convenient Built-in Cabinets and a Dining Alcove Are Included in this Compact Kitchen

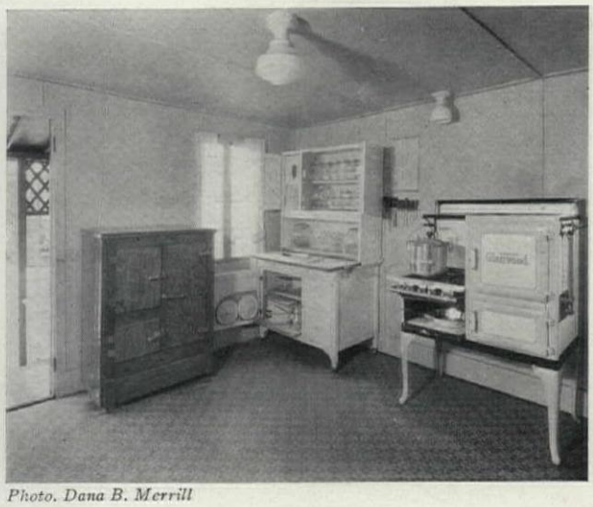


Photo. Dana B. Merrill

The Well Lighted Working Kitchen Cabinet is Here Placed Near the Refrigerator and the Range

hose, using hotter water than is practical for mop or scrub brush cleaning.

Laundry. The laundry, wherever situated, should be conveniently and adequately equipped. Laundry work in the modern country house is now done almost entirely by machinery. The clothes are washed most efficiently and thoroughly in washers of various types, the moisture is removed by "extractors," and the clothes are dried and ironed by other apparatus. Drudgery is eliminated. If the room is large enough, washer and laundry trays at the center of the room are advantageous. Tubs should be set 36 inches from the top rolled rim to the floor to make the work of washing less back-breaking. The easiest tubs to keep clean are white or cream with vitreous finish. Whatever kind of a washer is chosen should be set with permanent drain and faucet connection. A small gas stove, wheel table and wall table are needed for washing clothes. Over the wall table shelves for stain removal and reagents will be convenient to use as the clothes are sorted before laundering. The same table will serve for sprinkling the clothes and as a receptacle for the ironed clothes. An ironing board built to fold up to the wall when not in use, is protected from dust and out of the way.

Bars where the electric iron cords can be hung away from the danger of being wet, and a place to keep the irons, should be provided. Science has not yet devised a clothes dryer that equals the sun as a bleacher and sterilizer, although there are many kinds of excellent dryers on the market. It is most important that this room should be well lighted. Give as much sunlight as possible, with center ceiling artificial light, supplemented by wall brackets near the washing and ironing centers. Electric outlets for irons, washer, etc., are necessary.

Light and Ventilation. The lighting and ventilation of a room are related, because the placing of the windows affects both. It is of the utmost importance to have the working centers well lighted. One authority says a kitchen should have the total glass area of its windows, outside door and transom equal to at least one-fifth of its floor area. Where windows are set high enough, 50 to 52 inches from the floor, the sink and work-table can be placed under them. The electric lights should illuminate work, not cast the worker's shadow upon it. There should be a kitchen unit for general lighting, a local light at the sink, and a pendant light over the table. Closets should be equipped with center lights, as well lighted spaces are seldom left dirty. It is in dark corners and shut-in places that dirt collects unseen to menace health and comfort. Whatever ventilating system is installed, windows and doors will contribute their share. It is well to arrange windows, transoms, and doors to allow a cross current of air to prevent cooking odors from being carried into the house. An electric exhaust fan can be used to good effect. Cold air on the range affects the cooking temperature and will cause a gas or oil flame to smoke. If the outer kitchen door is a Dutch door, the upper part can be open while the lower half acts as a screen to protect work-table and range from direct air currents.

Use of color in kitchens is in danger of being overdone, and the builder is warned to plan the color scheme for this room with consideration of its effect upon the workers. Too much strong color is as tiresome as the old glaring, white kitchen. The choice of a neutral colored sink, pale green or autumn tint is recommended,—a tone that will harmonize with any tint in the trim. The trim can be repainted at little expense, but a new sink is a costly affair, if the color scheme is to be changed. The exposure of the room should of course influence the color used. It is important that the household workrooms be well lighted, comfortable and pleasant. The workers may not appreciate the influence of the color and arrangement, but it plays a part in making them contented.

BUSINESS RELATIONS WITH COUNTRY HOUSE CLIENTS

BY

C. STANLEY TAYLOR

FROM the architect's point of view, country house work can be the most profitable of any type of commission which may develop in his office. Generally speaking, experience has not proved this to be the case, but in almost every instance the fault lies with the architect's business relations.. There is no reason why a client should pay less than 10 per cent for work of this nature; first, he can afford to pay it; second, the architect cannot afford to do the work for less if he is to render the proper kind of service; and, third, this commission represents a real, paying investment from the client's standpoint, provided the work is well done and serves to create real value.

The most prolific cause of non-profitable or unsuccessful country house planning projects lies in the careless approach to the matter of ultimate cost. If he is capable, the architect need not worry about matters of design, but if the cost of his project exceeds the owner's budget, a condition of unpleasantness is permanently established. This does not mean that the owner may not ultimately spend much more than he had originally planned on doing, but he will do it with full understanding and of his own volition. It is the mystery of home building which annoys clients,—unexpected costs arising toward the end of construction,—bills for extras which were never really understood, and the uncertainty which lack of proper explanation always causes. Perhaps there is a rigid rule which can be applied to every country house project,—that explanations should be made *before,* not *after,* the fact. If the architect will adopt this policy, he cannot fail to give satisfactory service, and incidentally, to make a good profit on the fees received. If a non-profitable project is analyzed, it will be found that the profit has been expended largely in explaining or making plan changes to suit the client. The architect cannot make extra charges for this type of work, and consequently he should avoid it by better preparation. An hour spent in advance explanation may save days of drafting room costs, not to mention disappointment and loss of confidence on the part of the client.

Country house clients are most exacting in their contacts with architects. They demand a degree of skill and a full measure of personal service consistent with the quality and nature of the projects. The average country house client is at once both appreciative of excellent work and critical of any weaknesses, shortcomings, or lack of service which may be discovered in those whom he may employ. Perhaps the most important and difficult of these factors is the demand for the personal attention of the architect to every detail of design and construction. This type of client takes the attitude that he is paying well for expert services; he is impatient of delays and of any seeming lack of attention, and is frequently unwilling to have the architect's authority delegated to representatives or assistants unless in turn these associates of the architect demonstrate their ability and capacity for understanding the client's problems.

Necessarily, country house clients are fairly well to do, and whether they have possessed their fortunes for generations or have recently acquired them, they are usually thoroughly businesslike in their financial transactions and usually watch expenditures as closely as an investor or merchant. This does not mean that they are unwilling to spend money or that they are parsimonious, but it does mean that they are able to judge values and expect a full measure of return for every dollar expended. These considerations are worth bearing in mind when seeking and dealing with country house clients. for upon the architect rests not only a very great responsibility for the successful conduct of the design and building project, but an equally great opportunity for enlarging his clientele and for creating a residence that will increase or more firmly secure his own prestige.

Securing Commissions. The first business problem in country house practice is that of securing commissions for such work. Perhaps to a greater degree than in any other form of architectural practice, country house projects are obtained through either social or client channels,—that is, either through personal acquaintance with the prospect or through the recommendation of past clients who have been eminently satisfied with the architect's services and capabilities. There is little value in solicitation of such projects, a matter which must be at once apparent upon realization that the country house project is something of a temporary avocation for the owner rather than a business investment. The owner's first thoughts are expressed among his friends with whom he discusses their own building experiences, the features that they incorporated in their own houses, and the architects and builders they employed to carry out their ideas. The owner thinks in terms of social rather than business relationships, and the architect who is socially acquainted with the prospective client and is welcome at his home has a distinct psychological advantage over the architect with whom the owner is not acquainted, even though the latter is more competent and better equipped to carry out the project. Prestige, of course, counts for a great deal among people of wealth, and it is very true that architects of the highest prestige totally unacquainted with a prospective country house owner may be asked to undertake the work without there having been any previous contact and without there being any apparent channel which brings the two together, solely because the client wants a well known name connected with his project, for the same reason

that his wife wants to wear a gown with a genuine Paris label. In other words, country house projects are secured largely through (1) acquaintanceship, (2) direct recommendation of mutual friends or clients, or (3) through prestige. Solicitation, if employed at all, must be of an indirect nature utilizing some intermediate channel.

Fees. With a country house project in view, the next business problem the architect faces is that of establishing a fee and securing a suitable contract for the work. To a considerable degree the charge established by the architect is of less importance to the owner than a knowledge of his capacity to carry out the project capably. The very forces that bring the architect an opportunity to undertake the work are more influential in securing him the commission than the price of his services. If a client seeks the architect on the basis of his prestige, he is willing to pay whatever the architect charges without question. If the contact is purely social, the owner is seldom willing to negotiate for a lower fee than the architect proposes to charge. One important matter, however, is the fact that such owners quickly appreciate whether an architect is worthy of his fee and whether or not he is establishing an unduly high charge as compared with the compensation received for other similar projects. Hence, the fee problem is largely in the architect's hands, but the intelligent method of establishing a fee is to disregard the opportunity for making an exorbitant charge and to base the compensation strictly upon the nature of the project, the amount of work involved and the quality of service to be rendered. In an article in THE ARCHITECTURAL FORUM for August, on "Payment for Architectural Services," this matter was discussed in some detail, and it appeared to be the prevailing opinion among architects that fees should be based upon the individual project rather than on an empirical formula or standard percentage.

Services to be Rendered. In drawing up the contract, however, it is of vital importance that the client be fully informed as to the nature and extent of the services to be rendered by the architect, the owner's obligations and responsibilities, and the architect's functions and the limit of his responsibilities. Loosely worded contracts, implying that the architect will give constant supervision to the project, will lead to trouble unless the architect intends to personally visit the site daily. Any implication that the architect will control costs or produce a house of given character within an established limit of expenditure is dangerous in the extreme, unless the architect intends to hold himself responsible for doing exactly that thing. The contract should be clearly and fairly worded, establishing definite limits upon the responsibilities and obligations of both parties without intimations or vague phrasing that may be construed to the disadvantage of either.

Cost Limits. In spite of the statements in the beginning of this article, the third business problem generally surrounds the matter of cost. Country house clients are not very different from other clients in their usual lack of appreciation of the cost of building materials and building construction. They frequently establish in their own minds total expenditures which they consider adequate for the development of their proposed estates. Subsequently, unless they advise their architects of these limits and request their coöperation in keeping all expenditures within the budgets, they may request accommodations or adopt suggestions of the architect and carry the ultimate costs far beyond their original conceptions. Sometimes such a development of expenditure is entirely satisfactory to the client, if he feels that the accommodations he is obtaining are exactly what he wants and that the prices charged are fair. A case in point is the instance of a wealthy owner who purchased an old Connecticult farmhouse and remodeled it for his country estate in a very comprehensive manner, employing old time construction methods and materials so that the extensive additions and improvements were in full harmony with the original building. Subsequently, the structure was so satisfactory that the architect was commissioned to carry out all of the furnishings and decorations, lest the owner introduce some inconsistent element which would destroy the happy effect. At the start of this project, the architect was warned that he would be hung from a high limb or otherwise held personally accountable if the total expenditure exceeded $60,000. So successfully was the project carried out, however, that as the owner's interest developed and his ideas expanded, the subsequent cost reached $250,000 to the complete satisfaction of the client, whose enlarged viewpoint now embraces the development of many extraneous features, including a swimming pool, formal gardens and other features which will require a still further outlay. Such an ideal condition, however, is not always encountered in such work, and even this project would not have gone so smoothly had not the architect taken care to advise the owner during the development stages that changes approved or required by him would involve a substantial increase in the original allowance.

At this point an important statement may be made. It is always possible to determine costs in advance, at least within a very small percentage, so that a budget may be established. It is found highly advisable to segregate completely the cost of ground improvements and of furnishing and decoration. In other words, the architect should primarily undertake the designing of the building itself, and it should be clearly understood by the client that the costs referred to have only to do with the building. Let the matter of ground improvements and of furnishings and decorations be another project, for which a general budget may be established, but which will not become specific until the house is nearly finished.

Considerable time should be taken in the preparation and correction of sketch plans, until they have been thoroughly approved by the owner with the understanding that any changes he may authorize will

cost considerable money and that the approval must be forthcoming in writing. When the building has been brought to an approved sketch plan stage, it will be found that local contractors can give very close estimates. These estimates should be taken as based on the sketch plans and fairly well detailed specifications. The costs should be submitted to the owner, together with the architect's fee and a *contingency amount*. There always are contingent costs, and it is better to put them into the picture before than after. By taking the intermediate figure of the various contractors' estimates and adding the architect's commission and adding a contingency fund, which usually should be about 5 per cent of the estimated cost, a figure is established which is a real budget and which it is unnecessary ever to exceed except under the owner's direction for additional work. This type of project resolves itself into a comparatively simple business relationship. Many an architect makes serious errors because a project is started in a somewhat haphazard manner in order to get the work going in the office. Any serious-minded country house client knows that he must pay for what he intends to get. He cannot accomplish unusual economies; he cannot expect his architect to do this. Consequently, he should not be led to believe by statement or by inference that he can get more for his money than anyone else can. If he wants more than he can possibly get, it is good business to tell him that he must reduce the size of space required or the quality of construction and equipment. It will be found that this kind of a business approach in the early discussions will establish a type of confidence which will carry through the entire project. Then, if the owner decides to build a larger or a better house or to install convenience or luxury equipment beyond the first conception, he automatically decides to spend more money, and he should be called upon to authorize this in writing.

The base cost having been arrived at, as already explained, these additional authorized expenditures can be recorded so that at no time should the matter of ultimate cost be mysterious, and at no time should it be necessary to explain this cost *except before commitments are made*. Homebuilding *is* expensive,—everyone knows it, and no owner will long be blind to this fact. It is obviously better to clear up this situation in the beginning. If at the end of the work the owner has spent a little less than he has been led to believe it will cost, he is the architect's friend for life, and he will go out and get more business for him. If the reverse condition is true, he will go out of his way to stress the unpleasantness of his relationship with his architect.

Supervision. The fourth business problem develops during the construction stage when the owner expects close supervision of every detail of the construction by the architect or some competent representative. Not only is it desirable to have a resident clerk of the works, but the architect should establish a regular schedule for inspection and should keep the owner fully informed not only of this schedule, but of the developments which he finds at each visit to the site. There can be no argument or criticism if the owner knows in advance what he may expect of the architect in the form of field supervision, unless the architect fails to maintain the established schedule and deliberately neglects his obligation.

Changes. The fifth, and probably the most troublesome, business problem arising on country house work develops during the finishing stages, when the owner is closely concerned with the selection of finishing materials not included in the general contract and often not discussed in detail as to either cost or type when plans were being drawn. It is at this stage that the owner begins to see in physical form the home which he attempted to visualize from sketches and blueprints. Many changes are likely to be made at the owner's request, and these changes almost invariably result in extra charges by the contractor. Many of these changes are ordered verbally by the owner when inspecting the work with the architect. The significance of these changes in terms of cost may not be fully appreciated at the time, and they may mount up in total to an amount which the owner is quite unwilling to pay when the bills are presented. The careful architect will not only immediately confirm these orders in writing to the owner, as well as to the contractor, but will wherever possible secure an estimate of the cost before it is too late for the owner to save the extra expenditure by reverting to the original plan. In practice this is most difficult to accomplish on every detail, and toward the end of construction there are many finishing items which represent unauthorized extras. The architect is responsible to the builder for most of these extras, and he usually has to submit the bills to the owner after the work is completed, with explanations and justifications which will result in the owner's acceptance of the charges. No element in architectural practice is usually so troublesome or so unpleasant as straightening out costs of such extras, and the happiest results are always obtained when this work is reduced to a minimum or entirely eliminated by taking great pains to have all work orders approved by the client in advance. Occasionally a country house client gives the architect carte blanche for the expenditures necessary to produce the desired results. While, apparently, this simplifies the problem of charges, it imposes even greater responsibility upon the architect to see that the bills are fair and correct and that they are no higher than they must be to accomplish the necessary work. Thoroughly businesslike methods are imperative in country house projects. It is a fatal mistake to assume that because a client is wealthy or because he is spending a large sum of money, he is indifferent to how much is spent or what it goes for.

After completion, the sixth and last problem of relationship which architects encounter in country house work is the neglected matter of following up completed construction. We have already noted that

country house projects are obtained largely through social channels and through the friendly recommendation of past clients. This suggests very forcibly the desirability of making certain that a client is not only a friend but remains satisfied with the work accomplished. The close contact or friendship that often develops between the architect and the client during the course of an important building operation is one that need not be abruptly terminated upon completion of the work,—in fact it is far better if the business relationship can be restored to or established upon a social basis when the work is done. There are several reasons for this,—the first being the selfish reason that the architect's interests in obtaining new work are not so readily forgotten by the client and he, therefore, may prove to be a more fertile source for new work than is likely to be the case if the architect himself drops out of the client's notice. A second and even more powerful reason is that the continued relationship assures the architect that no difficulties will arise after the occupation of the house which justly or unjustly may be attributed to some fault of the architect. Very frequently minor flaws appear, such as cracking of plaster, the warping or shrinkage of woodwork or floors, or minor defects in plumbing or heating systems or other items of equipment. Almost invariably these troubles are not due to neglect on the part of the architect, but are inherent in the materials themselves or might possibly be due to defective workmanship, which was not discovered by the architect's supervisor during construction. If the client once gets the idea that his subsequent troubles are in any way blamable upon his architect, he may come forward and call for an explanation or adjustment, but very likely he will simply put it down as poor work and will hesitate to recommend the architect to other friends, due to these trivial matters. The best practice seems to be for architects to make a point of visiting every building they complete at regular intervals for several years after their work is terminated, simply to raise questions regarding the condition of the structures and to answer questions concerning maintenance and care of the buildings. Such action pleases the client immensely; it entirely removes the possibility of there being continued dissatisfaction.

Photo. Paul J. Weber

Proper Landscaping Is Essential to Country House Architecture
House at Whitinsville, Mass.
Joseph D. Leland & Company, Architects

LANDSCAPING THE COUNTRY ESTATE

BY
JOSEPH FRADLEY WHITNEY
LANDSCAPE ARCHITECT

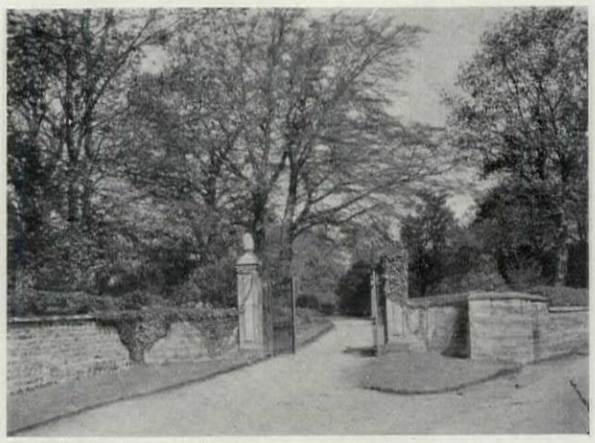
TO fit a piece of land for affording the utmost in human use and enjoyment is the object of landscaping. To achieve this goal, organization is necessary, and this in the case of estate planning means that the various uses to which such grounds are subjected must be recognized and adequately prepared for. The units resulting from an analysis of uses fall into three main divisions: the private (the enclosed lawns, terraces, flower gardens and the like); the semi-public (those portions visible to the passing public); and the service (the garage and garage court, laundry yard, vegetable garden, auxiliary buildings and sheds); and then each division is related by its position to the corresponding divisions of the house. Thus the influence of the room arrangement and the orientation of the well considered house extend out into the grounds and indicate, sometimes quite definitely, the position of each of these three outdoor divisions. As this arrangement is gradually evolved it should be borne in mind that restfulness should be the keynote of the average estate development. Broad lawns of gentle contour will give just this effect. That lesser element of restfulness, the satisfaction of the senses, felt in a garden which is a riot of all colors, is also important, but in a different way.

Selecting the Site. The owner of a country estate asks invariably to be satisfied on four points. He wants (1) easy access to his house; (2) attractive views of it as he approaches; (3) comfort and a sense of security upon reaching it; and (4) pleasing prospects from the rooms, terraces and the porches. This means that there must be worked out on the grounds directness of approach; road grades under 10 per cent, if possible; no sharp turns; and one or more carefully planned views of the house as seen from the approaching road. It means, furthermore, that the house should stand in an area sufficiently large to give it a stable appearance, since a very narrow terrace or a sudden dropping of the ground away from the house will destroy the sense of security as surely as does a position buffeted by gales or within reach of the waves. It is absolutely essential that the building platform drain easily. This is a point often neglected, as usually insufficient data are taken on existing soil and topographical conditions, the assumption being that a little grading will overcome all difficulties. Neglect of this point, in one case with which I am familiar, involved the prolonged use of a steam shovel. To arrange a good view is an easy matter, but to bring it into the picture without damaging vegetation or topography is often difficult, for the sides of an opening do not "feather down" where there is a lack of undergrowth and where it must be planted. This requires skill and experience, as does also the selecting of a small picture of importance from a broad mediocre view. Screening unpleasant vistas is another matter, in which a knowledge of plant forms and habits is essential.

Disposing of Excavated Material. When the site has been selected, it is most important that a landscape plan be prepared in order that the soil excavated may be placed, without rehandling, in its permanent position. The time lost in rehandling is often more important than the extra expense involved, as in the case of a delayed planting season, where it means holding over certain plantings for almost a year and others for four or five months. Delayed lawn planting, especially, is a serious inconvenience. It is taken for granted that the loam will be stripped off all areas marked for grading so that it may be replaced when the final grade is established, since good loam is frequently scarce and generally costly.

Protecting Important Trees. The possibility of saving important trees in a filled area by the use of "tree wells" is a widespread fallacy. The tree lives often in spite of the well rather than because of it, for it frequently holds excess water that is harmful to the tree. Its only virtue lies in its keeping the soil and the tree's bark apart. The more approved method of protection where use of fill is inevitable is in trenching around the feeding roots which lie under the outer edges of the foliage, as a rule, and in putting in some manure to stimulate root growth. At approximately the old grade, a line of unglazed tile or a 6-inch layer of gravel or broken stone with occasional outlets to the surface is used in order to bring air and water to the roots at the original level and to give an opportunity for occasional liquid feeding. Some trees, like elms and willows, will stand several feet of fill without adverse effects, and on the other hand I have seen a beech, that Beau Brummel of trees, show the harmful effects of a 4-inch fill and die under 12 inches after living a hundred years with roots partly exposed. It is best to seek advice of an expert where a good tree is involved, and the expert must be carefully chosen,—not merely a self-styled expert.

Roads. Except in the case of farm roads, which will not be discussed here, it is usually desirable to have the main approaching driveway enter the property as directly as possible, so that those entering may lose sight of the public road quickly. When there is clear indication from what direction will come the traffic destined to enter, a road entering at an angle facilitates driving to a great degree. The smallest radius of a turn-in should be 20 feet on center line unless traffic in only one direction is planned to be served. The narrower the public road or the busier it is with traffic, the wider the turn-in should be,



A Well Designed Approach, Forming an Easy Angle with the Highway

Restful Effect Obtained by Broad Sweeps and Few Simple Accessories

because of the difficulty of swinging out before entering. It is always pleasant to get a glimpse of the house from a distance soon after entering the property, even though it be lost sight of again, but any change in direction must be made gradually, especially if the house has been seen and its location established, for noticeable indirectness is irritating. Every curve should have a *raison d 'etre* that is evident, whether it is a natural curve such as to avoid a group of trees or a declivity, or a created obstacle. Notice how often the inside of a curve in a road is planted. It is more inviting when the house is reached to get a view into an angle rather than to look onto a corner or toward the end of a wing. The diameter of the turn-around at the house should not be less than 60 feet from the center line to center line. This should be considered a minimum, for any increase will make driving easier with less danger of overrunning the edge of the sod. It is customary to widen a single roadway at the house entrance to 15 feet or more, or else to provide, within sight, a place for the parking of several cars.

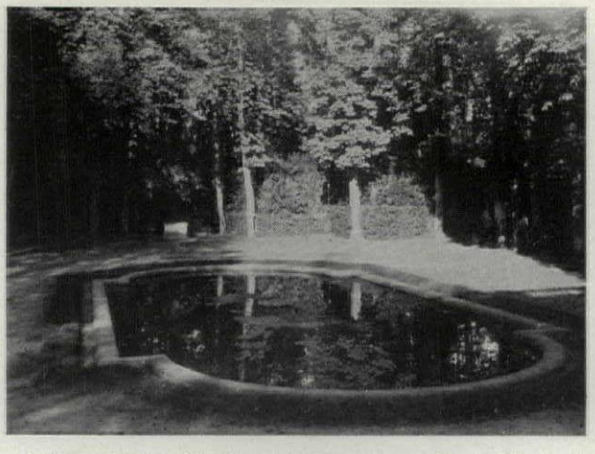
Where usefulness alone is the controlling factor, no road should be less than 8 feet wide. On turns where the radius is less than 40 feet, the width should be increased to 10 feet or more, for the reason that the rear wheels of a car cut inside the front wheels as much sometimes as 2½ feet when the car is making its shortest turn. Double roadways should have a minimum width of 14 feet. Usually any driveway between 10 and 14 feet in width is not advisable, because it is unnecessarily wide for a single and not wide enough for a double road. A discussion of actual road construction will be omitted, except to suggest that a road of much lighter construction than is customary will adequately serve the purpose during the summer months, where it would go to pieces if used during a winter thaw or when the frost is coming out of the ground.

Separation of Forecourt and Garden

Garage Courts and "Y's". Garage courts should be 35 feet in depth, if possible, for ease of entrance and exit. In plotting the route of a car backing out of a garage, use a 20-foot radius on center, and remember that the front wheels of a car cannot be cramped until the car is about 8 feet out of the garage. In the case of a "Y" turn, the length of the "Y" should be almost the length of the car, and the width 10 feet or more. These conditions will permit a change of direction with only one backing. The garage or service court is easily separated from the other portions of the grounds by walls or fences, and proper planting. One of the most effective, and at the same time pleasing and unobtrusive, types of fence for such purposes is woven-wood, made of small sapling pickets wired together. It secures the requisite privacy and screening without the heavy or forbidding aspect that a solid wall might have. Its material blends naturally with the landscape.

Planting is used to define and divide areas of different uses from one another, to give background to important features, to screen unpleasant outlooks, frame good views, deaden noises, and in general to tie together all objects and areas in one unified whole. Broad lawn areas are laid out and surrounded by planting, trees are placed to frame pictures and to cast cool shadows, and buildings are surrounded by sufficient planting to overcome any bare, isolated aspect and to emphasize their important features.

Where a building depends upon its picturesque irregularities for part of its interest, all its angles



A Quiet Pool with Wooded Background Gives Play to Light and Shade

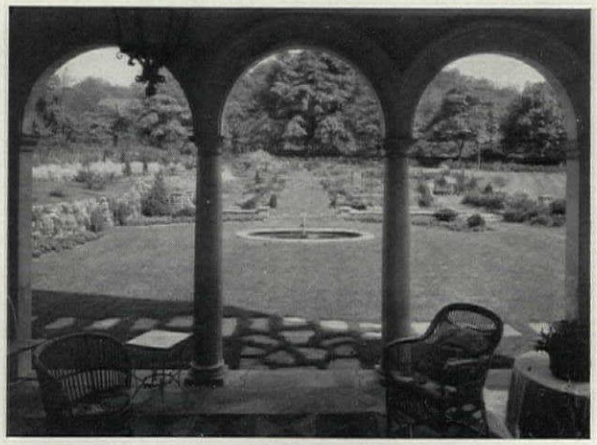
Pleasing Vistas Are Possible in the Gardens of Large Estates

should not be filled with planting or it will become less interesting. Many buildings have the appearance of having had all the plants in sight swept neatly against their walls. This effect defeats the purpose of planting, which is to make the house look at ease in its setting as well as to distinguish it. The necessity for planning the foundation plantings before the building is erected may be illustrated by one instance. In a recent project the only logical position in which a large shrub could be placed to screen a laundry yard from the entrance road was found to be directly on the top of a dry well which had been thoughtlessly located, and which could have been placed elsewhere. Frequently do areaways, underground drains and pipe lines come in the most inconvenient places in relation to landscaping, and this is usually true of outside hose connections and roof leader connections, which should not be placed where the heaviest planting will be necessary.

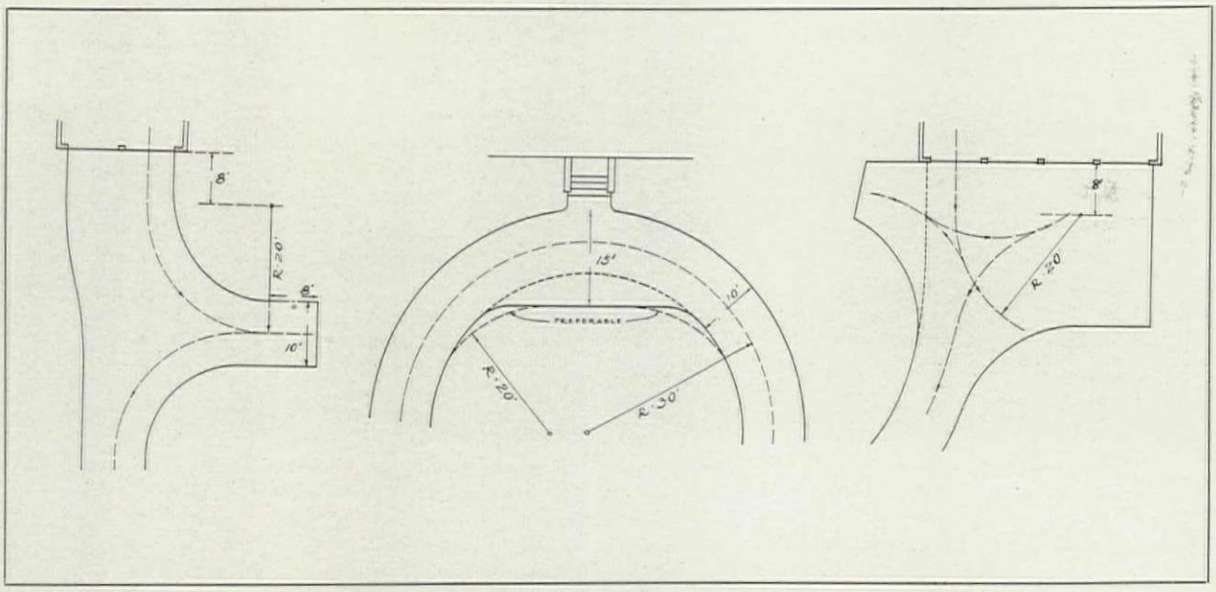
The amateur in planting always runs to extremes in the use of verticals, for the reason that the planting is thought of as an end in itself and not as a part of a general composition. It is therefore as conspicuous as the plant forms permit. Several lessons are learned by experience,—among them, that rounded forms are mellow and that vertical forms are best for accent. Too many verticals destroy the accent effect, and "if the salt hath lost its savor, wherewith shall it be salted?" Another and a very important point is that except in the case of a garden or parterre, the shape of the planting bed has very little significance. It is the shape of the area left after the planting is done that should have thought.

The garden does not often occupy the most conspicuous position, for reasons already given, and also because it is not so pleasant to look at continually as a broad lawn. It is usually placed where it is at least partially visible, however, so that the glimpse that one gets will lead to a closer inspection. If it is in close proximity to the house, it is built up on an axis of the house extended, with beds and paths so arranged that they will offer the most attractive views from the terraces and the overlooking windows. But whether it is close by or at some distance away, it should have a well defined enclosure and a definite center of interest, and whenever possible, a background of good trees. The arrangement of beds, and the selection and use of colors are matters of personal taste and skill and demand a fund of technical knowledge. Beds that are too small prevent an effective massing of colors and increase the expense of maintenance; beds that are too large put many of the plants out of convenient reach of the gardener. The sizes of the beds should be governed somewhat by the ease with which the innermost plants can be reached, a free-standing bed being made as wide as 12 feet without making necessary a concealed path inside. Combinations of colors are legion, and everyone has his own pet schemes. It might be noted, however, that large masses of brilliant colors may make a garden garish without making it bright, while brilliant colors scattered throughout will give sparkle. It might be noted, too, that many admirable soft color combinations go to pieces under a bright sun.

Pools. Inasmuch as pools often form the centers of interest in gardens, a few points about their construction might be mentioned. Formal pools, with which the architect usually deals, are often constructed of waterproofed, reinforced concrete. Space does not permit a discussion of informal, naturalistic



The Arcade of the Porch Enframes the View of the Garden



Satisfactory Dimensions for Turns

Left: A "Y" Turn from the Garage. *Center:* Dimensions for a Forecourt Drive. *Right:* Turns to Ease the Exit from a Garage Court.

pools. If the pool is partly for growing aquatic plants as well as to give life and movement or reflections, it need be no deeper than 2 feet. This is sufficient for lilies, and if constructed deeper than this, the tubs in which the bulbs are planted will have to be raised above the bottom. If shallower-growing plants are desired, pockets to contain earth may be used in the corners and across the ends as parts of the permanent construction. Where the coping has an overhang, it is well to be sure that its underside lines up straight and level, since any irregularity is conspicuous against the water line. It is best to keep the water level about as far below the bottom of the coping as the width of the overhang in order that the shadow of the latter may be effective. If a blue for the pool is insisted upon, I should use a tile lining, which seems best in the long run, for I have not yet discovered a blue paint or stain that is waterproof and permanent. Green and bluish-green stains are available and quite satisfactory. Black gives the greatest reflecting value, but it detracts from the interest of any colors under the surface.

If ordinary piping is used for the supply line, the pool will probably become discolored from rust very soon. The outlet pipe should be at least 2 inches in diameter, and right-angle bends should be omitted, using instead two 45° angles. This will help to prevent clogging with leaves and other litter and also will facilitate cleaning if the line does clog. Every pool must have an overflow drain to prevent the water from becoming stagnant and to keep the surface clean as well as to prevent overflowing the pool's edges, and to keep a permanent water level. A convenient form for this overflow drain is a pipe with a screen at the top which screws into the clean-out drain. As both drains do not operate at once, this combination is ordinarily perfectly satisfactory.

The Landscape Architect's Charges. Unless the project is so small and so definite that a lump sum payment can be arranged, the landscape architect works upon a percentage basis. To quote from the recommendations of the American Society of Landscape Architects, "this method of charge is much better adapted to the professional supervision of construction work than to the development of plans involving professional advice and drafting room charges, except on large undertakings where the definite and immediate expenditures for construction work can be determined and used as a basis for a satisfactory charge." This schedule, (condensed) is recommended by the A.S.L.A. for minimum charges: Preliminary plans only,—2 to 7 per cent on $5000 and over to less than $1,000 worth of work. Complete working drawings and supervision,—10 per cent to 25 per cent on $5000 and over to less than $1,000 worth of work. Many of the larger architectural firms specializing in country house work have their own departments of landscape architecture, each under the direction of a trained landscape architect who is often a member of the firm. So important is the setting of the country house considered that some firms of architects will not accept commissions unless they are given the contracts for the designing both of the houses themselves and of the landscaping. They thus insure an ensemble that is unified. The collaboration between the architect and the landscape architect should begin at the inception of the project, for only in this way is it possible to achieve the best results. The landscape architect can be of material assistance in selecting the site so that the approaches give the most effective views of the house, and also that the gardens and vistas coördinate properly with the important rooms, terraces and porches.

ARCHITECTS' CHECK LIST FOR COUNTRY HOUSES

BY
KENNETH K. STOWELL

PROBABLY one of the most frequent causes of difficulties that arise between architects and clients is due to lack of a clear understanding of the clients' needs and wishes. To eliminate this cause it is wise to make definite notes of conversations with clients and to send copies of the notes to the clients for their verification or amendment;—too often there returns more amendment than verification, because many items, forgotten in conversation, later occur to both architect and client. The use of a Check List greatly facilitates definite decisions and an early and complete understanding. This list is devised so that the topics occur as nearly in chronological order as possible, and it is of course subject to much modification in each individual case of its use. It is advisable to make notes on the Check List as the conversation with the client progresses. The list can be used successfully as the basis of the interview with the client. The discussion can be centered on the various considerations, item by item, and definite decisions may be reached in a short time. This procedure will usually save much of the architect's time and will also prevent that strain on the architect's patience that is inevitable if the interview is allowed to ramble on in hit-or-miss fashion when the architect is tied up with a loquacious client, in spite of other important engagements.

Check List No. 1 covers the important and essential points that should be brought out in the first interview with the client. It is not difficult to explain to the client that one can best arrive at exactly the type and size of country house desired by taking up first certain of the important factors, and later taking up all the details and "charming bits" in their proper order. This is usually as pleasing to the client as it is time-saving to the architect. Much misunderstanding may result by allowing the discussion to run to window-seats, broom closets and ingle-nooks before the essential requirements are ascertained.

Check List No. 1 will give enough information to enable the architect to proceed with rough preliminary sketches. These sketches can be made to indicate merely a *parti* diagramatically and can be the basis for obtaining approximate cubage and cost figures. These estimates should be essential in discussing the country house with the client in a subsequent conference. Much time and drafting expense can be saved if there is a frank discussion of size and costs as indicated by the *parti* sketches based on Check List No. 1, and revisions may be made, as necessary. The client should clearly understand that the *parti* sketches are merely diagrammatic and indicate only the general arrangement of rooms and relative sizes and are subject to radical and immediate revision. From these revised diagrammatic *parti* sketches the real preliminary drawings will be made. At this time the detailed Check List No. 2 can be used to make sure that there is an understanding in regard to the items of exterior and interior materials, and the mechanical, electrical, heating and sanitary equipment. The use of the Check List does not prevent the exercise of the architect's own judgment in regard to materials or equipment, but it will give an opportunity of learning the owner's predilections and prejudices. This procedure will save a great amount of labor and much of the expense that is so often incurred in making several consecutive sets of elaborate preliminary sketches for the client's inspection.

COUNTRY HOUSE CHECK LIST NO. I

A. SITE
- Streets
- Points of Compass
- Survey Required

B. GENERAL TYPE OF HOUSE
(*Style and Materials*)

C. ROOMS

1st Floor
- Living Room
- Dining Room
- Kitchen
- Pantry
- Library
- Morning Room
- Reception Room
- Breakfast Room
- Card Room
- Hall
- Stairs
- Coat Closets
- Lavatories
- Cloak Rooms
- Telephone Room
- Porches, Loggias
- Sun Room
- Billiard Room

Servants' Rooms
- Sitting Room
- Dining Room
- Number of Servants' Bedrooms

2nd Floor
- Master Bedroom
  - Dressing Room
  - Bath
- Master Bedroom
  - Dressing Room
  - Bath
- Master Bedroom
  - Bath
- Bedroom
  - Bath
- Bedroom
  - Bath
- Bedroom
  - Bath
- Stair Hall
- Playroom
- Nursery
- Boudoir
- Sewing Room
- Linen Room

Basement
- Cellar
- Fuel Storage
- Heater Room
- Cold Room
- Storage
- Other Rooms

Garage (Number of Cars)

D. COST (*Amount Client Wishes to Spend*)

E. ARCHITECT'S FEE (*Percentage.....Cost Plus*)

A clear statement of fees to be charged and services to be rendered should be made verbally and also in written or printed form.

CHECK LIST NO. II

EXTERIOR FEATURES

FOUNDATIONS Material — Waterproofing (*Membrane, Integral*)
MAIN WALLS Material — Furring
ENTRANCE Material
WINDOWS Double-hung — Casement
Screens — Weatherstrip
Storm Sash — Glass (*Grade and Kind*)
Blinds
EXTERIOR TRIM Stone; wood; terra cotta, etc.

ROOF Slate — Tile
Shingle — Composition
Sheet Metal — Canvas
LEADERS AND GUTTERS Material — Flashing
PORCH 1 Floors, (*Tile, stone, slate, cement, wood*)
2 "
3 "
CHIMNEYS Chimney Caps
PAINT Whitewash, Stain

INTERIOR FEATURES

INTERIOR FINISHES (BY ROOMS)

Room Name	*Size*	*Style*	*Walls*	*Floor*	*Ceiling*	*Trim and Finish*	*Notes (special features desired)*
Entrance Hall	.....	.....	.....	.....	.....	.....	.....
Living Room	.....	.....	.....	.....	.....	.....	.....
Dining Room	.....	.....	.....	.....	.....	.....	.....
Library	.....	.....	.....	.....	.....	.....	.....
Etc., Etc.	.....	.....	.....	.....	.....	.....	.....

Under Walls indicate choice of materials and finish, as, Textured Plaster; Wallpaper; Paint; Pine Paneled, etc., etc.

Under Floor indicate material, as oak; parquetry; maple; pine; tile; stone; concrete; linoleum; rubber tile; cork tile; slate; terrazzo; marble; etc.

Under Trim and Finish indicate material of trim and finish, as, paint; enamel; lacquer; stain; varnish; wax, etc.

PARTITIONS
Stud, hollow tile, gypsum, brick, etc.
LATH
Metal (type); wood, wall board, etc.
HEAT INSULATION
Type, material and thickness
SOUND INSULATION
Method and material
HARDWARE
Kinds, styles and finishes
(*Make separate complete list by rooms.*)

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, etc.
WATER PIPES
Hot—Material, brass, wrought iron, steel.
Cold—Material, brass, wrought iron, steel.
HOT WATER HEATER
Type and Fuel
WASTE AND SOIL PIPES
FIXTURES
Material, type; Lavatory, Tub, Showers, Sitz Bath, Bidet, W. C., Faucets, Mixing Valves. (Accessories.)
(*Make list for each bath.*)
SEWAGE DISPOSAL
Septic Tanks; Sewers

ELECTRICAL EQUIPMENT

SUPPLY
Public Service, Private Plant
Lighting, Power, Heating
OUTLETS *for*
Lighting Fixtures, Floor Lamps, Reading Lamps, Toasters, Percolators, Fans, Sewing Machines, Irons, Washing Machine, Mixers, Buffers, Vacuum Cleaner, Radiant Heaters, Curling Irons, Water Heaters, etc.
Switches (types), Base Plugs (types)
LIGHTING FIXTURES
(*List for each room to be made showing design, type, material and finish*)
BELL SYSTEM for all entrances
ANNUNCIATOR SYSTEM to service quarters; night; day
INTERCOMMUNICATING private telephone system
TELEPHONE (Long distance)
BURGLAR ALARM SYSTEM
FIRE ALARM SYSTEM
SPRINKLER SYSTEM OF FIRE PROTECTION
ELEVATOR
Trunk Lift; Dumbwaiter
RADIO
Plugs and Connections

SERVICE EQUIPMENT

SINKS
Kitchen; Pantry; Faucets
CABINETS
Kitchen; Pantry
RANGE
Coal; Gas; Electric
REFRIGERATORS
Ice; Electric; Gas
INCINERATORS
CLOTHES CHUTE
DISHWASHERS
PLATE WARMERS
LAUNDRY EQUIPMENT

THE SPECIFICATIONS FOR THE COUNTRY HOUSE

BY

CHARLES E. KRAHMER

A HOME is one of man's most personal possessions. It shelters his family and furnishes the means for the enjoyment of their home and social life, and it creates a background for their cultural and intellectual attainments. The country home, owing to its relative isolation, affords great freedom in gratifying personal desires. The construction of a country house is so definitely affected by the character of the client that it is difficult to furnish any but the most general rules for the guidance of the specification writer. The specification for the country house is so often influenced by the client's wishes and the designer's ideas that it is generally compiled directly by the architect specializing in this class of work. Where this is not the case, the notes furnished to the specification writer should be so complete that his function would be limited to the compiling and editing of the specification.

Country homes can be divided into three general classes,— small, medium and large. The medium type is that in which the client's wishes must be most closely followed, for the reason that his desires are generally conservative in relation to his resources. The medium-sized country house, being of reasonable size and not overly ambitious in scope, is the type in which the client generally feels justified in expressing his ideas. The client for the smaller type of country house is generally restricted in his desires by the amount of money available, and is therefore open to reason, so that as a rule comparatively little trouble is encountered with him. The larger type of country house is generally constructed by wealthy and ambitious men. These men, as a rule, cannot afford the time necessary to investigate and pass upon the mass of detail necessary in the planning and construction of the country house of the larger type. Therefore the larger the country house, the less "personal" it becomes. The larger types of country homes are planned with private suites for the client and his immediate family, with private rooms for personal secretaries, maids and valets. The remaining portions of the house are in charge of the housekeeper and her corps of servants. The duties of the housekeeper are to look after the house and the comfort of guests. This type of country house closely approaches the exclusive social hotel or club in operation, and is the least personal of all types.

The physical, moral, artistic, business and cultural characteristics of the client and his family will greatly affect the design and construction of the country house and its later development. Two examples are used here as illustrations. Both houses were handled by the same firm of architects. The first example consisted of the renovating, restoring and enlarging of one of the most beautiful and cherished homes in Connecticut, constructed by the wealthy grandson of the official minister on the "Mayflower," and the home for 150 years of one of the most famous New England families. The later owner was a former cowboy. As an accident, one of the best equipped architectural organizations was selected to carry out the alterations. This organization was instrumental in the selection of an unusually capable man for the development of the 100-acre estate which surrounded the house. The architects had their way in the early stages of the operation, and the house was sympathetically and intelligently restored, preserved and enlarged, retaining all of the simple beauty of the original building. The grounds were very successfully laid out and followed very closely the New England garden of the period, the flowers being of the simplest varieties. After the house and grounds were practically complete, the client assumed control and hired a commercial "decorator" who sold him Louis XVI furniture, Chinese lacquer furniture, oriental rugs, French tapestry, silk damask wall coverings, etc., in contrast to the early New England detail of the house with its spindle stair balustrade, wrought iron hardware, plank floors, brick-faced wood mantels, etc. The garden was filled with marble seats, sun dials, fountains, statuary, etc. Upon the simple brick terrace were placed six gigantic potted palms. The house and grounds are gradually assuming a grandiose effect in startling contrast to the simple New England effect produced by the architects.

The client in the other instances was well known in social and intellectual circles and a powerful factor in the business world. He invited the architect to live in his home for three months so that he could study, at first hand, the social, physical and cultural activities and habits of his family so that they could be properly planned for. The result was a home which adequately provided for the expression and development of the activities and habits of the family and formed an ideal background for their culture and intellectual attainments. This country house was awarded a gold medal for its excellence. I seriously question if the committee awarding the medal realized how perfectly the house fitted and sheltered the client and his family.

The "personal" character of the country house affects the entire construction of the home, and therefore the specification. It should be evident that the existence of considerable confusion and misunderstanding is natural during the planning and construction of the country house. In order to eliminate misunderstandings and confusion, typewritten reports should be made of all conferences with the client, and a copy of each should be furnished the specification writer, who should file it in a folder

kept for that purpose. As soon as the sketches are made for a country house, the specification writer should prepare a "snake," as outlined in an article on specifications entitled "Simplifying the Writing of Specifications," which appeared in the January issue of THE ARCHITECTURAL FORUM. The snake is a memo pad indexed at the edge for the general conditions, general contractors' work, work done by the client, and then with a section for each trade which may be called in to perform work upon the building. Before the preparation of the specifications, all correspondence with the client should be carefully gone over and all important requirements should be then entered upon the snake under the proper trade designation. All reports should be checked by the specification writer and the data extracted and included in the snake under the proper trade heading. Before the preparation of the specifications the snake should be so complete that it will have answered all of the questions necessary to completely compile the specification. At this stage of the operation the snake will form a complete skeleton specification. The snake should be carefully checked by the architect and client before the preparation of the specifications, so that no misunderstanding will occur and no reason will exist for the client's exclaiming, "Oh, I didn't know that you were going to put that in!" The function of the snake is to round up all of the miscellaneous requirements and decisions and to have them before the specification writer at the proper time and in proper sequence, so that no excuse will exist for not including these requirements or decisions in the specifications.

The element of "good will" is most important for obtaining the successful administration of the construction of the country house and is invaluable, owing to the personal character of this class of work. Good will should be carefully cultivated by the specification writer in the early stages of the operation, and considered an essential item in the planning of the country house. Good will is the "lubricant" which prevents friction during the construction of the country house, due in great measure to the client's injecting himself into all phases of the operation and disturbing the routine nature of the work with resulting delays, extras, etc. The general contractor should be selected with extreme care and upon his personal integrity, experience, and financial resources as well as upon his record for carrying out similar work with tact and diplomacy. The general contractor who has a reputation as an "extra hunter" should be avoided under all circumstances, for the reason that there exists no class of work where extra hunting is so profitable as in country house work. The reason for this condition is that the client generally changes his ideas as the house assumes tangible shape and form, allowing him to better visualize what he is getting. Another reason for the profits of the extra hunter is the close contact which exists between the client and the contractor, owing to the personal character of the work. The extra hunter is quick to take advantage of this condition to suggest changes which will lead to his personal gain and operate to the disadvantage of the architect's prestige. A general contractor of the better class will avoid law suits under most any circumstances, as he realizes that law suits with clients are the surest means of destroying his prestige. It is well, therefore, to look into this phase of the subject before approving or recommending a general contractor for this class of work.

"Or equal" should be rarely, if ever, used in the specifications for the country house, for the reason that close competition, which is desirable in public and commercial work, is not so desirable for country house work. The specification writer enjoys an opportunity by means of the "closed" specification, to build up an ideal organization of material, men and subcontractors to perform the work upon the building with tact and diplomacy, thereby eliminating friction to a great extent. The architect can also utilize the good will created by the "closed" specification to build up a skeleton organization which will work to produce exactly what he desires and to allow him to retain control of the building operation by working for and not against his wishes. This opportunity of creating good will between the architect, material men and subcontractors should not be neglected by the specification writer.

A scientific study of building materials in their relation to the country house should be made by the specification writer, so that he will possess first hand knowledge of their qualities, prices and the market conditions. The specification writer should also study the price differences of the various materials as incorporated in a building, so that when relative costs are desired, the specification writer will be in a position to furnish them. This qualification of the specification writer will eliminate a considerable number of alternative estimates. When visiting the site to obtain first hand information in connection with the local conditions, the specification writer should make it a point to interview the local dealers of building materials and obtain from them first hand information in connection with the building materials used and available, with complete data as to the usual stocks carried and the qualities generally used. Much local information can be obtained from the same sources in relation to the local building practices, labor conditions, etc., and also the soil conditions and waterproofing problems which are usual in the locality. There are generally local sand and gravel pits, and sometimes small brickyards. It is wise to visit these sand and gravel pits to see if the material is suitable for use in the proposed building, or if it should be screened and washed, or if it is of no use at all. This information should be included in the specifications, so that the builder knows exactly what to estimate upon. The product of the local brickyards, if any, should be examined to see if it is suitable, and if not the fact should be definitely specified. A careful investigation of local

conditions before compiling the specifications and the inclusion of results in the specifications are the surest means of compiling a "closed" specification which will "stand up" under fire. The time spent in the preliminary investigations referred to amounts to practically nothing and will eliminate, later on, considerable trouble, friction and discussion, as all conditions will be foreseen and planned for.

The most important duty of the specification writer is that of looking after the physical qualities of the building so that it will be capable of resisting the elements in the locality in which it will be constructed. The client takes it for granted that the building will be in good physical condition. The designers are concerned with the planning and purely architectural phases of the problem. The engineers' duties are to look after the structural safety and mechanical efficiency of the building. Securing weather-resisting qualities and making the proper selection of materials and their quality are the duties of the specification writer.

The first problem to solve is the waterproofing of the basement. Test holes should be dug to the level of the deepest proposed excavation, and the soil conditions and water level, if any, should be carefully noted. When a waterproofing problem occurs, there are two methods of attacking it; one is to remove the water, and the other is to waterproof the basement, or, in the vernacular of the trade, "build a boat." The best method of removing the water is to install an agricultural tile drain around the building at the footing level and backfilling to grade with cinders or similar coarse material, so that the water can percolate through the fill to the tile drain and then be carried away. When springs are encountered in the basement, or a severe condition occurs, it is better to excavate 6 inches below the concrete basement bottom and fill in the space with field stone, brickbats, cinders, and finally a thin layer of clay upon which the concrete basement bottom should be cast. A line of drain should be installed in trenches through the center of the basement, and branches installed in trenches 10 feet on centers. These tile drains should discharge on grade, where possible, or into a brook or similar stream. Where the discharge is into a storm sewer, a manhole should be installed to catch the sediment. The three methods of waterproofing are: (1) integral system, (2) membrane system, and (3) pulverized iron system. The integral system consists of adding a chemical compound to the ingredients of the concrete, mixing and depositing the concrete as directed by the manufacturer of the compound. The integral system of waterproofing has been referred to as "85 per cent labor and 15 per cent compound." The general contractor, if he is worthy of the name, realizes that "water content" and "density of mix" are the important requirements for waterproofed concrete. The general contractor should guarantee the waterproofing in writing. The pulverized iron method of waterproofing consists of the application of numerous coats of pulverized iron mixed with a corroding chemical designed to corrode the pulverized iron immediately upon application, expanding and gripping the concrete so that a plating of iron will eventually cover the inside of the foundation walls and bottom. The corrosion is then arrested by means of a cement wash or trowel coat of cement mortar. This work can be installed only by experts and is generally guaranteed in writing directly by them. The membrane system consists of using asphalts or pitches of various grades for the waterproofing agent, and rag felts, asbestos felts, burlap and cotton cloth for reinforcing agents. The method consists of building up a series of layers or piles of waterproofing agent and reinforcing agent applied alternately. The writer prefers the best grade of asphalt for the waterproofing agent and a saturated cotton cloth for the reinforcing agent. Membrane waterproofiing should be applied by waterproofing contractors, not by roofers.

The next important problem is the construction of the weather-exposed masonry walls. Most of the failures in the construction of country houses are due to leaking and damp exterior walls. No possible method is a "cure all" for all conditions, since the exposure of the walls and the location of the building have a definite effect on the construction and weather-resisting qualities of the walls. At Newport, a stone country house with walls 2 feet thick was so located in reference to the prevailing winds, sun and dampness that the moisture penetrated the walls and completely rotted out the 2 by 4-inch furring strips, making necessary the entire reconstruction of the finish on these walls. A safe rule to follow is always to furr weather-exposed masonry walls. Should the location of the house be such that fogs and long periods of dampness are liable to occur, such as at Newport and sections of Long Island, the sensible method is to apply an asphalt compound to the interior of the wall and then to furr the wall with split furring tile. Where unusually good construction is desired, it is good practice to waterproof the mortar used in laying the brick or stone, and then parge the inside of the wall with 1:2 Portland cement mortar, upon which the waterproof asphalt paint and tile should be installed. All windows should be calked and heads covered with copper. The selection of the face brick for the exterior walls is important, as it is becoming common knowledge that a brick with a medium rate of absorption will help create a dry wall, due to the greater bond between the brick and the mortar and primarily because the moisture will "mushroom" across the face of the wall, create a "blotter effect," allowing the heat and sun to extract the moisture through the entire face of the wall and not through the joints, which would occur if an impervious brick were used.

When the northern styles of architecture are used as precedents, and are followed closely, it is customary to use substantially the same materials as are used in the original buildings. When this is done, little trouble will be experienced, since the materials

used in the construction of the northern styles were selected to withstand climatic conditions. The proof of this is how well they have endured through the ages. When the southern styles of architecture are used as precedents for homes constructed in our northern climates, the specification writer's troubles begin. The result is similar to that which would follow transplanting a tropical tree in Bronx Park, New York. The materials used in the southern styles are, as a rule, colored stucco, colored and glazed architectural terra cotta, cast concrete stone, terra cotta roofing tile, and a multitude of imitations of these materials, and the great majority are inferior to the original materials they are designed to replace. In the southern climates we do not encounter the destructive action of moisture, penetrating a building material and then freezing and thawing. This action disintegrates most materials, but has a particularly destructive effect on architectural terra cotta, cast stone, stucco roofing tile, etc. In southern climates the heat of day will evaporate the moisture before it has a chance to do any harm. The temperature changes also are relatively small, so that the effect of expansion and contraction is not severe.

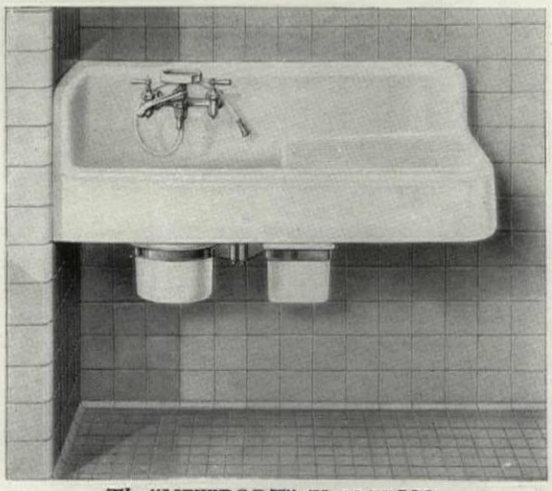
There is little in the interior finishing of the country house which the specification writer need feel as a special responsibility. The selection of materials in almost all cases is that of a personal nature. The exact class of material and workmanship desired should be carefully specified in detail, so that the bidder will know exactly what to estimate upon. The better sort of country house building is divided into two classes. The one class consists of the construction of the shell of the building, including the finishing of the service portions of the structure. The finish of the main rooms is generally handled as a separate operation and not by the general contractor. The finishing of the main rooms is let as separate contracts directly to high class cabinet and decorative contractors specializing in this class of work. The specifications for the finishing of the main rooms should be accurately and carefully compiled so that the exact class of work desired will be covered in detail. The exact flitches of the veneers should be selected from a hardwood dealer, and then the period hardware should be selected from a dealer specializing in this class of work. After these details are taken care of, the specifications should be compiled. In the better class of work it is good practice to require that all woodwork in the rooms, including the doors, be built up complete in the cabinet shop, and be veneered from the flitches of wood selected from the hardwood broker's stocks. This should include panels, rails and stiles, except the mouldings which may be of solid stock. The cabinet work is completely finished in the shop and delivered and set up complete, like fine furniture. Schedules of finishes were designed to simplify the preparation of plans and specifications and also to tell exactly what is required for finishing a particular room or space. The schedules of finishes list up generally the finished floor, base, wainscot, plaster, picture moulding, chair rail, cornice, ceiling and mantels occuring in each portion of the building, and are either included as part of the drawings or included in the specifications. The writer prefers to include the schedules in the specifications, where they are indexed and numbered, showing where the different finishes are specified in detail.

Questions will arise as to the relative costs of different materials for a given place. In the absence of definite cost data, the architect will generally suggest that alternative estimates be requested from the contractor. This matter of requesting alternative estimates is being greatly abused and is causing contractors heavy estimating costs. The practice should be discouraged as much as possible, as the better class of contractors are refusing to estimate where an unusual number of alternative bids are requested. It is considered better form to request the alternative estimates as additions to the bid rather than as deductions, the theory being that the base bid includes the minimum that will be accepted, so that the client can add desirable features as his funds will permit. Another reason is the practice of the estimator in quoting the price used in his "makeup" sheet for deductions without giving the client the advantage of the overhead and profit charges included in the final tabulation. The alternative estimates should be segregated so as to appear in a separate section directly after general contractor's work and not scattered throughout the specification, causing a "hide and seek" game to find them.

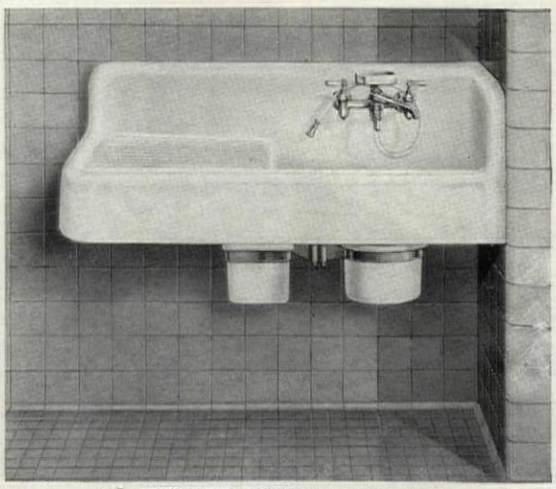
The specification for the country house can be summed up as an instrument controlled in a large measure by the personal desires of the client. The specification writer's function in this class of work should include:

1. Preserving order, so that no mistakes will occur.
2. Assuming responsibility for the physical qualities of the building.
3. Preparing a complete document, so that a standard agreement can be executed.

The duties herein summarized are very difficult to assume in connection with the specification for the average country house. This is due mainly to the personal character of the work. The specification writer must be tactful and diplomatic in his relations with the client and should not try to impose his ideas in questions of a purely negative character. Those questions which relate to the physical quality of the building and the proper and fair administration of the work, should be decided by the specification writer. Should questions of this character be decided against the better judgment of the specification writer, he should make it plain that he will assume no responsibility for the results of such decisions. The successful solution of the practical problems arising in connection with the planning and construction of a country house, with all its complications, is one of the quickest and surest methods of building up the prestige of the architect.



The "NEWPORT" (K-1285-LM)



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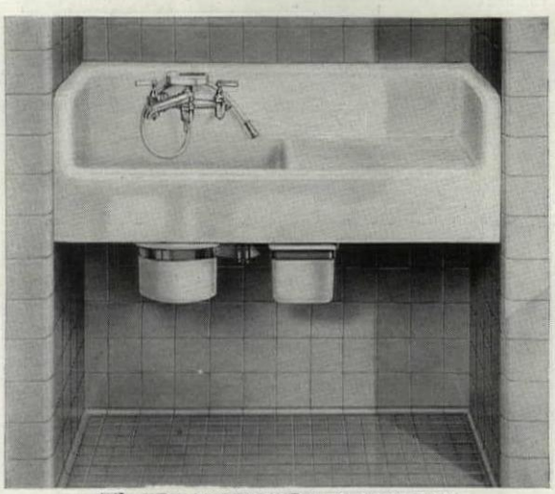

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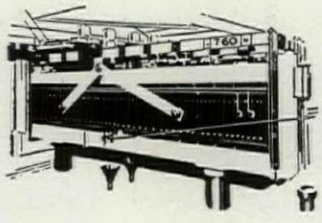

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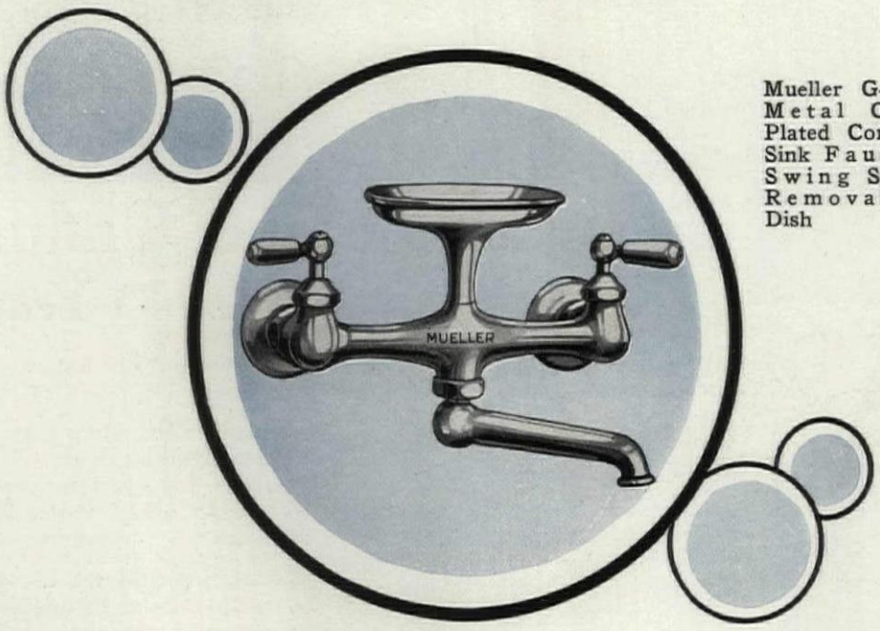

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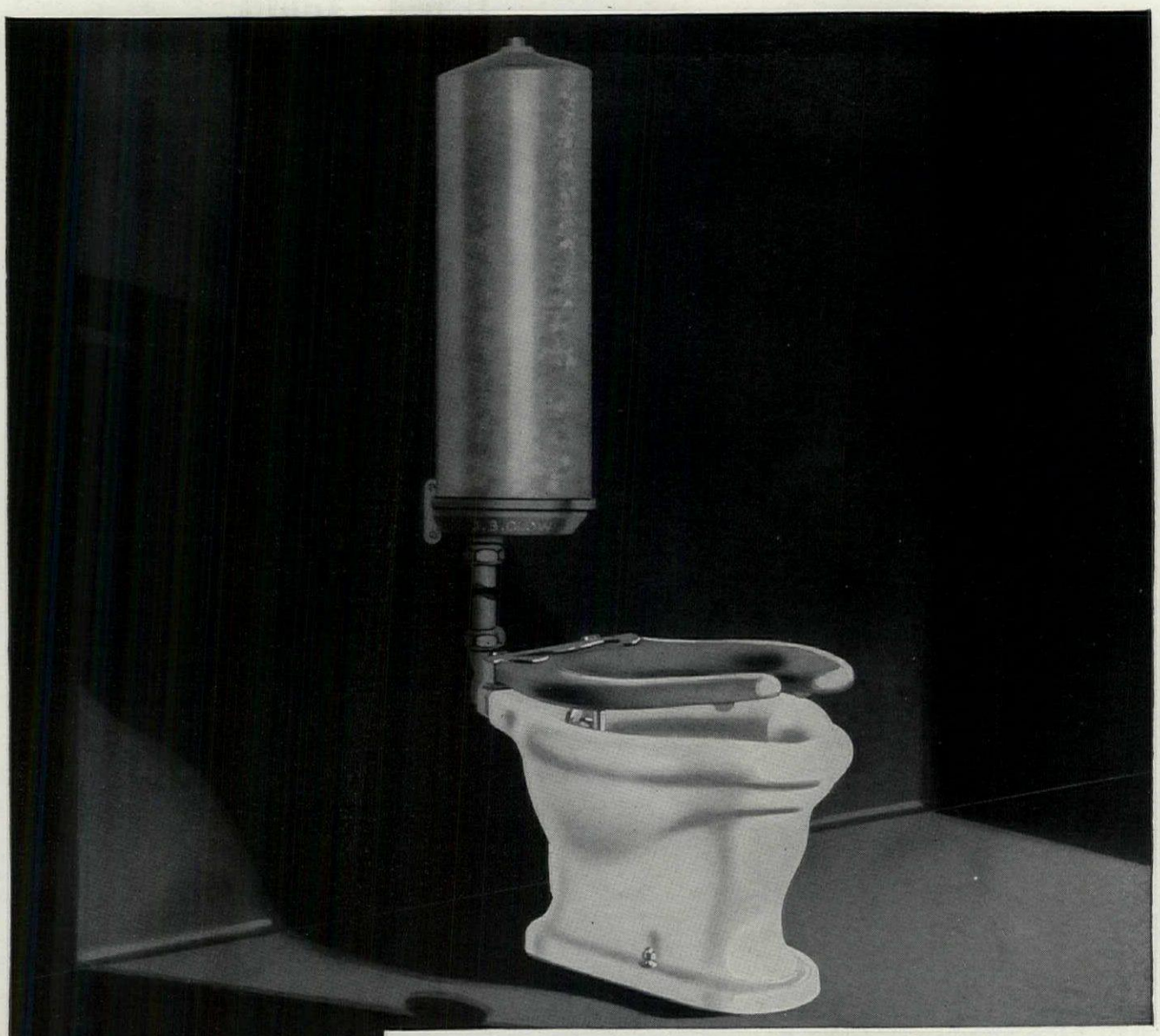

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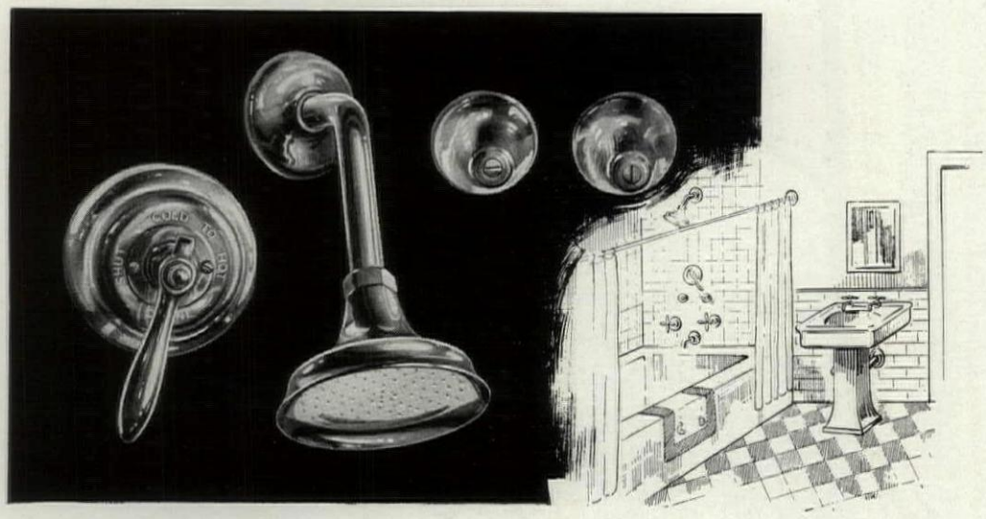

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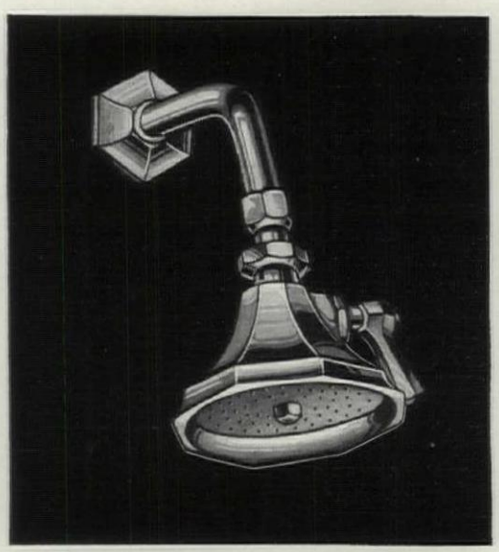

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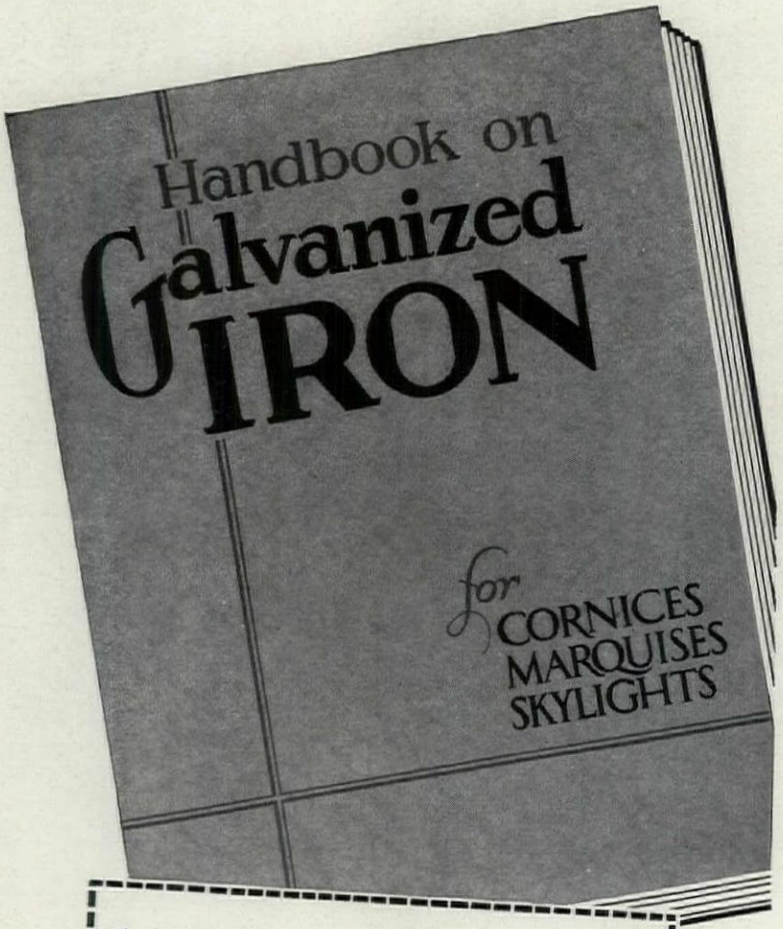

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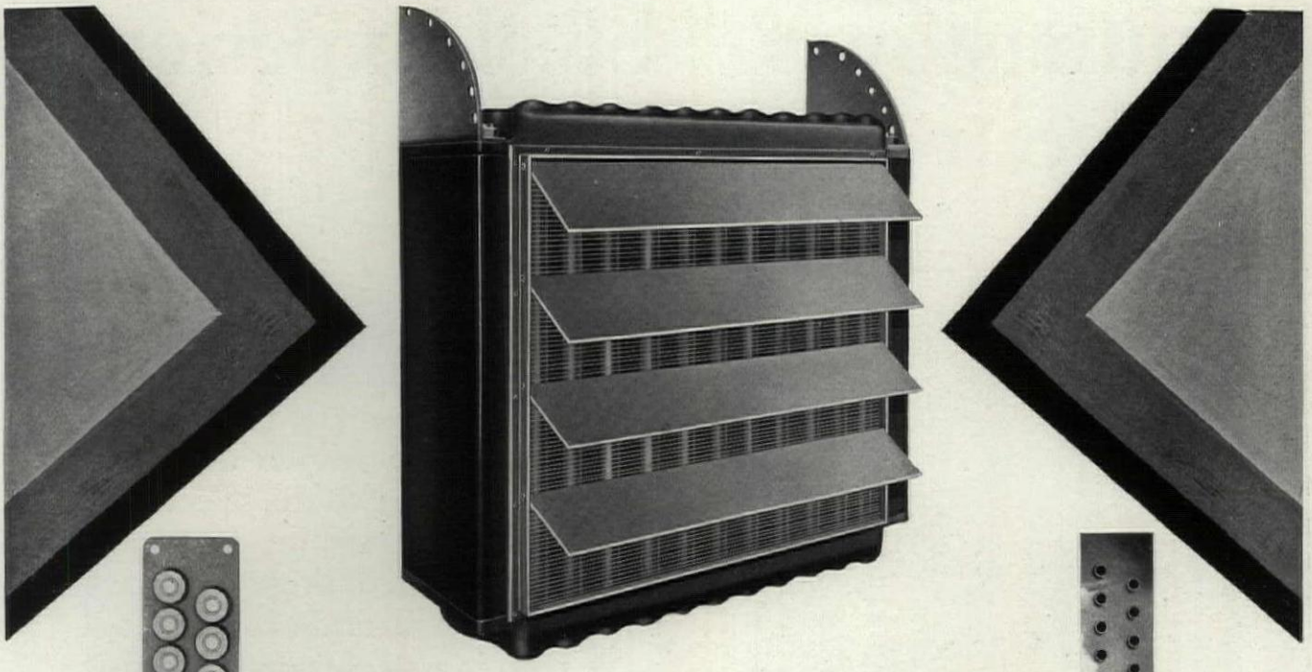

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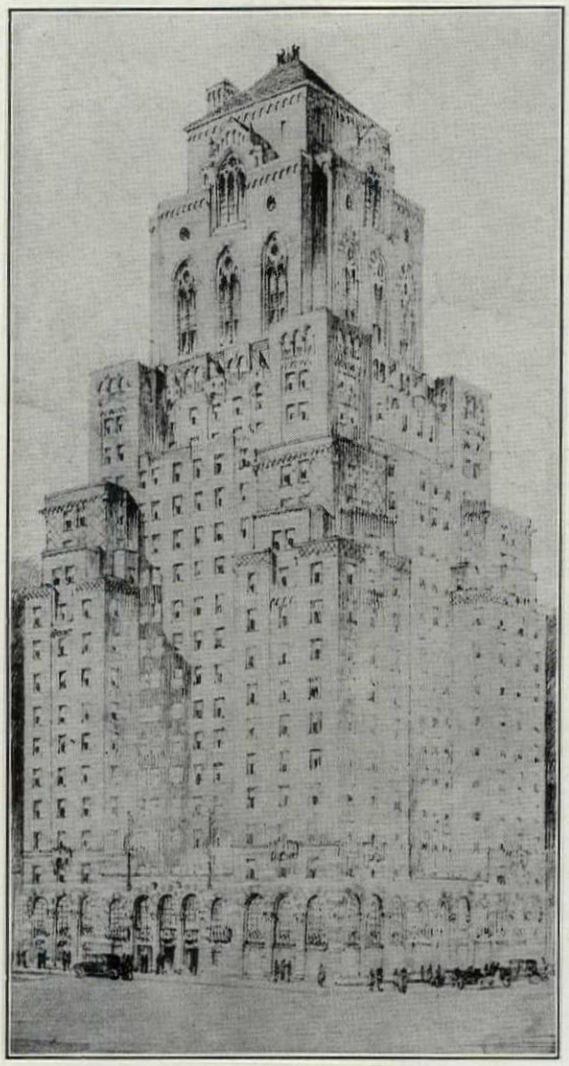

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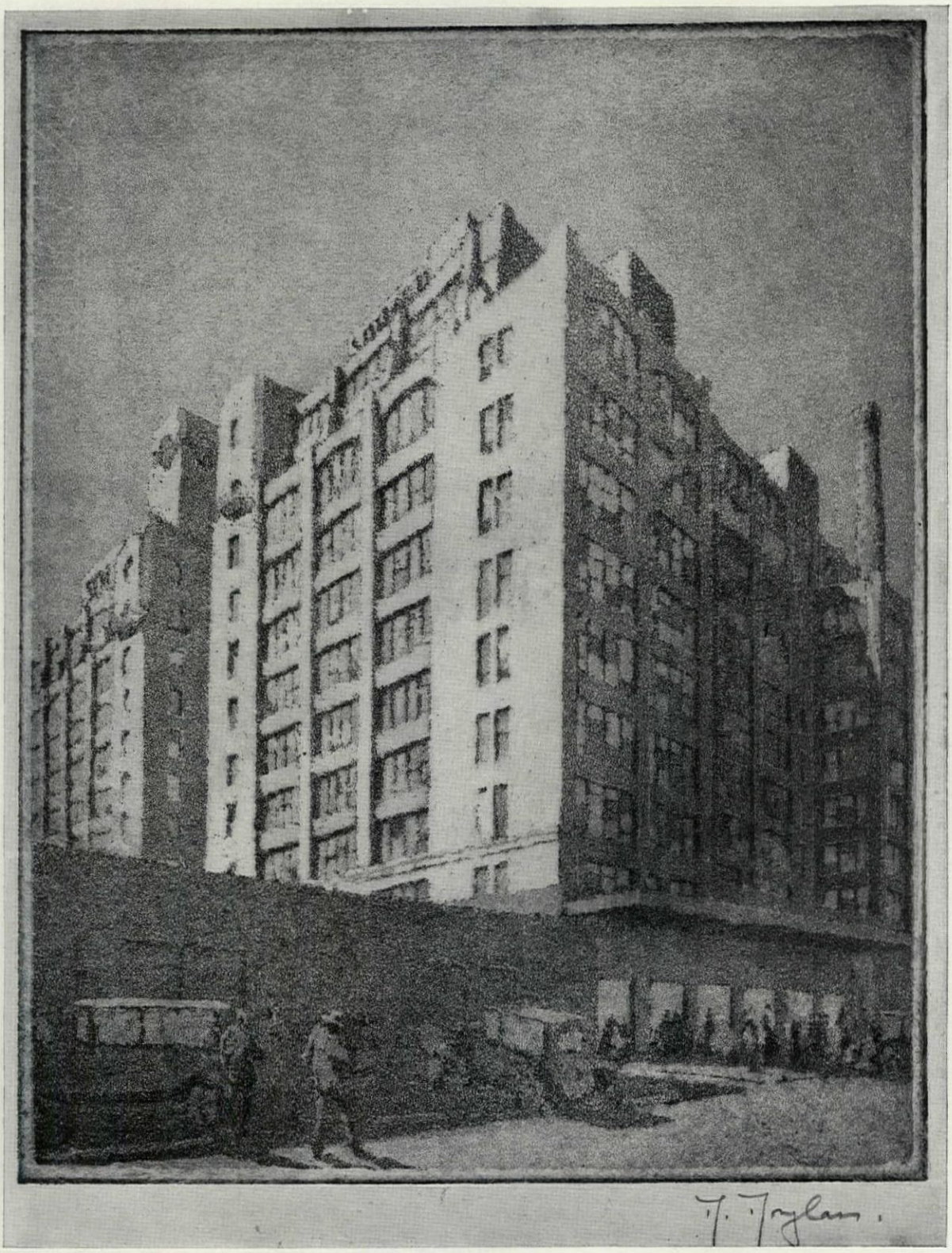

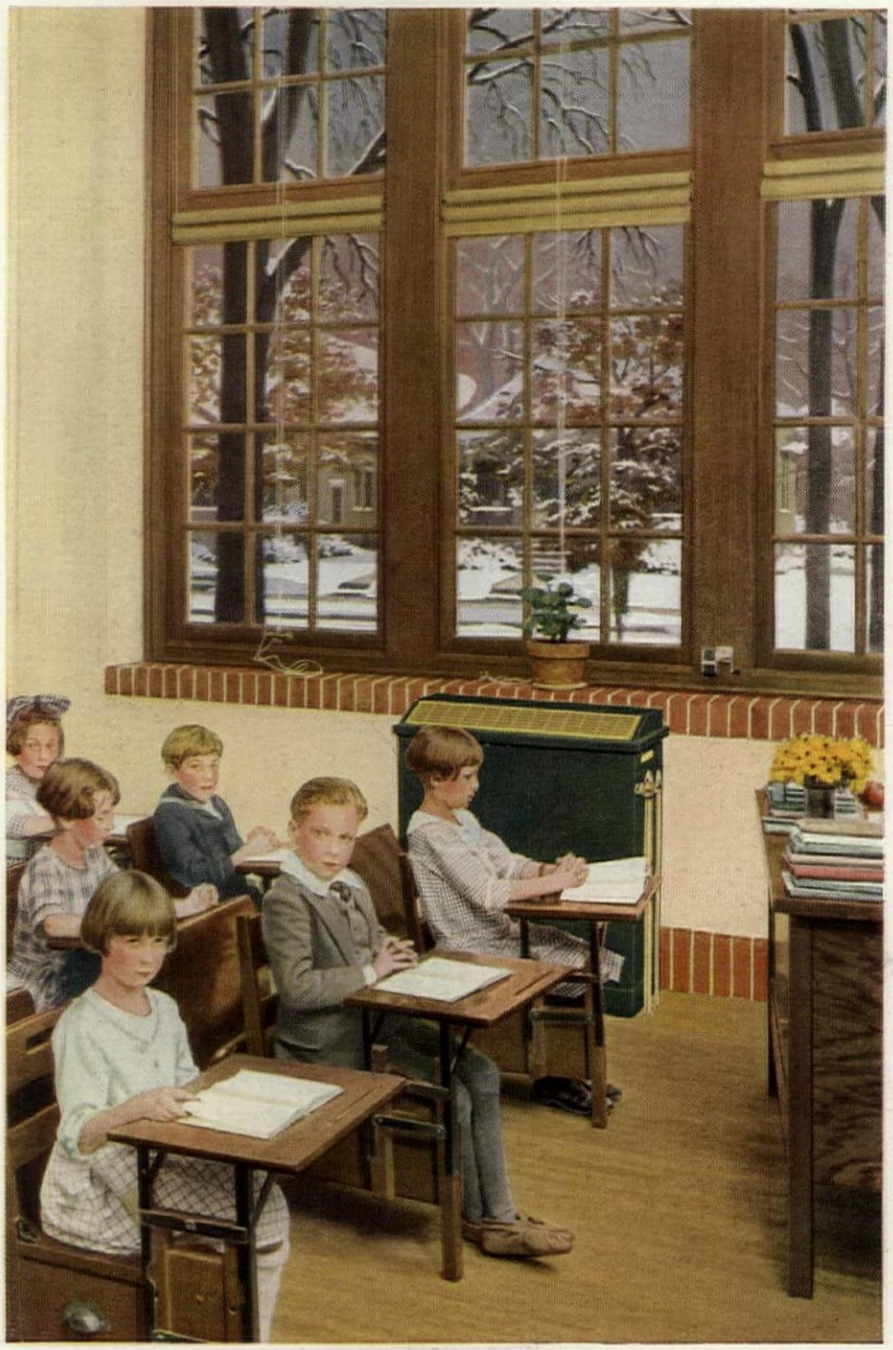

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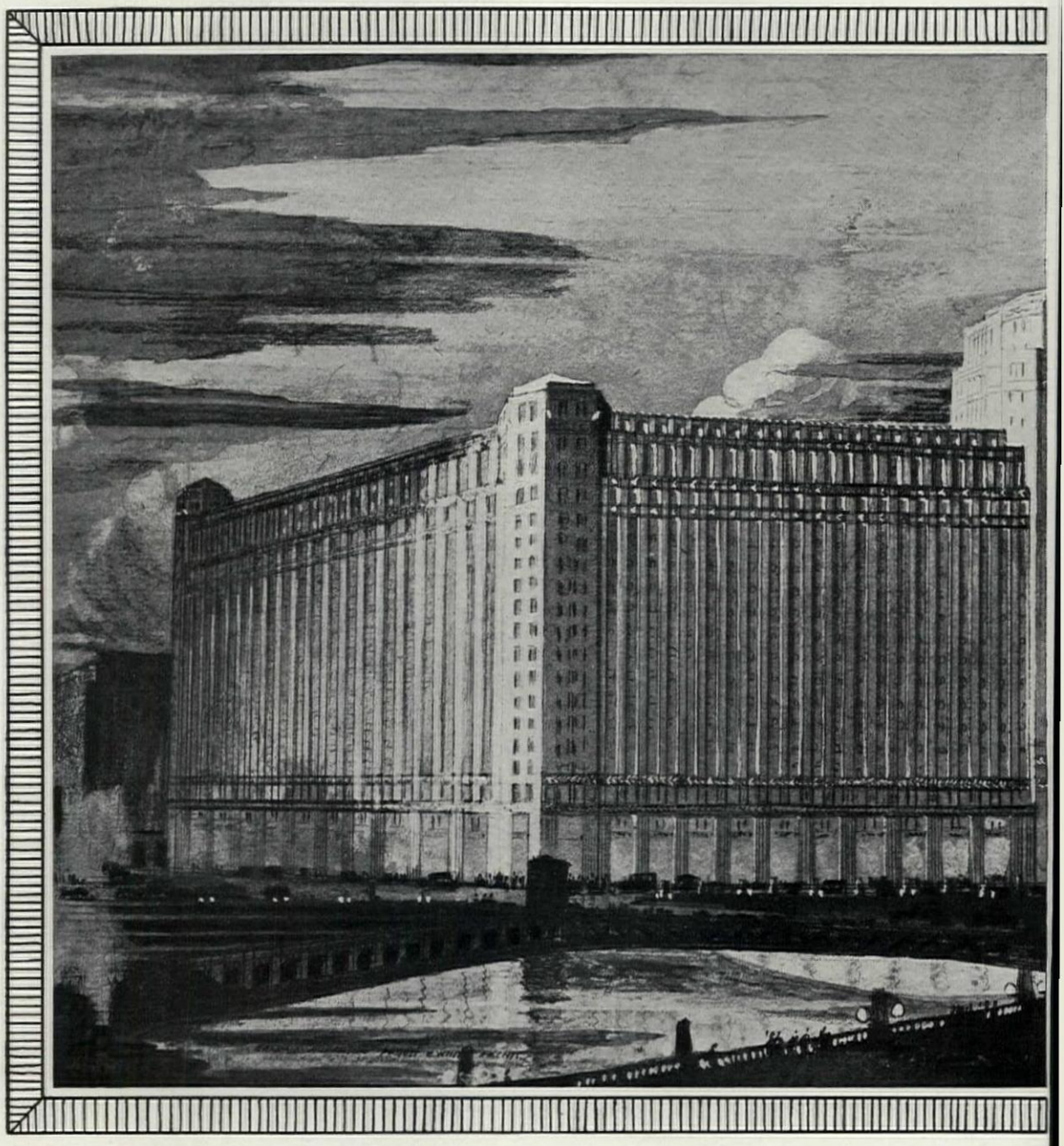
The largest build



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THIS remarkable structure, The Merchandise Mart, to be erected in Chicago, will be by far the largest building in the world. It will have 18 stories, with a tower of 23 stories, and a total floor space of 4,000,000 square feet. The framework will require 45,000 tons of steel and will be constructed of Bethlehem Wide Flange Structural Shapes — commonly known as Bethlehem Sections.

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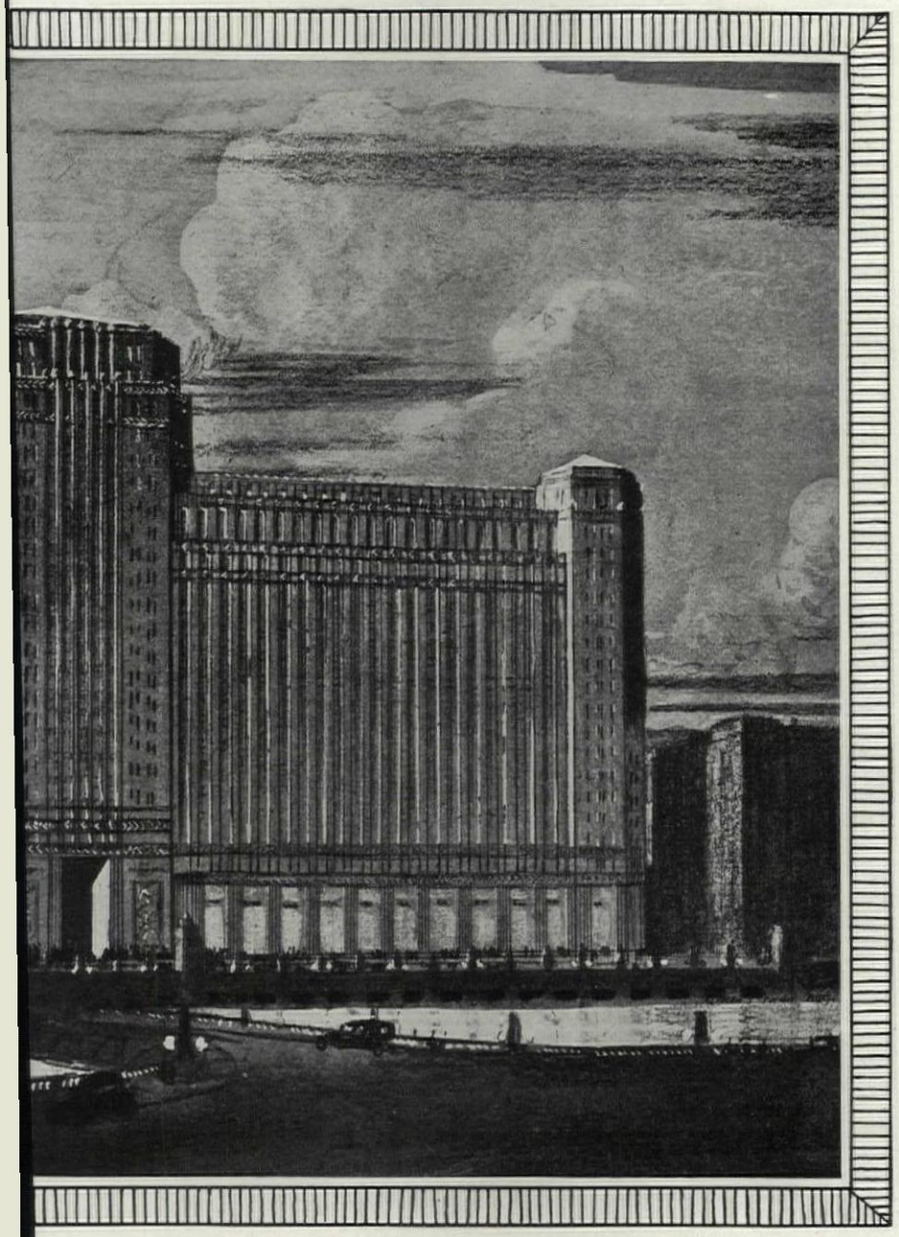
ing in the world



THE Merchandise Mart will extend 724 feet along Kinzie Street, Chicago. It will extend 577 feet along the river front, and 324 feet on Wells Street, with a diagonal frontage facing Orleans and Franklin Streets. There will be corridors 650 feet in length on every floor, and lined on each side with shops. The Merchandise Mart will contain the sales offices and displays of a number of manufacturers, wholesalers, and importers. The Building will be unique in numerous details, and will include a novel merchandise-handling system. On the ground level below the street floor there will be a freight station.

Graham, Anderson,
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Architects

MART, CHICAGO

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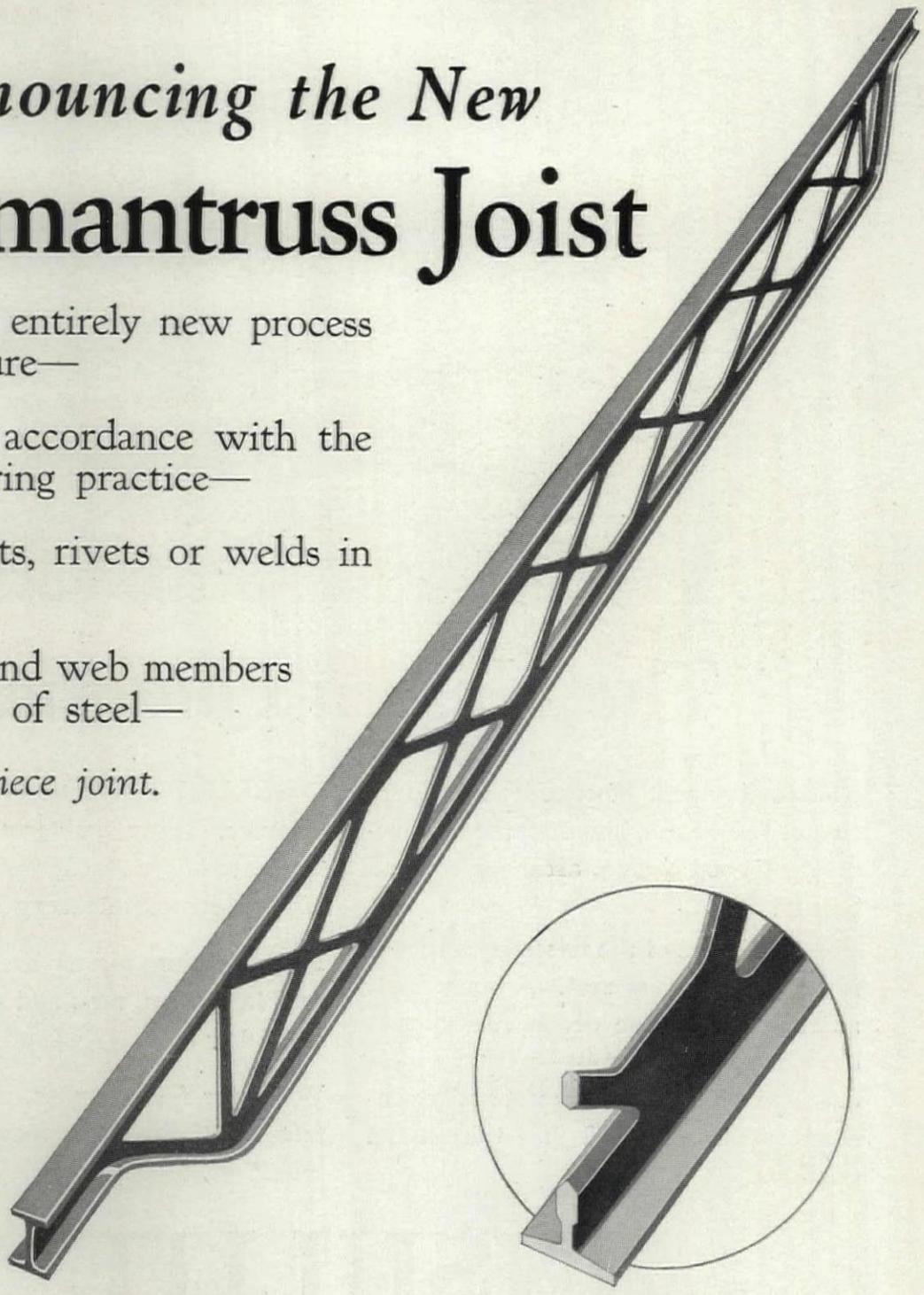
The chords and web members of one piece of steel—

A *true one-piece joint.*



KALMANTRUSS

J O I S T S

KALMAN STEEL COMPANY

CHICAGO	BOSTON	MILWAUKEE	HOUSTON	COLUMBUS
NEW YORK	BALTIMORE	PHILADELPHIA	KANSAS CITY	YOUNGSTOWN
BUFFALO	PITTSBURGH	ST. PAUL	DAYTON	CHARLOTTE
DETROIT	SYRACUSE	ATLANTA	MINNEAPOLIS	NILES
WASHINGTON, D. C.				

Export Office—NEW YORK

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*, 383 Madison Ave., New York, or the manufacturer direct, in which case kindly mention this publication.

ACOUSTICS

R. Guastavino Co., 40 Court St., Boston
Akoustolith Plaster. Brochure, 6 pp., 10 x 12½ ins. Important data on a valuable material.

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

AIR FILTERS

Staynew Filter Corporation, Rochester, N. Y.
Protectomotor High Efficiency Industrial Air Filters. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Data on valuable detail of apparatus.

BANK VAULTS

Macomber Steel Co., Canton, Ohio.
Bank Vault Reinforcing. Folder, 8 pp., 8½ x 11 ins. Designing Data and Insurance Rating.

BASEMENT WINDOWS

Genfire Steel Company, Youngstown, Ohio.
Architectural Details. Booklet, 28 pp., 8½ x 11 ins. Details on steel windows. A. I. A. File No. 16E.

BATHROOM FITTINGS

A. P. W. Paper Co., Albany, N. Y.
Onliwon for Fine Buildings. Folder, 8 pp. 3¼ x 6 in. Illustrated. Deals with toilet paper fittings of metal and porcelain.
Architects' File Card. 8½ x 11 in. Illustrated. Filing card on toilet paper and paper towel cabinets.
A Towel Built for Its Job. Booklet, 8 pp. 4¼ x 9⅝ in. Illustrated. Paper Towel System and Cabinets.
Cabinets and Fixtures. Booklet, 31 pp. 5¾ x 4¼ in. Illustrated. Catalog and price list of fixtures and cabinets.

BRICK

American Face Brick Association, 1751 Peoples Life Building, Chicago, Ill.
Brickwork in Italy. 298 pages, size 7½ x 10½ in., 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 in. 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).

Common Brick Mfrs. Assn. of America, 2134 Guarantee Title Bldg., Cleveland.
Brick; How to Build and Estimate. Brochure, 96 pp., 8½ x 11 ins. Illustrated. Complete data on use of brick.
The Heart of the Home. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Price 25 cents. Deals with construction of fireplaces and chimneys.
Skintled Brickwork. Brochure, 15 pp., 8½ x 11 ins. Illustrated. Tells how to secure interesting effects with common brick.
Building Economy. Monthly magazine, 22 pp., 8½ x 11 ins. Illustrated. $1 per year, 10 cents a copy. For architects, builders and contractors.

CEMENT

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

International Cement Corporation, New York.
Incor Cement. Brochure, 12 pp., 8½ x 11 ins. Illustrated. Data on a perfected, early strength Portland cement.

Kosmos Portland Cement Company, Louisville, Ky.
Kosmotar for Enduring Masonry. Folder, 6 pp., 3½ x 6½ in. Data on strength and working qualities of Kosmortar.
Kosmortar, the Mortar for Cold Weather. Folder, 4 pp., 3⅜ x 6½ in. Tells why Kosmortar should be used in cold weather.

Lawrence Cement Co., New York, Boston and Philadelphia.
Dragon Super Cement. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Data on a vaduable waterproof material.

Louisville Cement Co., 315 Guthrie St., Louisville, Ky.
BRIXMENT for Perfect Mortar. Self-filing handbook 8½ x 11 inches. 16 pp. Illustrated. Contains complete technical description of BRIXMENT for brick, tile and stone masonry, specifications, data and tests.

North American Cement Corporation, 285 Madison Ave., New York.
The Cal Boon. Brochure. 32 p. 6 x 9 ins. Illustrated. Use of Cal in Portland Cement mixtures.

Pennsylvania-Dixie Cement Corp'n., 131 East 46th St., New York.
Celluloid Computing Scale for Concrete and Lumber, 4⅝ x 2½ ins. Useful for securing accurate computations of aggregates and cement; also for measuring lumber of different sizes.

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

CEMENT—Continued

Town and Country Houses of Concrete Masonry. Booklet, 19 pp., 8½ x 11 ins. Illustrated.
Facts About Concrete Building Tile. Brochure, 16 pp., 8½ x 11 ins. Illustrated.
The Key to Firesafe Homes. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
Design and Control of Concrete Mixtures. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Portland Cement Stucco. Booklet, 64 pp., 8½ x 11 ins. Illustrated.
Concrete in Architecture. Bound Volume. 60 pp., 8½ x 11 ins. Illustrated. An excellent work, giving views of exteriors and interiors.

CONCRETE BUILDING MATERIALS

Celite Products Company, Chicago, New York, Los Angeles.
Designing Concrete for Workability as Well as Strength. Brochure. 8 pp. Illustrated. Data on how improved workability in concrete is secured without excessive quantities of water.
Better Concrete; Engineering Service Bulletin X-325. Booklet, 16 pp., 8½ x 11 ins. Illustrated. On use of Celite to secure workability in concrete, to prevent segregation and to secure water-tightness.
Economic Value of Admixtures. Booklet, 32 pp., 6⅛ x 9⅛ ins. Reprint of papers by J. C. Pearson and Frank A. Hitchcock before 1924 American Concrete Institute.

Concrete Surface Corporation, 342 Madison Ave., New York.
Bonding Surfaces on Concrete. Booklet, 12 pp., 8 x 11 in., illustrated. Deals with an important detail of building.

Dovetail Anchor Slot Co., 149 West Ohio St., Chicago.
Dovetail Masonry Anchoring System. Folder, 4 pp., 8½ x 11 ins. Illustrated. Data on a system of anchoring masonry to concrete.

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

CONCRETE COLORINGS

The Master Builders Co., 7016 Euclid Ave., Cleveland.
Color Mix, Colored Hardened Concrete Floors (Integral). Brochure. 16 pp. 8½ x 11 in. Illustrated. Data on coloring for floors.
Dychrome, Concrete Surface Hardener in Colors. Folder. 4 pp. 8 x 11 in. 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 in. 32 pp. Illustrated. A treatise on fireproof floor construction.

Northwestern Expended Metal Co., 1234 Old Colony Building, Chicago, Ill.
Northwestern Expanded Metal Products. Booklet. 8½ x 10¾ in. 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.

DAMPPROOFING

Philip Carey Co., Lockland, Cincinnati, Ohio.
Architects' Specifications for Carey Built-Up Roofing. Booklet. 8 x 10¾ in. 24 pp. Illustrated. Complete data to aid in specifying the different types of built-up roofing to suit the kind of roof construction to be covered.
Carey Built-Up Roofing for Modern School Buildings. Booklet 8 x 10¾ in. 32 pp. Illustrated. A study of school buildings of a number of different kinds and the roofing materials adapted for each.

Genfire Steel Company, Youngstown, Ohio.
Waterproofing Handbook. Booklet. 8½ x 11 ins. 80 pp., A. I. A. File No. 7. Illustrated. Thoroughly covers subject of waterproofing concrete, wood and steel preservatives, dusting and hardening concrete floors, and accelerating the setting of concrete. Free distribution.

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

Sonneborn Sons, Inc., L., 116 Fifth Ave., New York.
Specification Sheet, 8½ x 11 in. Descriptions and specifications of compounds for dampproofing interior and exterior surfaces.

The Vortex Mfg. Co., Cleveland, Ohio.
Par-Lock Specification "Forms A and B" for dampproofing and plaster key over concrete and masonry surfaces.
Par-Lock Specification "Form J" for dampproofing tile wall surfaces that are to be plastered.
Par-Lock Dampproofing. Specification Forms C. F. I. and J. Sheets 8½ x 11 ins. Data on gun-applied asphalt dampproofing for floors and walls.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 185*

DOORS AND TRIM, METAL

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

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

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

DOORS, SOUNDPROOF

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

DUMBWAITERS

Sedgwick Machine Works, 151 West 15th St., New York.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ in. 60 pp. Illustrated.
Catalog and pamphlets, 8½ x 11 in. Illustrated. Valuable data on dumbwaiters.

ELECTRICAL EQUIPMENT

Baldor Electric Co., 4358 Duncan Avenue, St. Louis.
Baldor Electric Motors. Booklet, 14 pp., 8 x 10½ ins. Illustrated. Data regarding motors.

Benjamin Electric Mfg. Co., 120 So. Sarigamore St., Chicago.
Reference Wall Chart, 22 x 28½ ins. "Enables one to select at a glance the right type of reflector or other lighting equipment."
Benjamin-Starrett Panelboards and Steel Cabinets. Booklet, 80 pp. 8½ x 10½ ins. Full data on these details for light and power.
Benjamin-Starrett Panelboards for Light and Power. Booklet, 80 pp., 8½ x 11 ins. Illustrated. Full data on company's line of panelboards, steel cabinets, etc.
Benjamin Electric Ranges. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Data on an excellent line of ranges for apartment house use.

General Electric Co., Schenectady, N. Y.
"Electrical Specification Data for Architects. Brochure, 36 pp., 8 x 10½ ins., illustrated. Data regarding G. E. wiring materials and their use.
"The House of a Hundred Comforts." Booklet, 40 pp., 8 x 10½ ins. Illustrated. Dwells on importance of adequate wiring.

Pick & Company, Albert, 208 West Randolph St., Chicago, Ill.
School Cafeterias. Booklet. 9 x 6 in. Illustrated. The design and equipment of school cafeterias with photographs of installation and plans for standardized outfits.

Signal Engineering & Mfg. Co., 154 W. 14th St., New York.
Signal Call Code System. Booklet, 16 pp., 8½ x 10 ins. Illustrated. Important telephone accessories.
Fire Alarm Systems,—Bulletin A-35. 12 pp., 8½ x 9½ ins. Illustrated. Data on fire alarn equipment.
Electrical Signaling Devices and Control Equipment. Booklet, 11 pp., 8½ x 11 ins. Illustrated.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Electric Power for Buildings. Brochure, 14 pp., 8½ x 11 ins. Illustrated. A publication important to architects and engineers.
Variable-Voltage Central Systems as applied to Electric Elevators. Booklet, 13 pp., 8½ x 11 ins. Illustrated. Deals with an important detail of elevator mechanism.
Modern Electrical Equipment for Buildings. Booklet, 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 and Cabinets (Catalog 42-A). Booklet, 32 pp., 8½ x 11 ins. Illustrated. Important data on these details of equipment.
Beauty; Power; Silence; Westinghouse Fans (Dealer Catalog 45). Brochure, 16 pp., 8½ x 11 ins. Illustrated. Valuable information on fans and their uses.
Electric Range Book for Architects (A. I. A. Standard Classification 31 G-4). Booklet, 24 pp., 8½ x 11 ins. Illustrated. Cooking apparatus for buildings of various types.
Westinghouse Commercial Cooking Equipment (Catalog 280). Booklet, 32 pp., 8½ x 11 ins. Illustrated. Equipment for cooking on a large scale.
Electric Appliances (Catalog 44-A). 32 pp., 8½ x 11 ins. Deals with accessories for home use.

ELEVATORS

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

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

Sedgwick Machine Works, 151 West 15th St., New York, N. Y.

ELEVATORS—Continued

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.

FIREPROOFING

Concrete Engineering Co., Omaha, Nebr.
"Handbook of Fireproof Construction." Booklet, 53 pp., 8½ x 11 in. Valuable work on methods of fireproofing.

Genfire Steel Company, Youngstown, Ohio.
Fireproofing Handbook, 8½ x 11 in. 32 pp. Illustrated. Gives methods of construction, specifications, data on Herringbone metals, lath, steel tile, Trussit solid partitions, steel joists, Self-Centering formless concrete construction.

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

FLAGSTONES

J. G. Robinson, 6202 Germantown Avenue, Philadelphia.
Robinson Flagstones. Brochure, 12 pp., 8½ x 11 ins. Illustrated. Data and Specifications.

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. 23 pp. 8½ x 11 in. Illustrated. Valuable work on an important subject.

Sonneborn Sons, Inc., L., 116 Fifth Ave., New York, N. Y.
Lapidolith, the liquid chemical hardener. Complete sets of specifications for every building type in which concrete floors are used, with descriptions and results of tests.

FLOORS—STRUCTURAL

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

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

FLOORING

Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Armstrong's Cork Tile Floors. Booklet, 7¾ x 10½ in. 30 pp. An illustrated work on cork flooring.
Linotile for Home Floors. Brochure. 7½ x 10½ ins. 27 pp. and colored enclosures of floor installations.

Armstrong Cork Co. (Linoleum Division), Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog. 8½ x 11 in. 40 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors.
Armstrong's Linoleum Pattern Book, 1927. Catalog. 3½ x 6 in. 272 pp. Color Plates. Reproduction in color of all patterns of linoleum and cork carpet in the Armstrong line.
Quality Sample Book. 3½ x 5¼ in. Showing all gauges and thicknesses in the Armstrong line of linoleums.
Linoleum Layer's Handbook. 5 x 7 in. 32 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 in. 48 pp. Illustrated in color. Explains use of linoleum for offices, stores, etc., with reproductions in color of suitable patterns, also specifications and instructions for laying.

Blabon Company, Geo. W., Nicetown, Philadelphia, Pa.
Planning the Color Schemes for Your Home. Brochure illustrated in color; 36 pp., 7½ x 10½ in. Gives excellent suggestions for use of color in flooring for houses and apartments.
Handy Quality Sample Folder of Linoleums. Gives actual samples of "Battleship Linoleum," cork carpet, "Feltex," etc.
Blabon's Linoleum. Booklet illustrated in color; 128 pp., 3½ x 8½ in. Gives patterns of a large number of linoleums.
Blabon's Plain Linoleum and Cork Carpet. Gives quality samples, 3 x 6 in. of various types of floor coverings.

Bonded Floors Company, Inc., 1421 Chestnut St., Philadelphia, Pa.
A series of booklets, with full color inserts showing standard colors and designs. Each booklet describes a resilient floor material as follows:
Battleship Linoleum. Explains the advantages and uses of this durable, economical material.
Marble-ized (Cork Composition) Tile. Complete information on cork-composition marble-ized tile and the many artistic effects obtainable with it.
Treadlite (Cork Composition) Tile. Shows a variety of colors and patterns of this adaptable cork composition flooring.
Natural Cork Tile. Description and color plates of this superquiet, resilient floor.
Practical working specifications for installing battleship linoleum, cork composition tile and cork tile. Resilient Floors in Schools. Resilient Floors in Stores. Resilient Floors in Hospitals. Resilient Floors in Offices. Resilient Floors in Apartments and Hotels. Booklets, 8 pp., 8½ x 11 ins. Illustrated.
Specifications for Resilient Floors. Leather bound booklet, 48 pp., 8½ x 11 ins. Illustrated.

Carter Bloxonend Flooring Co., Keith & Perry Bldg., Kansas City, Mo.
Bloxonend Flooring. Booklet 3¾ x 6¼ in. 20 pp. Illustrated. Describes uses and adaptability of Bloxonend Flooring to concrete, wood or steel construction, and advantages over loose wood blocks.

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

FLOORING—Continued

File Folder, 9⅜ x 11¼ in. For use in connection with A. I. A. system of filing. Contains detailed information on Bloxonend Flooring in condensed, loose-leaf form for specification writer and drafting room. Literature embodied in folder includes standard Specification Sheet covering the use of Bloxonend in general industrial service and Supplementary Specification Sheet No. 1, which gives detailed description and explanation of an approved method for installing Bloxonend in gymnasiums, armories, drill rooms and similar locations where maximum resiliency is required.

Albert Grauer & Co., 1408 Seventeenth St., Detroit, Mich.
Grauer-Watkins Red Asphalt Flooring. Folder, 4 pp., 8½ x 11 in. Data on a valuable form of flooring.

Thomas Moulding Floor Co., 165 W. Wacker Drive, Chicago.
Better Floors. Folder, 4 pp. 11¼ x 13¾ ins. Illustrated. Floors for office, administration and municipal buildings.
Better School Floors. Folder, 4 pp., 11¼ x 13¾ ins. Illustrated. Characteristics, Secifications and Uses. Brochure, 16 pp., 11¼ x 13¾ ins. Illustrated. Data on floors.

W. & J. Sloane Mfg. Co., 577 Fifth Avenue, New York.
Linoleum Patterns. Brochure, 10 pp., 8½ x 11 ins. Illustrated. Deals with fine assortment of floor coverings.
Linoleum Floors. Booklet, 42 pp., 8½ x 11 ins. Illustrated. Linoleum Data and Specifications for Architects.

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 in. Illustrated. Data on building floors of hollow tile and tables on floor loading.

United States Quarry Tile Co., Parkersburg, W. Va.
Quarry Tiles for Floors. Booklet, 119 pp., 8½ x 11 ins. Illustrated. General catalog. Details of patterns and trim for floors.
Art Portfolio of Floor Designs. 9¼ x 12¼ ins. Illustrated in colors. Patterns of quarry tiles for floors.

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

FURNITURE

American Seating Co., 14 E. Jackson Blvd., Chicago, Ill.
Ars Ecclesiastica Booklet. 6 x 9 in. 48 pp. Illustrations of church fitments in carved wood.
Theatre Chairs. Booklet. 6 x 9 in. 48 pp. Illustrations of theater chairs.

Kensington Mfg. Company, Showrooms, 41 West 45th St., New York.
Illustrated booklet indicative of the scope, character and decorative quality of Kensington Furniture, with plan of co-operation with architects, sent on request.
Photographs and full description of hand-made furniture in all the period styles, furnished in response to a specific inquiry.

Kittinger Co., 1893 Elmwood Ave., Buffalo, N. Y.
Kittinger Club & Hotel Furniture. Booklet. 20 pp. 6¼ x 9½ ins. Illustrated. Deals with fine line of furniture for hotels, clubs, institutions, schools, etc.
Kittinger Club and Hotel Furniture. Booklet. 20 pp. 6 x 9 ins. Illustrated. Data on furniture for hotels and clubs.
A Catalog of Kittinger Furniture. Booklet, 78 pp., 14 x 11 ins. Illustrated. General Catalog.

McKinney Mfg. Co., Pittsburgh.
Forethought Furniture Plans. Sheets, 6¼ x 9 ins., drawn to ¼-inch scale. An ingenious device for determining furniture arrangement.

New York Galleries, Madison Avenue and 48th Street, New York.
A group of Distinguished Interiors. Brochure, 4 pp., 8¾ x 11¾ ins. Filled with valuable illustrations.

White Door Bed Company, The, 130 North Wells Street, Chicago, Ill.
Booklet. 8½ x 11 in. 20 pp. Illustrated. Describes and illustrates the use of "White" Door Bed and other space-saving devices.

GARAGES

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

GLASS CONSTRUCTION

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

Libbey-Owens Sheet Glass Co., Toledo, O.
Flat Glass. Brochure, 11 pp., 5⅛ x 7⅝ ins. Illustrated. History of manufacture of flat, clear, sheet glass.

Mississippi Wire Glass Co., 220 Fifth Ave., New York.
Mississippi Wire Glass. Catalog. 3⅞ x 8½ in. 32 pp. Illustrated. Covers the complete line.

GREENHOUSES

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

HARDWARE

P. & F. Corbin, New Britain, Conn.
Early English and Colonial Hardware. Brochure, 8½ x 11 in. 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.

HARDWARE—Continued

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

McKinney Mfg. Co., Pittsburgh.
Forged Iron by McKinney. Booklet, 6 x 9 ins. Illustrated. Deals with an excellent line of builders' hardware.
Forged Lanterns by McKinney. Brochure, 6 x 9 ins. Illustrated. Describes a fine assortment of lanterns for various uses.

Richard-Wilcox Mfg. Co., Aurora, Ill.
Distinctive Garage Door Hardware. Booklet. 8½ x 11 in. 65 pp. Illustrated. Complete information accompanied by data and illustrations on different kinds of garage door hardware.
Distinctive Elevator Door Hardware. Booklet, 89 pp., 16 x 10½ ins. Illustrated.

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

HEATING EQUIPMENT

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

American Radiator Company, The, 40 West 40th St., N. Y. C.
Ideal Boilers for Oil Burning. Catalog 5½ x 8½ in. 36 pp. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.
Corto—The Radiator Classic. Brochure 5¼ x 8½ in. 16 pp. Illustrated. A brochure on a space-saving radiator of beauty and high efficiency.
Ideal Arcola Radiator Warmth. Brochure 6¼ x 9¼. 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.

James B. Clow & Sons, 534 S. Franklin St., Chicago.
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 Street, Chicago, Ill.
Dunham Radiator Trap. Bulletin 101. 8 x 11 in. 12 pp. Illustrated. Explains working of this detail of heating apparatus.
Dunham Packless Radiator Valves. Bulletin 104. 8 x 11 in. 8 pp. Illustrated. A valuable brochure on valves.
Dunham Return Heating System. Bulletin 109. 8 x 11 in. Illustrated. Covers the use of heating apparatus of this kind.
Dunham Vacuum Heating System. Bulletin 110. 8 x 11 in. 12 pp. Illustrated.
The Dunham Differential Vacuum Heating System. Bulletin 114. Brochure, 8 pp., 8 x 11 ins. Illustrated. Deals with heating for small buildings.
The Dunham Differential Vacuum Heating System. Bulletin 115. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for large buildings.

Excelso Products Corporation, 119 Clinton St., Buffalo, N. Y.
Excelso Water Heater. Booklet. 12 pp. 3 x 6 in. Illustrated. Describing the new Excelso method of generating domestic hot water in connection with heating boilers. (Firepot Coil eliminated.)

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.

Illinois Engineering Co., Racine Ave., at 21st St., Chicago, Ill.
Vapor Heat Bulletin 21. 8½ x 11 in. 32 pp. Illustrated. Contains new and original data on Vapor Heating. Rules for computing radiation, pipe sizes, radiator tappings. Steam table showing temperature of steam and vapor at various pressures, also description of Illinois Vapor Specialties.

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

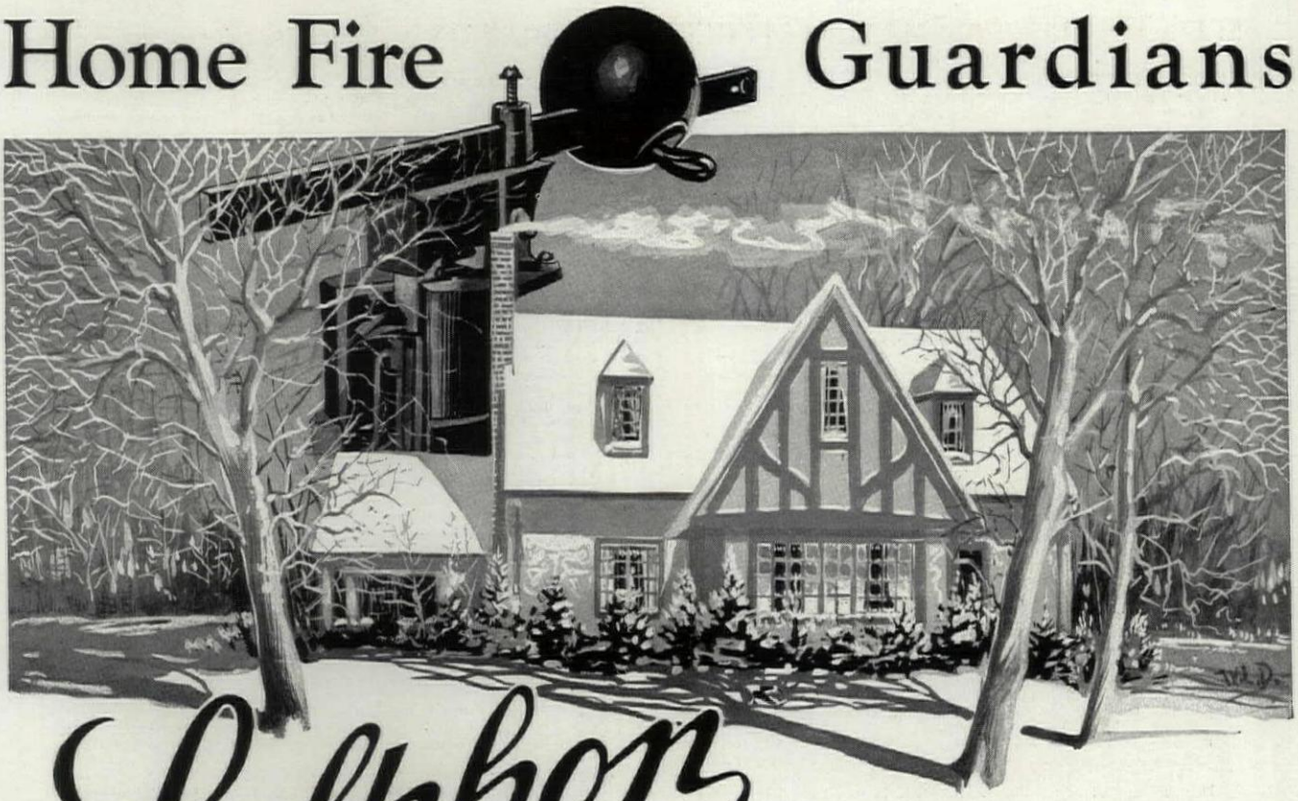
Kewanee Boiler Corporation, Kewanee, Ill.
Kewanee on the Job. Catalog. 8½ x 11 in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.
Catalog No. 78, 6 x 9 in. Illustrated. Describes Kewanee Firebox Boilers with specifications and setting plans.
Catalog No. 79.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

May Oil Burner Corp., Baltimore.
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.

Milwaukee Valve Co., Milwaukee.
MILVACO Vacuum & Vapor Heating System. Nine 4-p. bulletins, 8½ x 11 ins. Illustrated. Important data on heating.
MILVACO Vacuum & Vapor Heating Specialties. Nine 4-p. bulletins, 8½ x 11 ins. Illustrated. Deal with a valuable line of specialties used in heating.

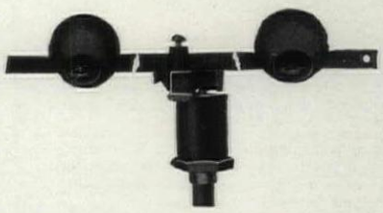
Modine Mfg. Company, Racine, Wis.
Thermodine Unit Heater. Brochure, 24 pp., 8½ x 1 ins. Illustrated. Apparatus for industrial heating and drying.
Thermodine Cabinet Heater. Booklet, 12 pp., 8½ x 11 ins. Illustrated. Cabinet heaters to buildings of different kinds.

Home Fire Guardians



Sylphon TRADE MARK Hot Water Damper Regulators

THEY are the pioneers of accurate automatic draft control. They provide ideal regulation of house heating water boilers. They save fuel and that troublesome travel up and down cellar stairs to adjust drafts.

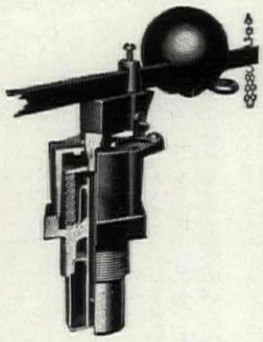


No. 46 Sylphon Hot Water Damper Regulator. Controls from 130 deg. to 200 deg. F. Length of bulb 1 inch; threaded 1-inch pipe size. May be screwed into boiler, laundry heater, or garage heater.

They afford even, lower cost heating. Their responsive action to the slightest changes in water temperature is constant and dependable, and their great durability makes them outlast the lifetime of the boiler.

There is a Sylphon Damper Regulator for Every Steam, Hot Water or Vapor Heating System

SEND FOR FULLY DESCRIPTIVE LITERATURE



Cut open view of No. 45-A Sylphon Hot Water Damper Regulator. Controls from 120 deg. to 220 deg. F. Length of bulb 2 inches; threaded 2-inch pipe size. Installed in a Y or screwed into boiler.

The Original and Only Genuine
SYLPHON BELLOWS

The motor element in all Sylphon Instruments is the most accurate, durable and flexible temperature control unit known to science.

THE FULTON SYLPHON COMPANY, *Knoxville, Tenn., U. S. A.*

Sales Offices: New York, Chicago, Philadelphia, Boston, Detroit. All Principal Cities in the U. S. DEPT. F

Gentlemen:
We are interested in Sylphon Damper Regulator for

SEE OUR CATALOGUE IN SWEET'S

Name _____

Company _____

Address _____

City _____ State _____

THE FULTON SYLPHON COMPANY — Sylphon — AUTOMATIC TEMPERATURE CONTROL

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 188*

HEATING EQUIPMENT—Continued

Molby Boiler Co., Inc., New York and Lansdale, Pa.
Molby Heating Boiler. Booklet, 24 pp., 4 x 9 ins. Illustrated. Deals with well known line of boilers.
Chimney Construction. Booklet, 26 pp., 6 x 9 ins. Data recommended by National Board of Fire Underwriters.

Nash Engineering Company, South Norwalk, Conn.
No. 37. Devoted to Jennings Hytor Return Line Vacuum Heating Pumps, electrically driven, and supplied in standard sizes up to 300,000 square feet equivalent direct radiation.
No. 16. Dealing with Jennings Hytor Air Line Heating Pumps.
No. 17. Describing Jennings Hytor Condensation Pumps, sizes up to 70,000 square feet equivalent direct radiation.
No. 25. Illustrating Jennings Return Line Vacuum Heating Pumps. Size M, for equivalent direct radiation up to 5,000 square feet.

National Radiator Corporation, Johnstown, Pa.
Aero Radiators; Beauty and Worth. Catalog 34. Booklet 6 x 9 in., 20 pp., describing and illustrating radiators and accessories.
Six Great Companies Unite to Form a Great Corporation. Booklet, 27 pp., 8½ x 10½ ins. Illustrated. Valuable data on heating.

Petroleum Heat & Power Co., 511 Fifth Avenue, New York.
Heating Homes the Modern Way. Booklet, 8½ x 11¾ ins. Illustrated. Data on the Petro Burner.
Residence Oil Burning Equipment. Brochure, 6 pp., 8½ x 11 ins. Illustrated. Data regarding Petro Burner in a bulletin approved by Investigating Committee of Architects and Engineers.
Petro Mechanical Oil Burner & Air Register. Booklet, 23 pp., 8½ x 11 ins. Illustrated. Data on industrial installations of Petro Burners.
Present Accepted Practice in Domestic Oil Burners. Folder, 4 pp., 8½ x 11 ins. Illustrated. A reprint from Heating and Ventilating Magazine.

Reznor Mfg. Co., Mercer, Pa.
Heating by the Ultimate Method. Folder, 4 pp., 8½ x 11 ins. Illustrated. Data on gas heating.

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

HOSPITAL EQUIPMENT

The Frink Co., Inc., 24th St. and Tenth Ave., New York City.
Catalog 426. 7 x 10 in., 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.

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

The Pick-Barth Companies, Chicago and New York.
Some Thoughts About Hospital Food Service Equipment. Booklet, 21 pp., 7½ x 9¼ ins. Valuable data on an important subject.

Wilmot Castle Company, Rochester, N. Y.
Sterilizer Equipment for Hospitals. Book, 76 pp. 8½ x 11 in. Illustrated. Gives important and complete data on sterilization of utensils and water, information on dressings, etc.
Sterilizer Specifications. Brochure, 12 pp. 8½ x 11 in. Practical specifications for use of architects and contractors.
Architects' Data Sheets. Booklet, 16 pp. 8½ x 11 in. Illustrated. Information on piping, venting, valving and wiring for hospital sterilizer installations.
Hospital Sterilizing Technique. Five booklets, 8 to 16 pp. 6 x 9 in. Illustrated. Deals specifically with sterilizing instruments, dressings, utensils, water, and rubber gloves.

HOTEL EQUIPMENT

Pick & Company, Albert, 208 West Randolph Street, Chicago, Ill.
Some Thoughts on Furnishing a Hotel. Booklet, 7½ x 9 ins. Data on complete outfitting of hotels.

INCINERATORS

Home Incinerator Co., Milwaukee, Wis.
The Decent Way. Burn it with Gas Brochure, 30 pp., 5¼ x 7¼ ins. inside. Illustrated, incinerator sanitation equipment for residence use.
A. I. A. File. 12 pp., 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.

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 ahs 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 Gernerator. Gives list of hospitals where installed.

INSULATING LUMBER

Mason Fibre Co., 111 West Washington St., Chicago, Ill.
Booklet, 12 pp., 8½ x 11 in. Illustrated. Gives complete specifications for use of insulating lumber and details of construction involving its use.

INSULATION

Armstrong Cork & Insulation Co., Pittsburgh, Pa.
The Insulation of Roofs with Armstrong's Corkboard. Booklet. Illustrated. 7½ x 10½ in. 32 pp. Discusses means of insulating roofs of manufacturing or commercial structures.
Insulation of Roofs to Prevent Condensation. Illustrated booklet. 7½ x 10½ in. 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 in. 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.

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Insulating Quilt. Booklet, 7½ x 10½ ins., 24 pp. Illustrated. Deals with a valuable type of insulation.

Philip Carey Co., The, Cincinnati, Ohio.
Carey Asbestos and Magnesia Products. Catalog. 6 x 9 in. 72 pp. Illustrated.

Celite Products Co., 1320 South Hope St., Los Angeles.
The Insulation of Boilers. Booklet. 8 pp., 8½ x 11 ins. Illustrated. On insulating boiler walls, breechings, and stacks to reduce amount of radiation.
Heat Insulation Specifications and Blue Prints. Booklet, 20 pp., 8½ x 11 ins. Illustrated. On approved types of insulation.
Sil-O-Cel Insulation Materials and Allied Products. Brochure, 16 pp., 8½ x 11 ins. Illustrated. Important data on insulation.

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

JOISTS

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

Genfire Steel Company, Youngstown, Ohio.
Steel Joists. 8½ x 11 ins. 32 pp. A. I. A. File Number 13G. Illustrated. Complete data on T-Bar and Plate-Girder joists including construction details and specifications.

KITCHEN EQUIPMENT

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

Pick & Company, Albert, 208 W. Randolph St., Chicago, Ill.
School Cafeteria. Portfolio. 17 x 11 in. 44 pp. Illustrated. An exhaustive study of the problems of school feeding, with copious illustrations and blue prints. Very valuable to the architect.
School Cafeterias. Booklet. 9 x 6 in. Illustrated. The design and equipment of school cafeterias with photographs of installation and plans for standardized outfits.

LABORATORY EQUIPMENT

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

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

LANTERNS

Todhunter, Arthur, 119 E. 57th St., New York.
Hand Wrought Lanterns. Booklet, 5¼ x 6¼ in. 20 pp. Illustrated in Black and White. With price list. Lanterns appropriate for exterior and interior use, designed from old models and meeting the requirements of modern lighting.

LATH, METAL AND REINFORCING

Genfire Steel Company, Youngstown, Ohio.
Herringbone Metal Lath Handbook. 8½ x 11 in. 32 pp. Illustrated. Standard specifications for Cement Stucco on Herringbone. Rigid Metal Lath and interior plastering.

National Steel Fabric Co., Pittsburgh.
Better Walls for Better Homes. Brochure. 16 pp. 7¾ x 10¾ 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.

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

Truscon Steel Company, Youngstown, Ohio.
Truscon ¾-inch Hy-Rib for Roofs, Floors and Walls. Booklet, ½ x 11 in., illustrating Truscon ¾-inch Hy-Rib as used in industrial buildings. Plates of typical construction. Progressive steps of construction. Specification and load tables.

Dr. Hornbeck's Residence
Rochester, N. Y.

A Contractor writes about Armstrong's Corkboard

THE following letter is one of many received from contractors describing their experience with Armstrong's Corkboard as insulation for the walls and roofs of houses. This one, from J. A. Culkin & Company, Inc., Rochester, N. Y., particularly stresses the plaster base feature.

"A lot of new and untried materials are being offered to architects and owners at all times for incorporation in building projects. Since the contractor is forced to deal with these in a practical manner, his experience in carrying out the architect's ideas is worthy of the greatest possible consideration.

"Being familiar with the fact that Armstrong's Corkboard has been used as a plaster base in cold storage work for over thirty years, I accepted its application as a good house insulation material with implicit faith. I felt that any material which had proven a good base for Portland cement plaster would prove an even better base for a wood pulp plaster such as is used extensively in this section. I also felt that the natural ability to stretch slightly or be compressed, would serve to prevent all of the movement in the building framing from being transmitted to the plaster surface. This is desirable.

"In the past few years I have had the pleasure of building among others, two of the finest residences in the Rochester section. These are as follows:

DR. C. SAHLER HORNBECK RESIDENCE,
Sandringham Drive
FREDERICK W. ZOLLER RESIDENCE,
Ambassador Drive

"Both of these homes were insulated with Armstrong's Corkboard as specified respectively by Arnold & Stern, and Mr. W. W. Ward. Both of these jobs serve to prove my impression that this was the best type of insulation which could be selected for residence work and one which would ultimately be accepted as a standard in spite of the fact that it is higher in price. I am convinced that it represents the biggest insulation value on the market today."

Special attention has been paid to the architect's requirements in the Armstrong filing catalog: "Armstrong's Corkboard Insulation for Walls and Roofs." If you do not have a copy in your files, send for one. Armstrong Cork & Insulation Company, 132 Twenty-Fourth Street, Pittsburgh, Pa.; 11 Brant Street, Toronto 2, Ont.; 1001 McGill Building, Montreal, Que.

Armstrong's Corkboard Insulation

A Heatproof Lining for Walls and Roof

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

LAUNDRY CHUTES

The Pfaudler Company, 217 Cutler Building, Rochester, N. Y.
Pfaudler Glass-Lined Steel Laundry Chutes. Booklet, 5⅛ x 7⅜ in. 16 pp. Illustrated. A beautifully printed brochure describing in detail with architects' specifications THE PFAUDLER GLASS LINED STEEL LAUNDRY CHUTES. Contains views of installations and list of representative examples.

LAUNDRY MACHINERY

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

LIBRARY EQUIPMENT

Art Metal Construction Co., Jamestown, N. Y.
Planning the Library for Protection and Service. Brochure, 52 pp. 8½ x 11 in. Illustrated. Deals with library fittings of different kinds.
Library Bureau Division, Remington Rand, N. Tonawanda, N. Y.
Like Stepping into a Story Book. Booklet. 24 pp. 9 x 12 in. Deals with equipment of Los Angeles Public Library.

LIGHTING EQUIPMENT

The Frink Co., Inc., 24th St. and 10th Ave., New York City.
Catalog 415. 8½ x 11 in. 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 Co. (Celestialite Division), 200 Fifth Avenue, New York.
Next to Daylight Brochure, 19 pp., 4 x 8½ ins. Illustrated. Deals with a valuable type of lighting fixture.
Celestialite Circular No. 40. Folder, 4 pp., 3½ x 6 ins. "What Nature does to the Sun, Celestialite does to the Mazda lamp."
Attractive Units in Celestialite. Folder, 12 pp., 3¼ x 6½ ins. Illustrates Decorated Celestialite Units.
It Has Been Imitated. Folder, 4 pp., 10 x 13 ins. Data in an important detail of lighting equipment.
Smyser-Royer Co., 1700 Walnut Street, Philadelphia.
Catalog "J" on Exterior Lighting Fixtures. Brochure, illustrated, giving data on over 300 designs of standards, lanterns and brackets of bronze or cast iron.

LUMBER

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

MAIL CHUTES

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

MANTELS

Arthur Todhunter, 119 E. 57th St., New York, N. Y.
Georgian Mantels. New Booklet. 24 pp. 5¼ x 6¼ in. A fully illustrated brochure on eighteenth century mantels. Folders give prices of mantels and illustrations and prices of fireplace equipment.

MARBLE

The Georgia Marble Company, Tate, Ga. New York Office, 1328 Broadway.
Why Georgia Marble is Better. Booklet. 3⅜ x 6 in. Gives analysis, physical qualities, comparison of absorption with granite, opinions of authorities, etc.
Convincing Proof. 3⅜ x 6 in. 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.
Hurt Building, Atlanta; Senior High School and Junior College, Muskegon, Mich. Folders, 4 pp., 8½ x 11 ins. Details.

METALS

The International Nickel Company, 67 Wall St., New York, N. Y.
The Choice of a Metal. Booklet, 6¾ x 3 in. 166 pp. Illustrated. Monel Metal—its qualities, use and commercial forms, briefly described.

MILL WORK—See also Wood

Curtis Companies Service Bureau, Clinton, Iowa.
Architectural Interior and Exterior Woodword. Standardized Book. 9 x 11½ in. 240 pp. Illustrated. This is an Architects' Edition of the complete catalog of Curtis Woodwork, as designed by Trowbridge & Ackerman. Contains many color plates.
Better Built Homes. Vols. XV-XVIII incl. Booklet. 9 x 12 in. 40 pp. Illustrated. Designs for houses of five to eight rooms, respectively, in several authentic types, by Trowbridge & Ackerman, architects for the Curtis Companies.
Curtis Details. Booklet, 19½ x 23½ in. 20 pp. Illustrated. Complete details of all items of Curtis woodwork, for the use of architects.

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

Roddis Lumber and Veneer Co., Marshfield, Wis.
Roddis Doors. Brochure, 24 pp., 5¼ x 8½ in. Illustrated price list of doors for various types of buildings.
Roddis Doors, Catalog G. Booklet, 183 pp., 8½ x 11 in. Completely covers the subject of doors for interior use.
Roddis Doors for Hospitals. Brochure, 15 pp., 8½ x 11 in. Illustrated work on hospital doors.
Roddis Doors for Hotels. Brochure, 15 pp., 8½ x 11 in. 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 in. 4 pp. Illustrated in color, gives full information concerning Clinton Mortar Colors with specific instructions for using them.
Color Card. 6½ x 3¼ in. Illustrates in color the ten shades in which Clinton Mortar Colors are manufactured.
Something new in Stucco. Folder, 3½ x 6 ins. An interesting folder on the use of coloring matter for stucco-coated walls.

ORNAMENTAL PLASTER

Jacobson & Co., 241 East 44th St., New York.
A book of Old English Designs. Brochure. 47 plates. 12 x 9 ins. Deals with a fine line of decorative plaster work.
Architectural and Decorative Ornaments. Cloth bound volume. 183 plates. 9 x 12 ins. 18 plates. Price, $3.00. A general catalog of fine plaster ornaments.
Geometrical ceilings. Booklet. 23 plates. 7 x 9 ins. An important work on decorative plaster ceilings.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Creosote Stains. Booklet. 4 x 8½ in. 16 pp. Illustrated.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book. 5½ x 3¾ in. 100 pp. Gives directions and formulae for painting various surfaces of wood, plaster, metals, etc., both interior and exterior.
Red Lead in Paste Form. Booklet, 6¼ x 3½ in. 16 pp. Illustrated. Directions and formulae for painting metals.
Came Lead. Booklet, 8¾ x 6 in. 12 pp. Illustrated. Describes various styles of lead cames.
Cinch Anchoring Specialties. Booklet. 6 x 3½ in. 20 pp. Illustrated. Describes complete line of expansion bolts.

Pratt & Lambert, Inc., Buffalo, N. Y.
Specification Manual for Paint, Varnishing and Enameling. Booklet, 38 pp., 7½ x 10⅝ ins. Complete specifications for painting, varnishing and enameling interior and exterior wood, plaster, and metal work.

Sherwin-Williams Company, 601 Canal Rd., Cleveland, Ohio.
Painting Concrete and Stucco Surfaces. Bulletin No. 1. 8½ x 11 in. 8 pp. Illustrated. A complete treatise with complete specifications on the subject of Painting of Concrete and Stucco Surfaces. Color chips of paint shown in bulletin.
Enamel Finish for Interior and Exterior Surfaces. Bulletin No. 2, 8½ x 11 in. 12 p. Illustrated. Thorough discussion, including complete specifications for securing the most satisfactory enamel finish on interior and exterior walls and trim.
Painting and Decorating of Interior Walls. Bulletin No. 3. 8½ x 11 in. 20 pp. Illustrated. An excellent reference book on Flat Wall Finish, including texture effects, which are taking the country by storm. Every architect should have one on file.
Protective Paints for Metal Surfaces. Bulletin No. 4. 8½ x 11 in. 12 pp. Illustrated. A highly technical subject treated in a simple, understandable manner.

Sonneborn Sons, Inc., L., Dept. 4, 116 Fifth Ave., New York.
Paint Specifications. Booklet. 8½ x 10¾ in. 4 pp.
U. S. Gutta Percha Paint Co., Providence, R. I.
Barreled Sunlight. Booklet, 8½ x 11 in. Data on "Barreled Sunlight" with specifications for its use.

Valentine & Co., 456 Fourth Ave., New York.
How to Use Valspar. Illustrated booklet, 32 pp., 3¾ x 8 in. Deals with domestic uses for Valspar.
How to Keep Your House Young. Illustrated brochure, 23 pp., 7 x 8½ in. A useful work on the upkeep of residences.
Architectural Four-Hour Varnishes and Enamels. Booklet, 8 pp., 4½ x 6 ins. Data on a useful line of materials.

Zapon Co., The, 247 Park Ave., New York City.
Zapon Architectural Specifications. Booklet, 28 pp., 8½ x 11 in. Describes odorless brushing and spraying lacquers and lacquer enamels.

PAPER

A. P. W. Paper Co., Albany, N. Y.
"Here's a Towel Built for Its Job." Folder, 8 pp., 4 x 9 in. Deals with "Onliwon" paper towels.

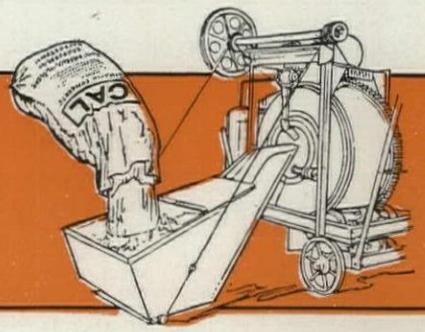
PARTITIONS

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

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

Improved Office Partition Company, 25 Grand St., Elmhurst, L. I.
Telesco Partition. Catalog. 8¼ x 11 in. 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 in. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

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



—just put it in the mix

CAL

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 192*

PARTITIONS—Continued

U. S. Gypsum Co., Chicago.
Pyrobar Partition and Furring Tile. Booklet. 8½ x 11 in. 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 in. 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 in. Data on dredge pipe.

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill.
Catalog "A". 4 x 6½ in. 700 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

Cohoes Rolling Mill Company, Cohoes, N. Y.
Cohoes Pipe Handbook. Booklet, 40 pp., 5 x 7½ in. Data on wrought iron pipe.

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

National Tube Co., Frick Building, Pittsburgh, Pa.
"National" Bulletin No. 2. Corrosion of Hot Water Pipe, 8½ x 11 in. 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 in. 20 pp. Illustrated. Discusses various causes of corrosion, and details are given of the deactivating and deaerating systems for eliminating or retarding corrosion in hot water supply lines.
"National" Bulletin No. 25. "National" Pipe in Large Buildings. 8½ x 11 in. 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 in., profusely illustrated with halftone and line engravings of the important operations in the manufacture of pipe.

PLASTER

Best Bros. Keene's Cement Co., Medicine Lodge, Kans.
Information Book. Brochure, 24 pp., 5 x 9 ins. Lists grades of plaster manufactured; gives specifications and uses for plaster.
Plasterers' Handbook. Booklet, 16 pp., 3½ x 5½ ins. A small manual for use of plasterers.
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

C. F. Church Mfg. Co., Holyoke, Mass.
Catalog S. W.-3. Booklet, 95 pp., 7¾ x 10½ in. Illustrated. Data on Sani-White and Sani-Black toilet seats.

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill.
Catalog "M." 9¼ x 12 in. 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 in. 80 pp. Illustrated.
Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6½ in. 34 pp. Illustrated.
Planning the Small Bathroom. Booklet. 5 x 8 in. 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.

Eljer Company, Ford City, Pa.
Complete Catalog. 3¾ x 6¾ in. 104 pp. Illustrated. Describes fully the complete Eljer line of standardized vitreous china plumbing fixtures, with diagrams, weights and measurements.

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

Maddock's Sons Company, Thomas, Trenton, N. J.
Catalog K. 10⅞ x 7⅞ in. 242 pp. Illustrated. Complete data on vitreous china plumbing fixtures with brief history of Sanitary Pottery.

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

PUMPS

Chicago Pump Company, 2300 Wolfram St., Chicago, Ill.
The Correct Pump to Use. Portfolio containing handy data. Individual bulletins, 8½ x 11 ins., on bilge, sewage, condensation, circulating, house, boiler feed and fire pumps.

Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill.
Bulletin E. 7¾ x 10¼ in. 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 Kenwanee Private Utilities Co.

PUMPS—Continued

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

Weil Pump Co., 215 W. Superior St., Chicago.
Pumps. Booklet, 8½ x 11 ins. Illustrated. Individual bulletins with specifications on sewage ejectors, and bilge, house, condensation, booster and boiler feed pumps.

RAMPS

Ramp Buildings Corporation, 21 East 40th St., New York.
Building Garages for Profitable Operation. Booklet. 8½ x 11 in. 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 Sylphon Company, Knoxville, Tenn.
Temperature Control of Refrigeration Systems. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Deals with cold storage, chilling of water, etc.

REFRIGERATORS

Lorillard Refrigerator Company, Kingston, N. Y.
Lorillard Refrigerator, for hotels, restaurants, hospitals and clubs. Brochure. 43 pp. 8 x 10 ins. Illustrated. Data on fine line of refrigerators.

REINFORCED CONCRETE—See also Construction, Concrete

Genfire Steel Company, Youngstown, Ohio.
Self-Sentering Handbook. 8½ 11 in. 36 pp. Illustrated. Methods and specifications on reinforced concrete floors, roofs and floors with a combined form and reinforced material.

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

North Western Expanded Metal Company, Chicago, Ill.
Designing Data. Book. 6 x 9 in. 96 pp. Illustrated. Covers the use of Econo Expanded Metal for various types of reinforced concrete construction.
Longspan ¾-inch Rib Lath. Folder 4 pp., 8½ x 11 in. Illustrated. Deals with a new type of V-rit expanded metal.

ROOFING

Barber Asphalt Co., Philadelphia, Pa.
Specifications, Genasco Standard Trinidad Lake Asphalt Built-up Roofing. Booklet. 8 x 10½ in. Gives specifications for use of several valuable roofing and waterproofing materials.

The Barrett Company, 40 Rector St., New York City.
Architects' and Engineers' Built-up Roofing Reference Series; Volume IV Roof Drainage System. Brochure. 63 pp. 8½ x 11¼ ins. Gives complete data and specifications for many details of roofing.

Bird & Son, Inc., E. Walpole, Mass.
Bird's Roofs. Folder, 16 pp., 3½ x 6 ins. Illustrated. Data of roofing materials.

Philip Carey Co., Lockland, Cincinnati, Ohio.
Architects Specifications for Carey Built-up Roofing. Booklet. 8 x 10¼ in. 24 pp. Illustrated. Complete data to aid in specifying the different types of built-up roofing to suit the kind of roof construction to be covered.
Carey Built-up Roofing for Modern School Buildings. Booklet. 8 x 10¼ in. 32 pp. Illustrated. A study of school buildings of a number of different kinds and the roofing materials adapted for each.

Heinz Roofing Tile Co., 1925 West Third Avenue, Denver.
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 in. 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.

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

Structural Gypsum Corporation, Linden, N. J.
Relative Effectiveness of Various Types of Roofing Construction in Preventing Condensation of the Under Surface. Folder, 4 pp. 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.
Pyrobar Roof Construction. Booklet. 8 x 11 in. 48 pp. Illustrated. Gives valuable data on the use of tile in roof construction.
Sheetrock Pyrofill Roof Construction. Folder. 8½ x 11 in. Illustrated. Covers use of roof surfacing which is poured in place.

SEWAGE DISPOSAL

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

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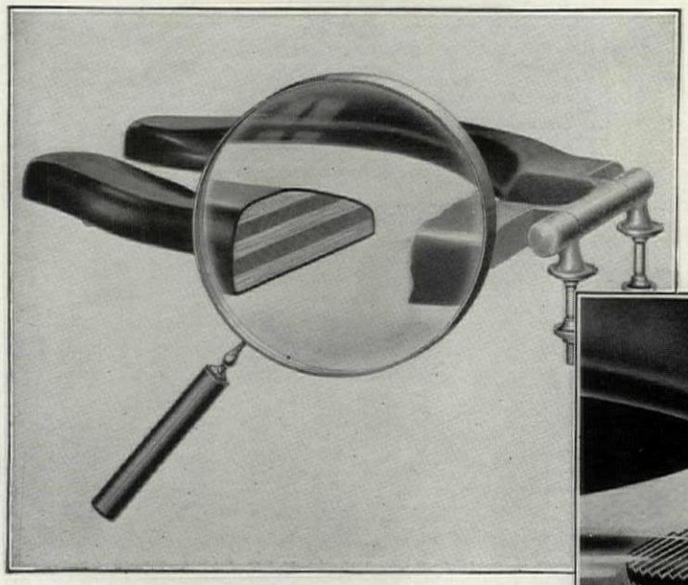

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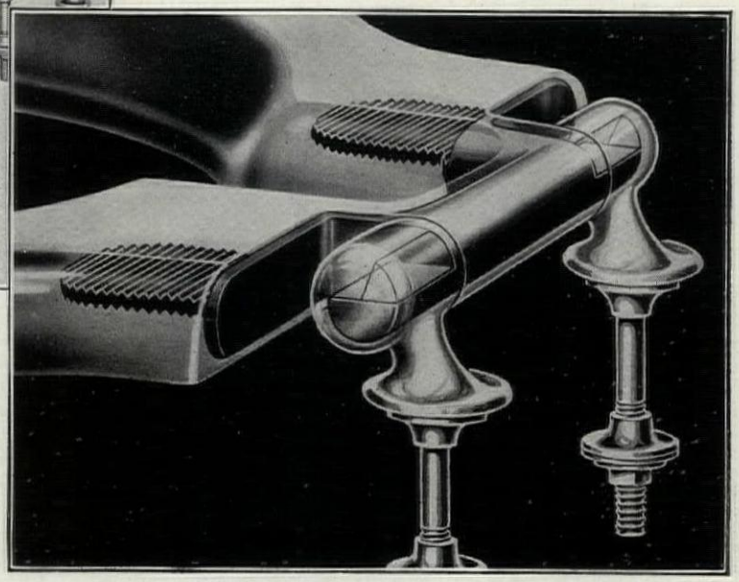

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 194*

SCREENS

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

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

Orange Screen Co., Maplewood, N. J.
Orsco Aluminum Screens. Booklet, 8 pp., 8 x 11 ins. Illustrated. Data on a valuable line of screens.
Orsco Screens and Other Products. Brochure, 20 pp., 8 x 11 ins. Illustrated. Door and window screens and other hardware.

SHADE CLOTH AND ROLLERS

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

SHELVING-STEEL

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

SKYLIGHTS

Albert Grauer & Co., 1408 Seventeenth St., Detroit, Mich.
Grauer Wire Glass Skylights. Folder, 4 pp., 8½ x 11 in. Illustrated. Data on an important line of wire glass lights.
The Effectiveness of Sidewalk Lights. Folder, 4 pp., 8½ x 11 in. Illustrated. Sidewalk or vault lights.
Let in the Light—The Light That's Free. Folder, 4 pp., 8½ x 11 in. Illustrated. Data on securing good lighting.

SOUND DEADENER

Cabot, Inc., Samuel, Boston, Mass.
Cabot's Deadening Quilt. Brochure 7½ x 10½ ins., 28 pp. Illustrated. Gives complete data regarding a well-known protection against sound.

STAIRWAYS

Woodbridge Ornamental Iron Co., 1515 Altgeld St., Chicago.
Presteel Tested for Strength—stairways, catalog, 92 pp., 8½ x 11 ins. Illustrated. Important data on stairways.

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.

Genfire Steel Company, Youngstown, Ohio.
Herringbone Metal Lath Handbook. 8½ x 11 in. 32 pp. Illustrated. Standard specifications for Cement Stucco on Herringbone.
Rigid Metal Lath and interior plastering.
Fireproofing Handbook. 8½ x 11 ins. 32 pp. Illustrated. Describes the full line of products manufactured by the Genfire Steel Company.

Ingalls Steel Products Co., Birmingham, Ala.
Construction Details. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Important data on building with steel.
Standard Specifications for Reinforced Concrete and the Ingalls Truss Floor. Brochure, 8 pp., 8½ x 11 ins. Authoritative specifications covering much construction.
Ingalls Trusses. Booklet, 12 pp., 8½ x 11 ins. Loading values and details.

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.

Steel Frame House Co., Pittsburgh.
Steel Framing for Dwellings. Booklet, 16 pp., 8½ x 11 ins. Data and details.

STONE, BUILDING

Indiana Limestone Company, Bedford, Ind.
Volume 3, Series A-3. Standard Specifications for Cut Indiana Limestone work, 8½ x 11 in. 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.
Vol. 1. Series B. Indiana Limestone Library. 6 x 9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.
Vol. 4. Series B. Booklet. New Edition. 8½ x 11 in. 64 pp. Illustrated. Indiana Limestone as used in Banks.
Volume 5. Series B. Indiana Limestone Library. Portfolio. 11⅜ x 8¾ in. 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 in., 80 pages, illustrated.
Volume 12, Series B—Distinctive Homes of Indiana Limestone. 8½ x 11 in., 48 pages, illustrated.
Old Gothic Random Ashlar. 8½ x 11 in., 16 pages, illustrated.

STORE FRONTS

Brasco Manufacturing Co., 5025-35 South Wabash Avenue, Chicago, Ill.
Catalog No. 31. Series 500. All-Copper Construction. Illustrated brochure. 20 pp. 8½ x 11 ins. Deals with store fronts of a high class.
Brasco Copper Store Front. Catalog No. 32. Series 202.
Brasco Standard Construction. Illustrated brochure. 16 pp. 8½ x 11 ins. Complete data on an important type of building.
Detail Sheets. Set of seven sheets; printed on tracing paper, showing full sized details and suggestions for store front designing, enclosed in envelope suitable for filing. Folds to 8½ x 11 ins.

STORE FRONTS—Continued

Davis Solid Architectural Bronze Sash. Set of five sheets, printed on tracing paper, giving full sized details and suggestions for designing of special bronze store front construction, enclosed in envelope suitable for filing. Folds to 2½ x 11 ins.

The Kawneer Company, Niles, Mich.
Store Front Suggestions. Booklet, 96 pp., 6 x 8½ ins. Illustrated. Shows different types of Kawneer Solid Copper Store Fronts.
Catalog K, 1927 Edition. Booklet, 32 pp., 8½ x 11 ins. Illustrated. Details of Kawneer Copper Store Fronts.
Detail Sheets for Use in Tracing. Full-sized details on sheets 17 x 22 ins.
Kawneer Construction in Solid Bronze or Copper. Booklet, 64 pp., 8½ x 11 ins. Illustrated. Complete data on the subject.

Modern Bronze Store Front Co., Chicago Heights, Ill.
Introducing Extruded Bronze Store Front Construction. Folder, 4 pp., 8½ x 11 ins. Illustrated. Contains full sized details of metal store fronts.

Zouri Drawn Metals Company, Chicago Heights, Ill.
Zouri Safety Key-Set Store Front Construction. Catalog. 8½ x 10½ in. 60 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.
International Store Front Construction. Catalog. 8½ x 10 in. 70 pp. Illustrated. Complete information with detailed sheets and installation instructions convenient for architects' files.

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 in. 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 9⅞ x 12¼ in., 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 in. 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 in. 32 pp. Illustrating many banking buildings in terra cotta with an article on its use in bank design by Alfred C. Bossom, Architect.

TILE, HOLLOW

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. 8½ x 11 in. 32 pp. Illustrated. A treatise on the subject of hollow tile wall construction.
Standard Fireproofing Bulletin 171, 8½ x 11 ins., 32 pp. Illustrated. A treatise on the subject of hollow tile as used for floors, girder, column and beam covering and similar construction.
Natco Double Shell Load Bearing Tile Bulletin, 8½ x 11 ins., 6 pp. Illustrated.
Natco Unibacker Tile Bulletin, 8½ x 11 ins. 4 pp. Illustrated.
Natco Header Backer Tile Bulletin, 8½ x 11 ins., 4 pp. Illustrated.
Natcoflor Bulletin, 8½ x 11 in. 6 pp. Illustrated.
Natco Face Tile for the Up-to-Date Farm Bulletin, 8½ x 11 ins.

TILES

Kraftile Company, 55 New Montgomery St., San Francisco. High Fired Faience Tile. Booklet. 32 pp. 8½ x 11 ins. Illustrated. Presents a fine line of tiles for different purposes.

Unites States Quarry Tile Co., Parkersburg, W. Va.
Quarry Tiles for Floors. Booklet, 119 pp., 8½ x 11 ins. Illustrated. General catalog. Details of patterns and trim for floors.
Art Portfolio of Floor Designs. 9¼ x 12¼ ins. Illustrated in colors. Patterns of quarry tiles for floors.

VALVES

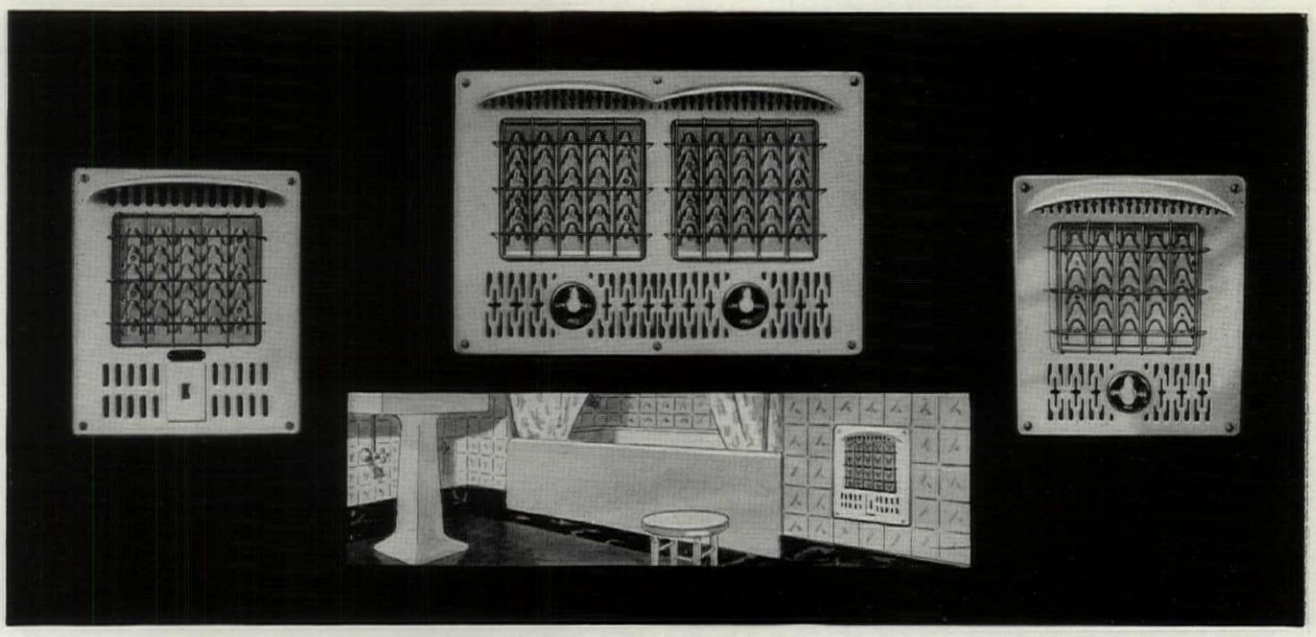
Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 51. General Catalog. Illustrated. Describes the complete line of the Crane Co.

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

Jenkins Bros., 80 White St., New York.
The Valve Behind a Good Heating System. Booklet 4½ x 7¼ in. 16 pp. Color plates. Description of Jenkins Radiator Valves for steam and hot water, and brass valves used as boiler connections.
Jenkins Valves for Plumbing Service. Booklet. 4½ x 7¼ in. 16 pp. Illustrated. Description of Jenkins Brass Globe, Angle Check and Gate Valves commonly used in home plumbing, and Iron Body Valves used for larger plumbing installations.

VENETIAN BLINDS

Burlington Venetian Blind Co., Burlington, Vt.
Venetian Blinds. Booklet, 7 in. x 10 in., 24 pages. 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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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 196*

VENTILATION

American Blower Co., Detroit, Mich.
American H. S. Fans. Brochure, 28 pp., 8½ x 11 in. 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.

Globe Ventilator Company, 205 River St., Troy, N. Y.
Globe Ventilators Catalog. 6 x 9 in. 32 pp. Illustrated profusely. Catalog gives complete data on "Globe" ventilators as to sizes, dimensions, gauges of material and table of capacities. It illustrates many different types of buildings on which "Globe" ventilators are in successful service, showing their adaptability to meet varying requirements.

Staynew Filter Corporation, Rochester, N. Y.
Protectomotor High Efficiency Industrial Air Filters. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Data on valuable detail of apparatus.

WATERPROOFING

Carey Company, The Philip, Lockland, Cincinnati, Ohio.
Waterproofing Specification Book. 8½ x 11 in. 52 pp.

Genfire Steel Company, Youngstown, Ohio.
Waterproofing Handbook. Booklet. 8½ x 11 in. 80 pp. Illustrated. Thoroughly covers subject of waterproofing concrete, wood and steel preservatives, dustproofing and hardening concrete floors, and accelerating the setting of concrete. Free distribution.

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

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

WATERPROOFING—Continued

Sonneborn Sons, Inc., L., 116 Fifth Ave., New York, N. Y.
Pamphlet. 3¾ x 8¾ in. 8 pp. Explanation of waterproofing principles. Specifications for waterproofing walls, floors, swimming pools and treatment of concrete, stucco and mortar.

Toch Brothers, 110 East 42nd St., New York City.
Specifications for Dampproofing, Waterproofing, Enameling and Technical Painting. Complete and authoritative directions for use of an important line of materials.

The Vortex Mfg. Co., 1978 West 77th St., Cleveland, Ohio.
Par-Lock Specification "Form D" for waterproofing surfaces to be finished with Portland cement or tile.
Par-Lock Specification "Forms E and G" membrane waterproofing of basements, tunnels, swimming pools, tanks to resist hydrostatic pressure.
Par-Lock Waterproofing. Specification Forms D, E, F and G. Sheets 8½ x 11 ins. Data on combinations of gun-applied asphalt and cotton or felt membrane, built up to suit requirements.
Par-Lock Method of Bonding Plaster to Structural Surfaces. Folder, 6 pp., 8½ x 11 ins. Official Bulletin of Approved Products,—Investigating Committees of Architects and Engineers.

WEATHER STRIPS

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

WINDOWS

The Kawneer Company, Niles, Mich.
Kawneer Solid Nickel Silver Windows. In casement and weight-hung types and in drop-down transom type. Portfolio, 12 pp., 9 x 11½ ins. Illustrated, and with demonstrator.

David Lupton's Sons Company, Philadelphia, Pa.
Lupton Pivoted Sash, Catalog 12-A. Booklet, 48 pp. 8½ x 11 in. Illustrates and describes windows suitable for manufacturing buildings.

WINDOWS, CASEMENT

Crittall Casement Window Co., 10951 Hearn Ave., Detroit, Mich.
Catalog No. 22. 9 x 12 in. 76 pp. Illustrated. Photographs of actual work accompanied by scale details for casements and composite steel windows for banks, office buildings, hospitals and residences.

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Not merely an automatic telephone, but a perfect system of interior communication designed and built to the finest engineering standards and of the same type of equipment that has been adopted for public exchange service the world over.

S P E E D

WHEN time is important—when a few seconds delay may turn profit into loss, safety into danger—then the value of Strowger P-A-X is emphasized. But its greatest use is its everyday service, saving a total of hours of valuable time and expense. With the speed of light the Strowger P-A-X responds to the turn of the dial; it knows no delay—is not hampered by heavy traffic, nor excited in emergencies. This most modern system of automatic interior telephony has won world supremacy by its unfailing speed even under trying conditions; it serves as the liaison unit in countless branches of industry—yours included. Details of its application to your own business will be gladly supplied—without obligation—by Strowger engineers.

STROWGER AUTOMATIC
Communication, Control and Signalling Systems

Strowger Automatic Equipment includes Public Automatic Telephone Systems . . . . P-A-X (Private Automatic Exchange) . . . . Watchman Supervisory Systems . . . . Tele-Chec Systems (for Theaters) . . . . Industrial Fire Alarm Systems . . . Supervisory Control Equipment for Industrial and Commercial Devices, and Railway Signalling and Communication Systems.

Engineered, Designed and Manufactured by

Automatic Electric Inc.

Factory and General Offices: 1005 West Van Buren St., Chicago, U. S. A.

Sales and Service Offices in the Following Cities:

Atlanta, Ga.
Los Angeles, Calif.
Dallas, Tex.
Detroit, Mich.
Cleveland, Ohio
New York, N. Y.
Philadelphia, Pa.
St. Paul, Minn.
Pittsburgh, Pa.
Boston, Mass.
St. Louis. Mo.
Seattle, Wash.

Export Distributors:
For Australasia—Automatic Telephones, Ltd.
Elsewhere—Automatic Electric Company, Ltd.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 198*

WINDOWS, CASEMENT—Continued

Genfire Steel Company, Youngstown, Ohio.

Architectural Details, Casement Windows and Doors. 8½ x 11 ins. 28 pp. A. I. A. File No. 16E. Specifications and construction details.

Hope & Sons, Henry, 103 Park Ave., New York, N. Y.

Catalog. 12¼ x 18½ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

The Kawneer Company, Niles, Mich.

Kawneer Solid Nickel Silver Windows. In casement and weight-hung types and in drop-down transom type. Portfolio, 12 pp., 9 x 11½ ins. Illustrated, and with demonstrator.

David Lupton's Sons Company, Philadelphia, Pa.

Lupton Casement of CopperSteel. Catalog C-217. Booklet, 20 pp., 8½ x 11 in. Illustrated brochure on casements, particularly for residences.

Lupton Heavy Casements. Detail Sheet No. 101, 4 pp., 8½ x 11 ins. Details and specifications only.

Richards-Wilcox Mfg. Co., Aurora, Ill.

Casement Window Hardware. Booklet. 24 pp. 8½ x 11 in. Illustrated. Shows typical installations, detail drawings, construction details, blue-prints if desired. Describes AIR-way Multifold Window Hardware.

Architectural Details. Booklet, 8½ x 11 in. 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.

Truscon Steel Co., Youngstown, Ohio.

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

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

WINDOW SHADES AND ROLLERS

Columbia Mills, Inc., 225 Fifth Avenue, New York.

Window Shade Data Book. Folder, 28 pp., 8½ x 11 ins. Illustrated.

WINDOWS, STEEL AND BRONZE

Genfire Steel Company, Youngstown, Ohio.

Architectural Details, Steel Pivoted, Commercial and Architectural Projected Windows. 8½ x 11 ins. 24 pp. A. I. A. File No. 16E. Specification and construction details.

David Lupton's Sons Company, Philadelphia, Pa.

A Rain-shed and Ventilator of Glass and Steel. Pamphlet, 4 pp. 8½ x 11 in. Deals with Pond Continuous Sash, Sawtooth Roofs, etc.

WINDOWS, STEEL AND BRONZE—Continued

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

Truscon Steel Co., Youngstown, Ohio.

Drafting Room Standards. Book, 8½ x 11 in., 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 in., containing illustrations of buildings using this type of window. Designs and drawings of mechanical details.

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

WOOD—See also Millwork

American Walnut Mfrs. Association, 618 So. Michigan Blvd., Chicago, Ill.

American Walnut. Booklet. 7 x 9 in. 45 pp. Illustrated. A very useful and interesting little book on the use of Walnut in Fine Furniture with illustrations of pieces by the most notable furniture makers from the time of the Renaissance down to the present.

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

Curtis Companies Service Bureau, Clinton, Iowa.

Better Built Homes. Vols. XV-XVIII, incl. Booklet. 9 x 12 in. 40 pp. Illustrated. Designs for houses of five to eight rooms, respectively, in several authentic types, by Trowbridge & Ackerman, architects, for the Curtis Companies.

National Lumber Mfrs. Assn., Washington.

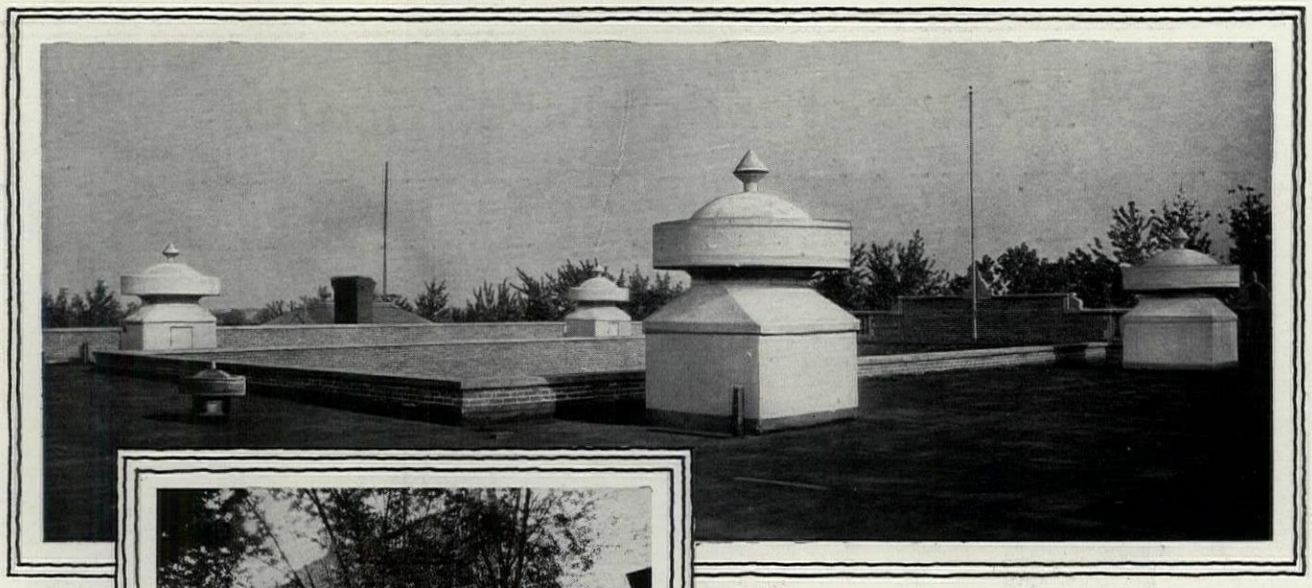
Airplane Hangar Construction. Booklet, 24 pp., 8½ x 11 ins. Use of lumber for hangars.

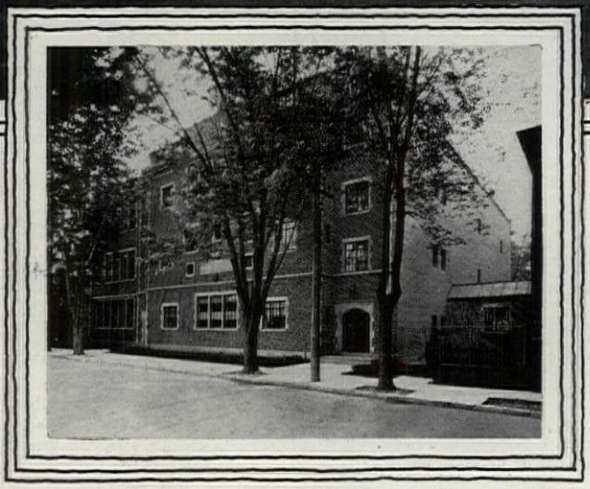
West Coast Lumber Trade Extension Bureau, Seattle, Wash.

"Durable Douglas Fir; America's Permanent Lumber Supply." Booklet, 32 pp., 7 x 11 ins. Illustrated. Complete data on this valuable wood.

"Douglas Fir Wall Hanger." Metal-bound hanger, 31 x 32 ins. An attractive advertisement for Douglas fir.

"Where to Use Douglas Fir in Your Farm." Brochure, 32 pp., 6 x 9 ins. Data on use of this wood for farm buildings.





GENERAL AND ROOF VIEWS OF EUCLID SCHOOL
Schenectady, N. Y.
R. L. Bowen, Architect

PURE AIR FOR SCHOOLS

Hundreds of "*Globe*" installations in schools in all parts of the United States are rendering excellent ventilating service. Many architects, gratified to find that schools can be properly ventilated so inexpensively, have accepted "*Globes*" as standard school ventilation.

GLOBE VENTILATOR CO.

Dept. F Troy, N. Y.

If They Illuminated Plants As They Once Had To Heat Them

Below — The way the Modine Unit Heater circulates heated air down and keeps it there.

Course of heated air circulation with cast iron radiation or pipe coils.

The New Way of Heat That Modine Introduced

How ridiculous the picture looks—all the light at the roof—working area a twilight zone. But, notice the heating coils. The heat waves are roof-ward bound.

It is just as unreasonable to waste your light at the roof as it is to waste heat with old-fashioned equipment. For the Modine Unit Heater directs heat almost as effectively as light is directed. It suspends from the steam line. Delivers heat down to working level. Produces a new degree of comfort—warm floors, uniform temperature.

If you're installing a new heating system, or supplementing your old one, get complete facts about the Modine Unit Heater.

Modine Unit Heater No. 701—weighs only 125 lbs., and has the heating capacity of nearly 2 tons of cast iron radiation.

MODINE MANUFACTURING COMPANY
(Heating Division)
1718 Racine St. Racine, Wisconsin
Branch Offices in all large cities—London Office:
S. G. Leach & Co., Ltd., 26-30 Artillery Lane

Modine
Unit HEATER

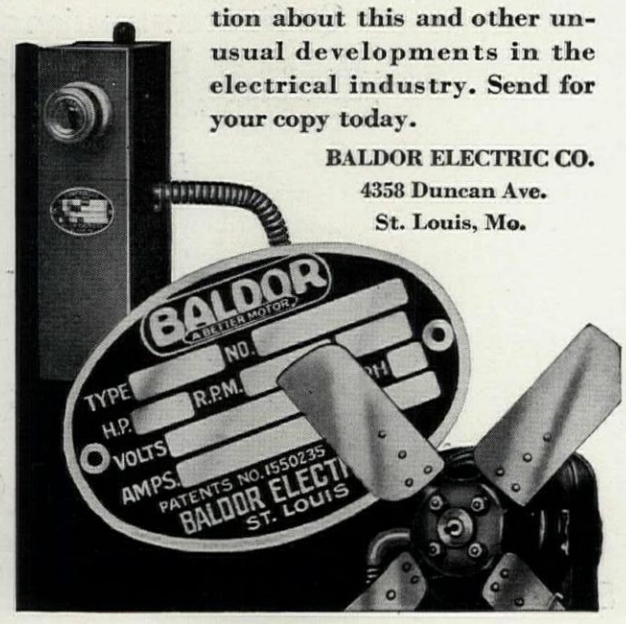
A MODINE Product

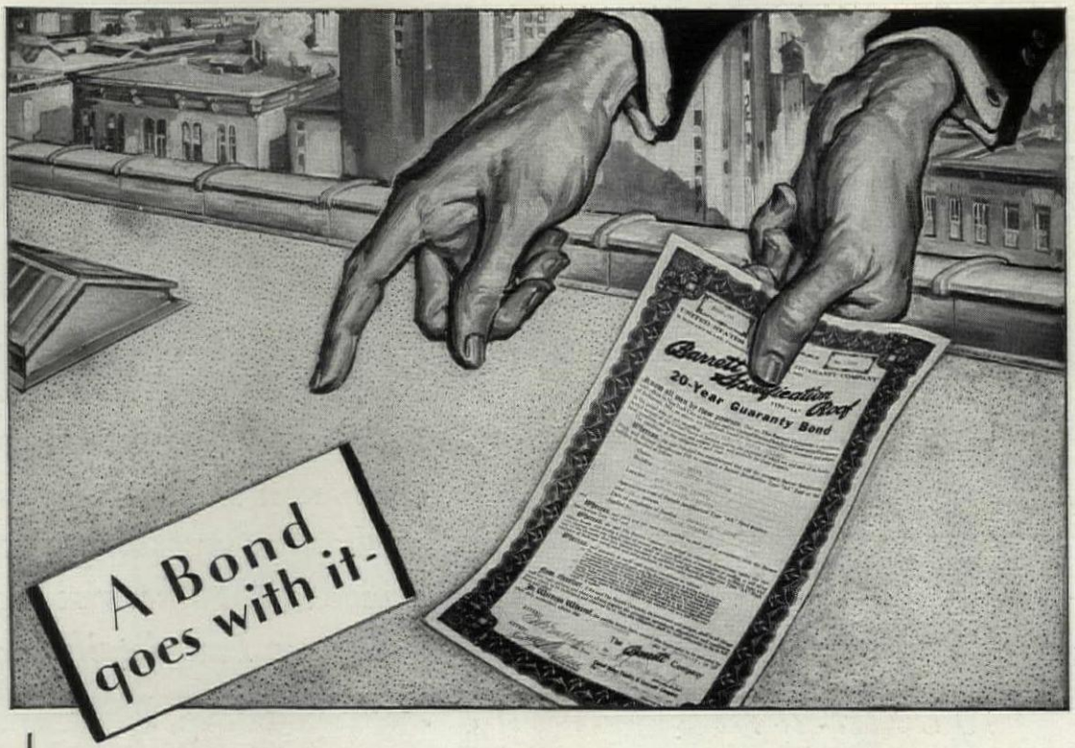
FOR STEAM-VAPOR, VACUUM, HOT WATER HEATING SYSTEMS

CONTROLLED
Ventilation or Radiation

A turn of a switch will give ½, ¾ or full speed when a fan or blower is equipped with a Baldor Type C Condenser Motor and Controller. Send for complete details. Bulletin No. 11 contains complete information about this and other unusual developments in the electrical industry. Send for your copy today.

BALDOR ELECTRIC CO.
4358 Duncan Ave.
St. Louis, Mo.





NO ROOF TROUBLES

FOR THE OWNER OF *THIS* BUILDING

WHAT'S the best thing that can be said of a roof—once it's laid? Just this—it's a roof you can forget.

A roof that never raises a rumpus about repairs and maintenance—a roof so trouble-free that you never have to give it a second thought. And this, of course, is exactly what your client gets in a Barrett Specification Roof.

When a Barrett Specification Roof is completed the building owner receives a Surety Bond, guaranteeing him against repair or maintenance expense for the next 20 years.*

Twenty years—that's leaping ahead to 1948, the middle of the century. How can any roof, no matter how finely constructed, last so long?

That question has already been answered. You've read the series of advertisements which appeared in this magazine during the past year. These advertisements showed a number of well-known American landmarks—business buildings that have survived from the 70's, 80's and 90's—roofed with Barrett Pitch and Felt!

And here's a significant fact. These old Barrett Roofs, without repairs, stood weather-tight not merely 20 years but 30, 40 and even 50 years. (Is it thinkable that the Surety Company which bonds Barrett Specification Roofs for 20 years would shoulder this responsibility if it were not for such records?)

Interested in that kind of roof? Then write us for full information.

*The Barrett Company also offers a Specification Type "A" Roof which is bonded for 10 years. This type of roof is adaptable to a certain class of buildings. The same high-grade materials are used, the only difference being in the quantities.

Depend on the Barrett Approved Roofer

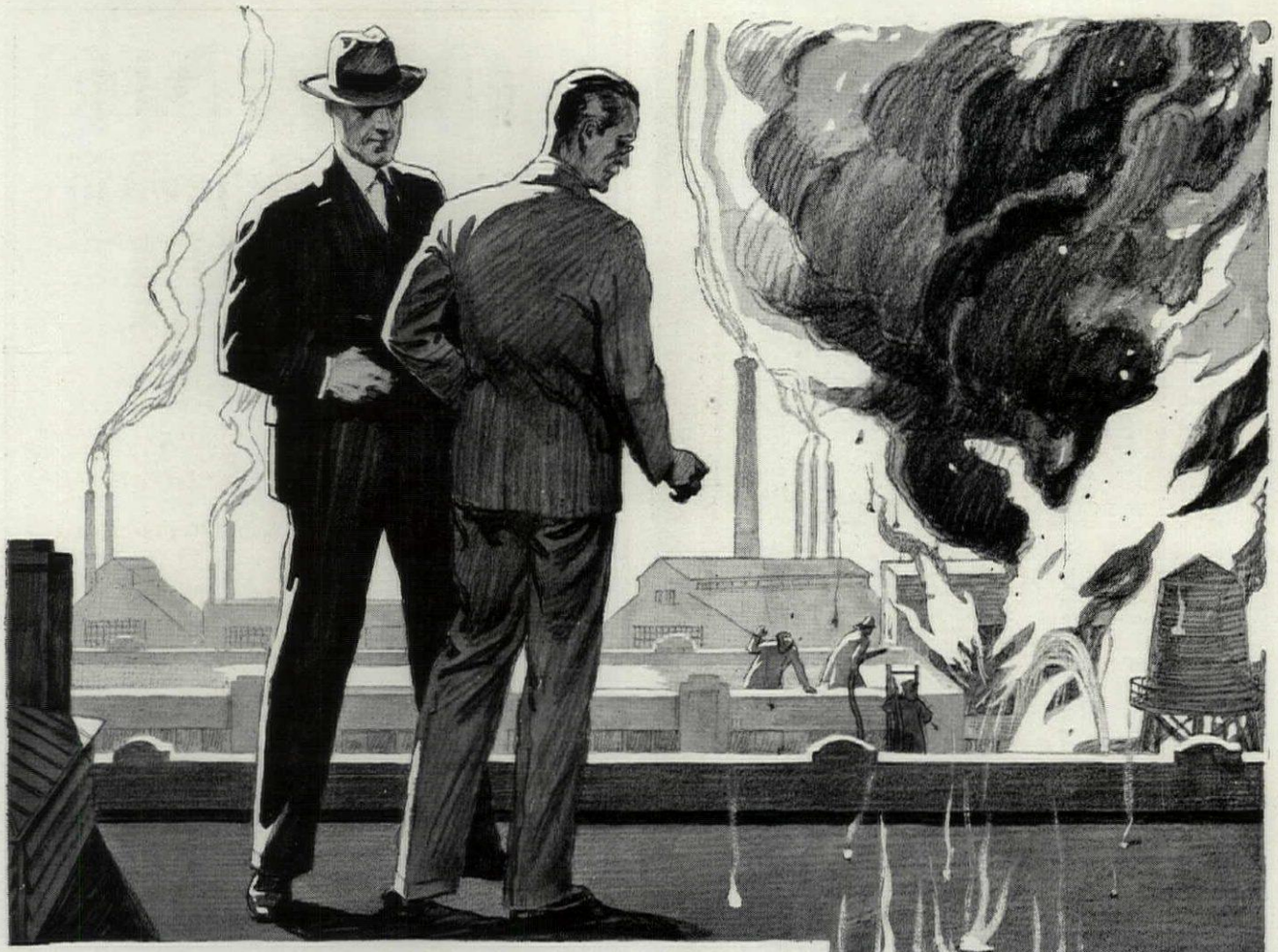
Throughout the United States and Canada a limited number of roofing contractors have been approved by Barrett to lay the Barrett Specification Bonded Roof. These men have earned a reputation for doing efficient work—a name for absolute dependability.

Good workmanship is a big part of any good roof. Good workmanship is a *certainty* when you provide for a Barrett Specification Roof.

THE BARRETT COMPANY
40 Rector Street, New York City

IN CANADA:
The Barrett Company, Limited
5551 St. Hubert Street, Montreal, Quebec

Barrett Specification Roofs



Flying Brands *will not* Ignite a J-M Built-up Asbestos Roof

The unburnable nature of asbestos makes Johns-Manville Felt particularly valuable for roofing industrial plants, office buildings, or any large structures.

Roofing felt is the term applied to the water-proof web which forms the basis of all built-up roofs.

Johns-Manville Built-up Asbestos Roofs are built up with layer upon layer of ASBESTOS Felt. Over this is laid a covering of smooth roofing asphalt.

"Roofing Sandwich" Fire Test proves difference

To show graphically the difference between Johns-Manville Asbestos Felt and rag felt we have prepared the "Roofing Sandwich." A piece of Johns-Manville Asbestos Roofing Felt and one of rag felt are clipped between a card and a sheet of celluloid. A flame is applied. The celluloid flares up in blazing heat. The rag felt is reduced to ash. But the Johns-Manville Asbestos Felt is strong and substantial after the terrific heat of the burning celluloid. Asbestos will not burn.

Let us send you the "Roofing Sandwich." Make this test for yourself. Or ask one of our salesmen to show you the merits of Asbestos Felt.

Will not flow on Slopes

Johns-Manville Built-up Asbestos Roofs are equally effective on sloping or flat roofs. This material will not flow when heated by sunlight. The surface is clean, smooth and free from gravel or slag. There is nothing to slide into drains or clog downspouts. Many of America's most famous industrial plants have roofed every building constructed for years with Johns-Manville Built-up Asbestos Roofs.

Let the "Roofing Sandwich" Fire Test Show You the Facts

We shall be glad to tell you in person or by letter more about our roofs—who uses them and why. Address: Built-up Roofing Department, Johns-Manville Corporation, New York, Chicago, Cleveland, or San Francisco.

JOHNS-MANVILLE CORPORATION
New York Chicago Cleveland San Francisco
Branches in all large cities
Canadian Johns-Manville Co., Ltd., Toronto

Please send me free of cost the "Roofing Sandwich."

Name.....

Company.....

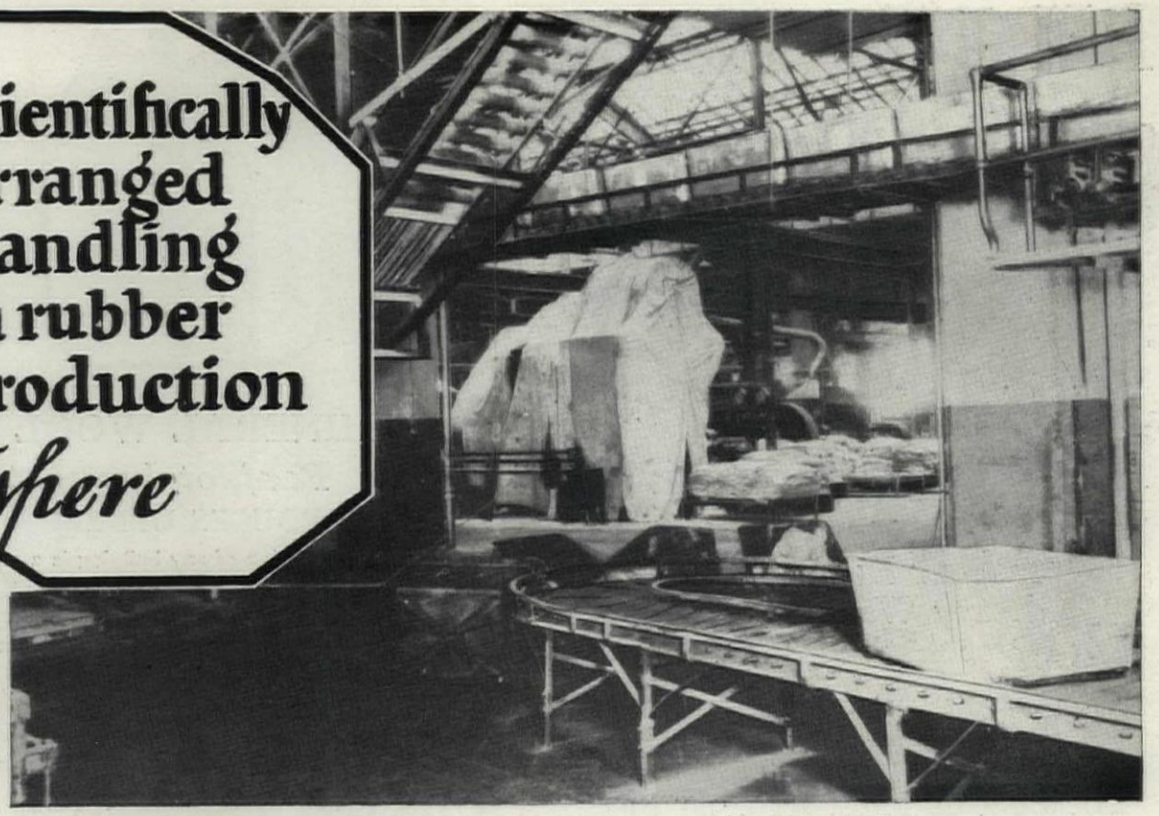
Address.....

R-88-9

.....

MASTER *of* ASBESTOS
Johns-Manville
BUILT-UP ASBESTOS ROOFING

Scientifically arranged handling in rubber production *Where*



Invested Capital in the American Industry has reached approximately $1,000,000,000

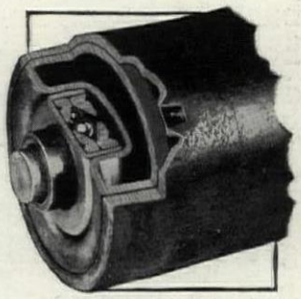
The tremendous growth of the rubber industry, where, in about a half century the annual consumption of crude rubber in the United States has advanced from 10,000 to 400,000 tons in 1926, has meant most modern production facilities such as in handling.

In 1925 the rubber industry employed more than 35,000 workers. By utilizing Standard Conveyor Systems scientifically the rubber industry made a large percentage of these workers of much greater productive value.

Architectural Engineers who have studied the progress of such large industries and their methods of operation have been able to offer a most valuable service to manufacturers planning new factories. Architectural Engineers have specified Standard Conveyor Systems and thereby aided the various manufacturers in production growth, employee value, production speed and economy.

The same Standard Conveyor Engineers who have cooperated with Architectural Engineers in many instances will be glad to confer with you.

Our rubber booklet citing valuable facts and figures and giving informative data will be mailed to you upon request.



The Three-Point Bearing For Heavy Use

The Roller—2⅞ in. dia. heavy gage Steel. ⅜ in. Steel Balls, 13/16 in. Cold Rolled Shaft. Locked in a frame the size of which is determined by the load to be carried. Called a three-point bearing because the balls are in contact with the ball race at three points thereby distributing weight and wear evenly and lengthening the life of the Conveyor.

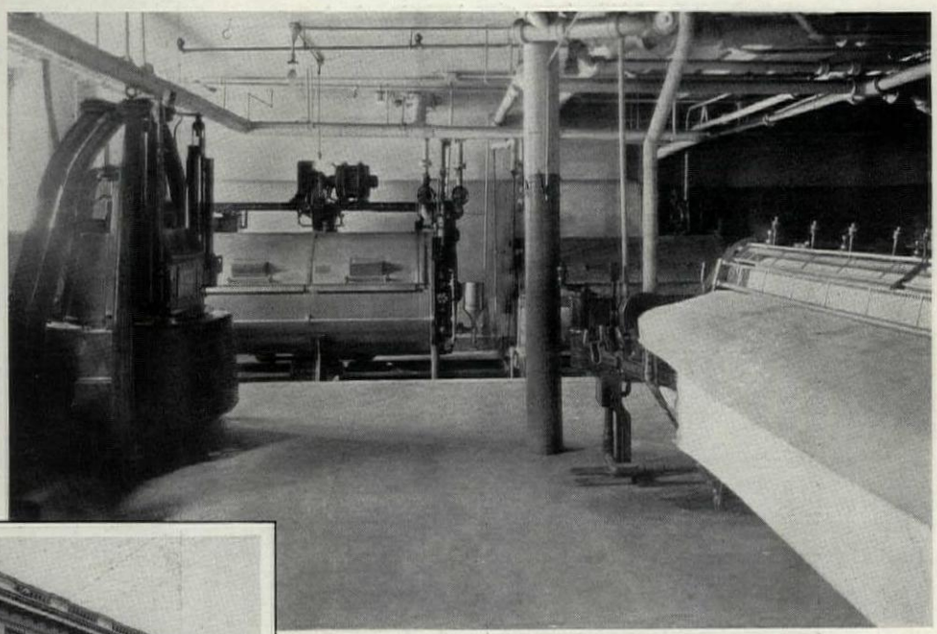
STANDARD
CONVEYOR COMPANY

NORTH ST. PAUL, MINNESOTA

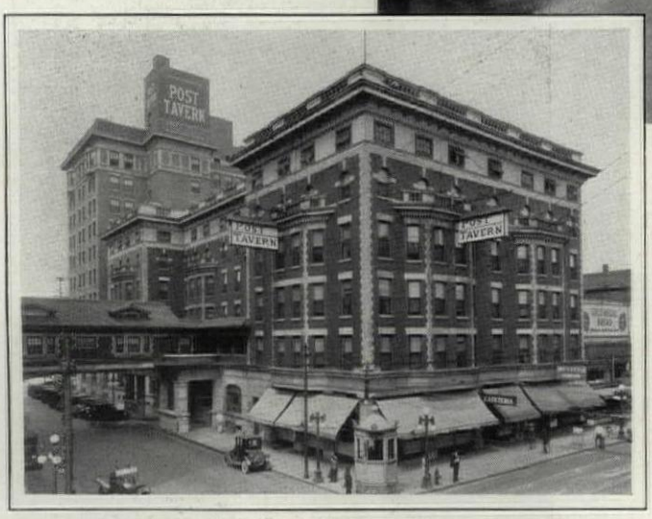
New York Office, 420 Lexington Avenue
Chicago Office, 549 West Washington Street
Philadelphia Office, 3110 Market Street
Cleveland Office, 1108 Hippodrome Building
Buffalo Office, 908 Ellicott Square
Kansas City Office, 419 Manufacturers' Ex. Bldg.
Milwaukee Office, 209 Wisconsin Avenue
Los Angeles Office, 335 So. San Pedro St.
Seattle Office, 321 Lumber Exchange
Charlotte Office, 301 Builders Bldg.

No. 48 of a series of advertisements featuring prominent laundry installations

We helped to plan the laundries *in dozens of modern hotels* like this—



The dependable, time-and-money-saving laundry department at Post Tavern was planned by the engineers of The American Laundry Machinery Company, in collaboration with the architects, and is completely "American" equipped.



Post Tavern, Battle Creek, Mich., has its own "American" laundry, operated under the direct supervision of its own officials.

Architects,
Jos. C. Llewellyn Co., Chicago, Ill.

AND that's not all . . . we have also helped to plan the laundries for hospitals, clubs, factories, schools—in fact, every type of modern institution. For architects, who usually incorporate this indispensable department in the original building plans, are glad to avail themselves of the cooperation of our engineers.

Surely you will be interested in the complete story of some of these laundry installations, and we would welcome the chance to talk to you about floor space dimensions, piping, power requirements, specifications on specialized "American" machines. Or, if you prefer, we can send you this data in compact form, ready for quick reference.

THE AMERICAN LAUNDRY MACHINERY CO.
***Norwood Station*, Cincinnati, Ohio**

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

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

45 FLOORS OF MEYER STEELFORMS

MEDINAH ATHLETIC CLUB BUILDING, CHICAGO

CHICAGO boasts of another unusual skyscraper—the beautiful new Medinah Athletic Club Building.

Meyer Steelforms, of course, were employed for the floor construction—366,190 square feet of Steelforms in all used on this one job.

Walter C. Alschlager designed this magnificent structure. Paschen Bros., General Contractors; Frank A. Randall, Engineer.

Throughout the nation you will find Meyer Steelforms saving time, labor and money on building projects of every size. Whenever you face a difficult reinforced concrete job—one demanding speed, economy and durability of construction, Ceco Super-Service and Ceco and Meyer Products are ready and dependable aids. Call our nearest office or write 901 North 11th Street, Omaha, Nebr.

CONCRETE ENGINEERING CO.

General Offices: Omaha, Nebraska

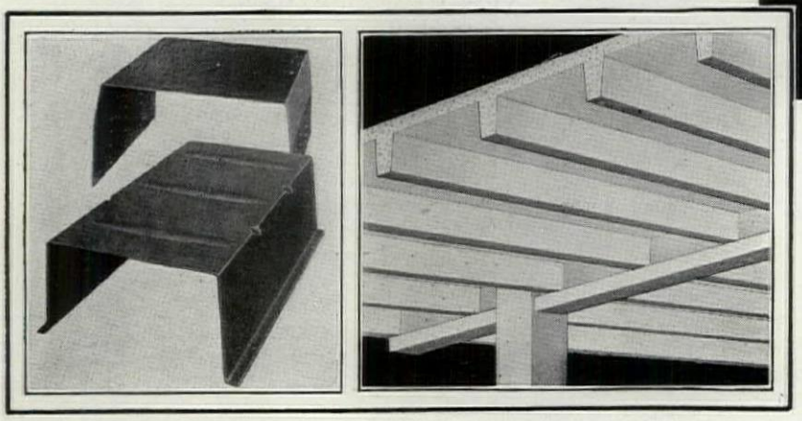
Sales Offices and Warehouses:

Chicago, Detroit, Milwaukee, Minneapolis, Des Moines, Kansas City, St. Louis, Dallas, Houston, San Antonio, Oklahoma City, Los Angeles, San Francisco, Pittsburg

Affiliated Companies:

Ceco Steel and Wire Company, Peoria, Ill.
Ceco Weatherstrip and Screen Company, Chicago

(2815)



Other Ceco Products

Meyer Adjustable Shores
Meyer Adjustable Column Clamps

Ceco Reinforcing Bars and Bar Chairs
Ceco Welded and Triangle Fabric
Ceco Column Spirals

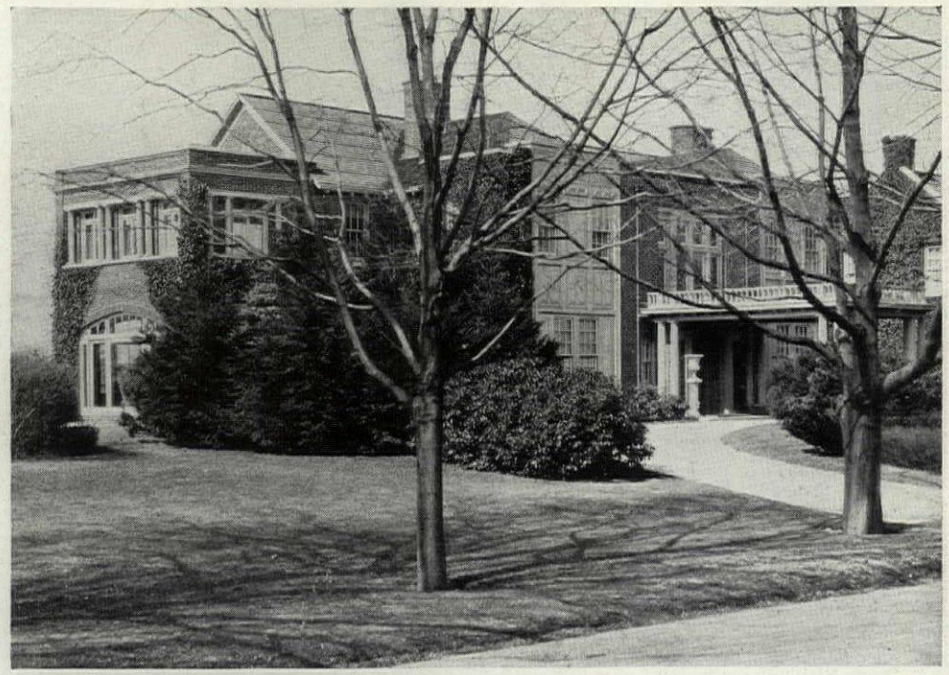
Ceco Metal Weather Strips and Screens

Ceco Metal Lath and Hook Hangers

Ceco Hot and Cold Rolled Channels
Ceco Corner, Base Bead and Moulding

Ceco Steel Roofing and Siding
Ceco Steel Fence, Gates and Posts

Engineering Service



KNOW ELECTROL BY THE HOMES IT HEATS

Two views of the residence of Mr. P. K. Hudson at Great Neck. Heated by Electrol.

Upper view—Front Elevation.
Lower view—Rear Elevation.

Correct Installation is Part of the Purchase

When you specify Electrol automatic oil heat you know that the oil burner will be correctly installed. The men who do the work have been trained at the factory. They have a thorough knowledge of the correct methods of fitting Electrol to each type of heating plant. This is one of the important features of the complete automatic oil heating service which is available wherever Electrol is sold.

Efficient Operation Assured

Electrol dealers first make an intelligent and conscientious survey of the heating requirements, and advise candidly regarding the possibilities with Electrol. Electrol will not be installed unless it will operate at full efficiency under the existing conditions.

Following rigid operating tests at the factory, the burners are received by Electrol dealers completely assembled, just as they were when tested. There is no reassembling at the time of installation The work is simplified and there is double assurance of dependable operation right from the start.

Electrol is being specified by architects throughout the country because of its quiet and economical operation... All-Electric... Entirely Automatic... and with every phase of its dependable operation regulated by *The Master Control* which stands watch, day and night, like a living sentinel always at the furnace door.

Oil heating has been developed by Electrol engineers to a point you may not have realized. This finer burner requires practically no attention whatever. It can be depended upon to keep right on through one heating season after another, producing a surprising volume of heat without waste of fuel and without attention.

Electrol is made in models for buildings of all types and sizes. Purchase of the burner can be financed along with the financing of the new building.

Send for A. I. A. Folder

Your request will bring complete details and the Electrol Regulation A. I. A. Folder containing the kind of information you want for your files. Or, it you prefer, consult the Electrol Sales and Service Representative in your city. Electrol, Inc. of Missouri, 179 Dorcas St., St. Louis, U. S. A.

ELECTROL

The OIL BURNER with *The Master Control*

Listed as Standard by the Underwriters' Laboratories, and bears their label.

Member of the Oil Heating Institute.

Electrol Inc. *of* Missouri,
179 Dorcas St., St. Louis, U. S. A.

Gentlemen: Please send the Electrol Regulation A. I. A. Folder.

Name.....

Address.....

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

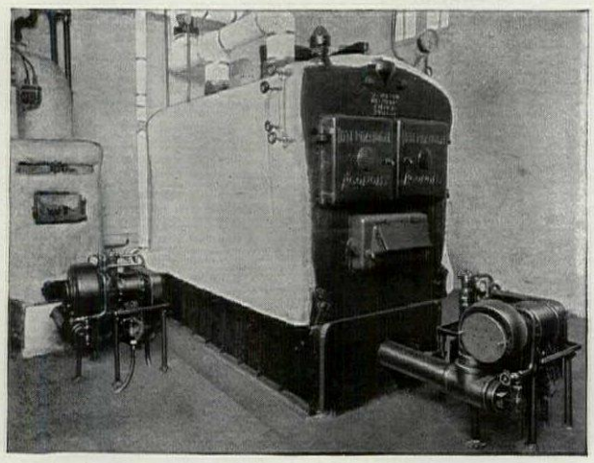
BENJAMIN FRANK, *Architect*

To insure the comfort and convenience of his client

THAT'S why Architect Benjamin Frank specified the Quiet May for the residence of Messrs. Philip and Sigmund Katz of Baltimore, Md.

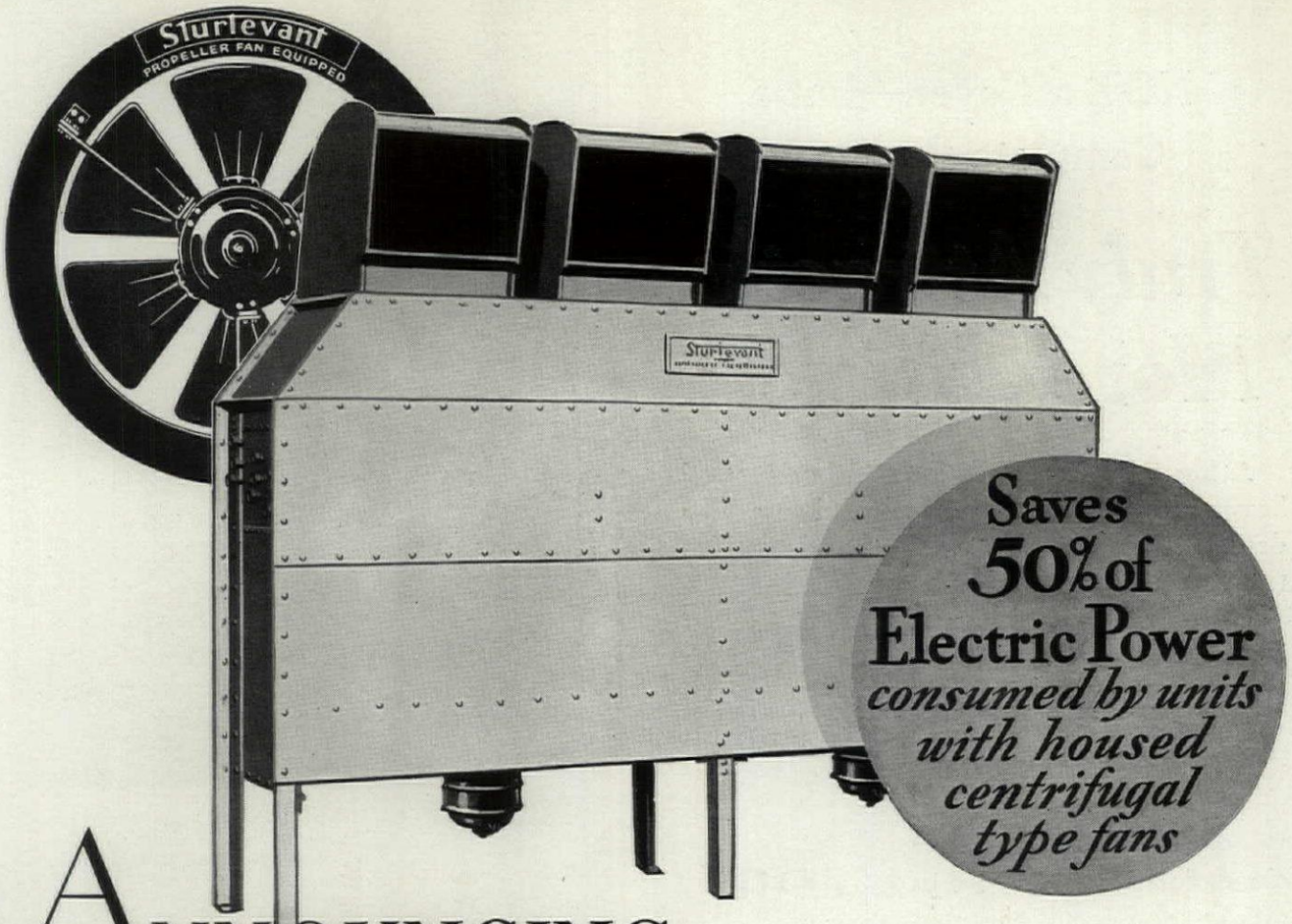
The one Quiet May Automatic Oil Burner fuels the equipment that heats this three-story home in which are nine bedrooms and four baths. Another Quiet May takes care of the hot-water equipment for the same house.

Recommended by simplicity of construction, quietness, economy and mechanical merit, the Quiet May is becoming more and more the choice of the architect who seeks to protect his own professional reputation as well as serving the best interests of his client.



QUIET MAY
AUTOMATIC OIL BURNER

MAY OIL BURNER CORPORATION
BALTIMORE, MARYLAND



Saves 50% of Electric Power *consumed by units with housed centrifugal type fans*

ANNOUNCING . . . .

. . . *a new floor type heater with propeller type fans!*

A worth while saving in electric power—a worth while saving in motor size and cost! Both are effected by this new development in industrial unit heating!

Propeller fans—designed and built by Sturtevant—are used in the "Tempervane" Heater. First—they're highly efficient. Second—they're *exactly* suited in performance for the low resistance offered by the Aerofin heating element. Result:—motors only half the horse-power of those used on housed centrifugal type units are required—current consumption cut 50%!

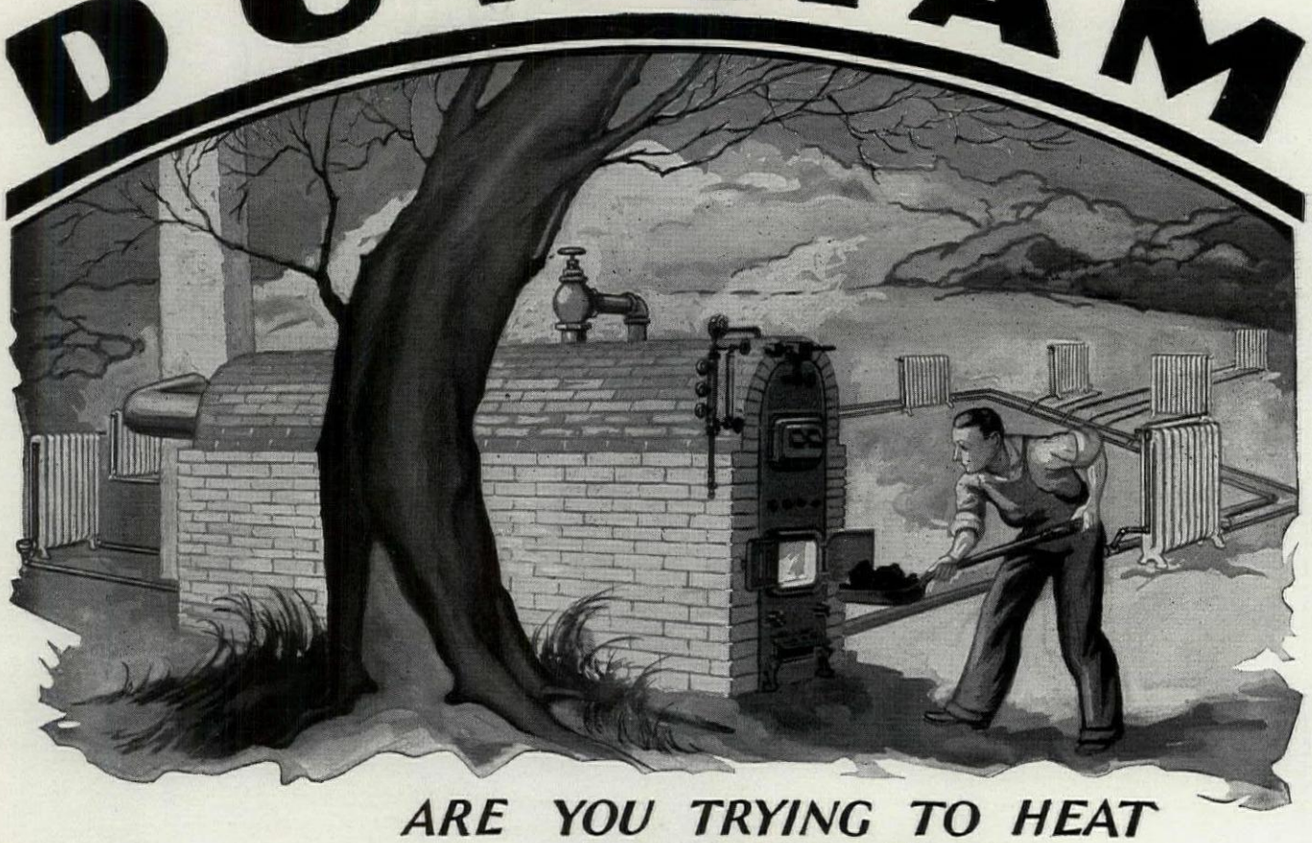
Developed in the Sturtevant Research Laboratory—the largest and most completely equipped air engineering laboratory in the world—Tempervane Heaters in design and performance meet the highest standards ever established for heating equipment, those set up by the heating and ventilating committees and societies. They have been subjected to undoubtedly the most accurate and exacting unit heater tests ever conducted. Built in both floor and overhead types, they are furnished for steam pressures up to 350 pounds per square inch.

We would welcome your request for the indisputable evidence of "Tempervane" economy—performance curves, test photographs, installations now in service. Just write our main office below.

B. F. STURTEVANT COMPANY
Hyde Park, Boston, Mass.
Branch Offices in Principal Cities

Sturtevant (REG. U. S. PAT. OFF.) *Tempervane* **Heater**

DUNHAM



ARE YOU TRYING TO HEAT ALL OUTDOORS?

Look for the Name
DUNHAM
This nameplate identifies a genuine DUNHAM Radiator Trap

U. S. Patent No. 1644114. Additional patents in the United States, Canada and Foreign Countries now pending.

Over eighty branch and local sales offices in the United States and Canada and the United Kingdom bring Dunham Heating Service as close to you as your telephone. Consult your telephone directory for the address of our office in your city. An engineer will counsel with you an any project.

THIS illustration may seem absurd but it represents very closely the average heating system waste. Any heating system not equipped to control heat generation and distribution supplies excess heat to the space heated, thereby overheating the building.

This excess heat is transmitted through the building structure and is also lost through windows when opened to reduce room temperature. This is a direct waste which could just as easily be saved as it is now wasted.

Occupants of buildings do not realize the tremendous amount of money wasted through widely opened windows, to get rid of this excess heat while hot radiators are busy releasing more heat into the rooms. The engineer or fireman, although he realizes the waste occurs, has little or no control over it in an ordinary type of vacuum return line heating system.

The Dunham Differential Vacuum Heating System overcomes this evil of wasted heat. In this system steam temperatures within the radiators and piping are varied and are controlled in conformity to outdoor weather. The building is heated on Sub-Atmospheric Steam which is LOW Temperature Steam produced and circulated at pressures lower than atmosphere, and, at temperatures ranging from 133 degrees up to 212 degrees. Even higher temperatures may be used.

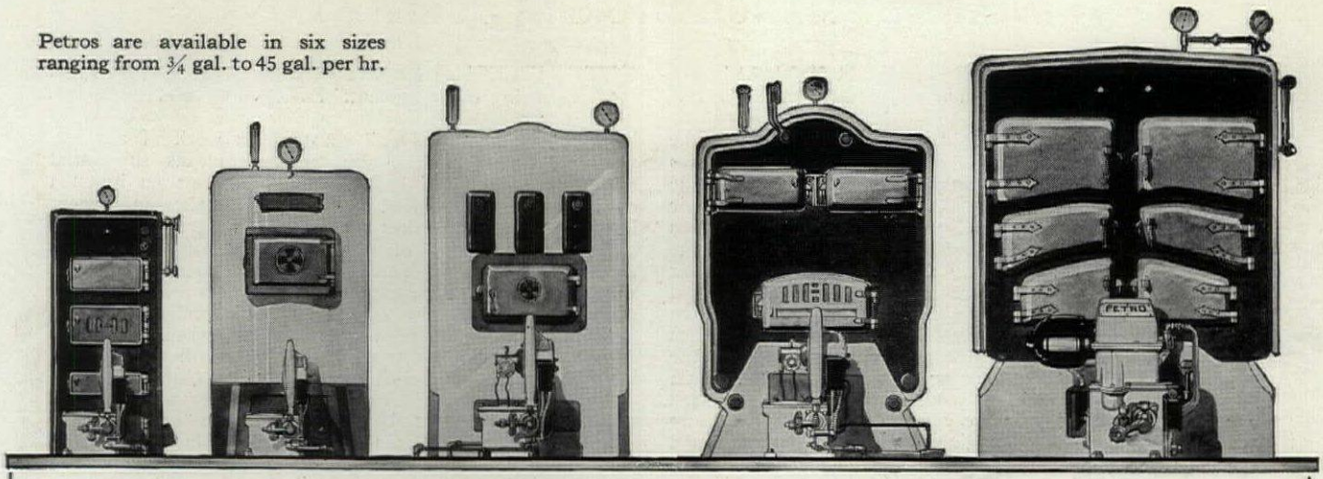
Statistics and records of full season's fuel economy, which are attention-compelling, will gladly be furnished upon request.

C. A. DUNHAM CO.

DUNHAM BUILDING
450 East Ohio Street, Chicago

HEATING

Petros are available in six sizes ranging from ¾ gal. to 45 gal. per hr.



A Petro—*for every type home*

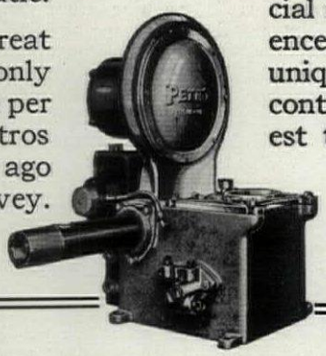
New record set for dependability

Based on 25 years' success in industrial oil heating, Petro now offers a complete line of six domestic oil burners. All are listed as standard by the Underwriters' Laboratories to burn oil as low as 24 gravity. All six are fully automatic.

A recent survey made by a great state university shows that only 1.91 service calls were made per Petro per year. Many Petros installed four and five years ago were included in this survey. This record-breaking small number of service calls indicates the extreme dependability of Petro.

By putting air to work, Petro engineers have simplified oil heating. Made it more quiet, more economical, more dependable. In fact, it is so dependable that each Petro installation is absolutely guaranteed.

Your local distributor or dealer has been selected with the greatest care. His financial resources, organization and experience, backed by the integrity of Petro's unique board of directors assure you continued oil heating service of the highest type. Petro is an oil burner you may recommend or specify for use in any type of home from the very smallest to the greatest estate.



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Our engineering department will gladly cooperate with you in solving any difficult oil heating problem. Write today for any technical data desired.

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Domestic and Industrial Oil Burners

Petroleum Heat & Power Company, Stamford, Conn.

Makers of oil burners since 1903

FESS SYSTEM CO. (subsidiary) 220 Natoma St., San Francisco, Calif.

REVIEWS OF MANUFACTURERS' PUBLICATIONS

STAYNEW FILTER CORPORATION, 101 N. Water Street, Rochester, N. Y. "High Efficiency Industrial Air Filters."

Research has brought to light some amazing facts. The very air we breathe contains more than 100,000 particles of dust per cubic inch, according to the estimate of the U. S. Weather Bureau. The dust and grit with which air is saturated, as well as the oil, water, rust and scale which are collected by air as it passes through pipe lines on its way to compressed air tools, paint sprays, compressed air equipment used in agitating liquids, ice-making, chemical processes, etc., are damaging elements which should be eliminated, for they cause clogged air passages, worn parts and carbon, and thus lower the operating efficiency of the apparatus, cause costly repairs, shut-downs and delays. These difficulties can be largely overcome by delivering clean dry air to air-using machinery and tools. This brochure gives complete data regarding the Protectomotor, and upon four pages there are listed buildings in which the Protectomotor is in use. A test made at the University of California using a dust, 98.6 per cent of which will pass through a 200-mesh screen, gives the Protectometor filter a very practical working filteration efficiency of 99.9 per cent.

BERGER MANUFACTURING COMPANY, Canton, O. "Berloy Concrete Form Construction Handbook."

The flexibility of the modern type of steel construction, which is probably one of the chief reasons for its popularity, has been brought about by many changes which from time to time have been made in building methods. Many changes have been made in the construction of floors, for example, and particularly where use has been made of concrete. This brochure deals with quite a number of the products of the Berger Manufacturing Company, but dwells especially upon the use of "Berloy Permanent Floor Cores" and "Berloy Removable Metal Forms." Permanent metal forms which are designated as "floor cores" are used in place where the lath ceilings are laid first and where it is not necessary to remove the cores. Removable forms are of the same general design as permanent cores, but they are made very much heavier so that they can be removed and used again. Removable forms can be used where the ceilings are not attached directly to the concrete joists or where it is desired to attach the lath after the concrete work is completed. Removable forms are particularly efficient in multi-story buildings where several uses can be secured from the same set of forms, which makes for economy.

THE OIL HEATING INSTITUTE, 420 Madison Avenue, New York. "Are Oil Heaters Perfected?"

There are at least five excellent reasons for using oil heaters: (1) heat is to be had when wanted; (2) it can be maintained at an even temperature; (3) the oil heater is safe; (4) quiet in operation, and (5) economical. These qualities are listed as the prime requisites of the perfect oil heater in this latest booklet issued by the Oil Heating Institute. "The perfect heater," says the Institute, "must be capable of supplying maximum heat when it is needed and of shutting itself off when the need is past. The modest looking thermostat that decorates the wall is the furnace man and,—unlike furnace men of a fast-disappearing era,—it is always faithful and never forgets." Under the heading of economy the booklet introduces a table of comparative costs prepared from studies of the United States Bureau of Standards. According to these figures, a house that requires ten tons of coal for a winter's supply, with cost at $12 a ton, can be heated for $120. The same amount of heat will be developed by 1,340 gallons of furnace oil costing, at 8 cents a gallon, $107.20. The Institute admits that oil heating has not reached its ultimate goal of perfection. "Neither, we hope, has the telephone or the automobile or the aëroplane. But oil burners have passed through their period of development and uncertainty and are today heating much over half a million homes in this country alone."

INTERNATIONAL CEMENT CORPORATION, New York. "Announcing Incor Cement." Excellent booklet on its use.

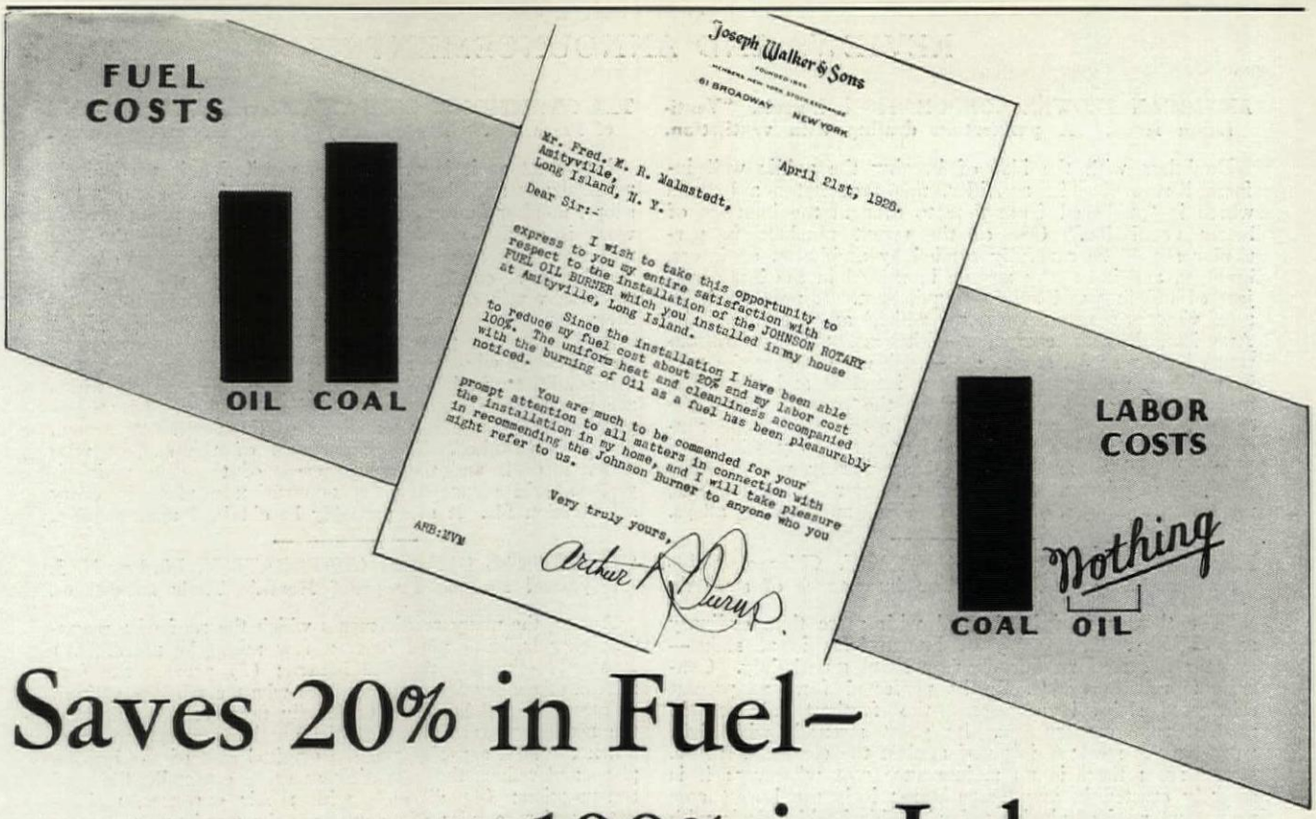
"Today, in practically all construction work of any importance, earlier use of the structure means substantial saving of money and inconvenience. Interest on invested capital hastened to earlier productivity, smaller investment in concrete forms, quicker turnover,—these are some of the important advantages of accelerated construction methods made possible by high early strength concrete. Leading architects, engineers, contractors and users of cement in general are alert to this opportunity. Convenience and the owner's pocketbook are very much concerned. Everyone connected with the construction industries will therefore be interested in the successful use of Incor Cement, as described in these pages." This brochure presents several reasons why Incor Cement should be used. The "International" system is made up of ten large firms producing Portland cement, with plants located in several parts of the United States as well as in Cuba and South America. The strategic locations of these plants assure uninterrupted service. The strength of the entire system is placed behind every order. One mill in an emergency can call upon another for help.

PAINT ENGINEERS, INC., 1009 South Kolmar Avenue, Chicago. "A Competitive Master Specification for Painting."

Much of the difficulty which an architect's office experiences with painting is the result of ignorance of the subject on the part of his assistants. The subject is of course highly complex, and the finishes and processes which should be used on one material are as different as possible from what should be used on another. This useful publication is just what its title implies, and if its instructions are obeyed, the architect may be sure of securing excellent painting from his contractor. It has been compiled especially for the exacting architect, covering every phase of scientific painting,—simplified to an exactness, that the entire specifications for painting, of even the largest project, can be completed in a few moments' time. It covers General Conditions; Scope of Work; Scaffolds; Protection of Work; Damage to Other Work; Colors, Samples, etc.; Materials; Mixing; Workmanship; Priming; Exterior Work; Interior Paint and Enamel Work; Interior Varnished and Finished Work; Floors; Interior Plaster Painting; Glazing; Starching; Canvasing; Cold Water Paint; Cement Paint; Kalsomine; Lacquer; Numbering and Lettering; Guarantee; Rubbish; Plaster Patching, etc.

ARMSTRONG CORK & INSULATION CO., Pittsburgh. "A Step Beyond Theory." Excellent brochure on insulation.

Interesting indeed is the study of insulation, particularly of insulation as it relates to heat. Insulation may be used to exclude heat, certain materials being often used in roofs to prevent the penetrating of the heat of summer, or it may be used to conserve heat, as witness the protection of lines of piping which carry steam or hot water for heating buildings. It is not often possible to give actual figures proving insulation's value, but in at least one instance it can be done. The Park Avenue plant of the American Tobacco Company, Brooklyn, had a serious problem in condensation and ceiling drip which they were able to overcome completely by insulating the roof and outside walls with Armstrong's Corkboard. Although this was the primary object, the Company was very much gratified to find that in addition to clearing up the condensation trouble, the insulation was saving them enough in heating expense to pay an annual return of 16.3 per cent on the cost of insulating the roof and walls. The annual charge against insulation, figuring amortization over 20 years, interest and maintenance charges, is $223.75, leaving a net saving of $408.05, which is a return of 16.3 per cent on the insulation investment of $2500. This, of course, includes only the actual measurable steam saving and takes no account of the improved conditions and the increased working efficiency.



Saves 20% in Fuel—

100% in Labor

This saving, *plus* uniform heat and cleanliness, is typical of the dependable carefree performance of Johnson Oil Burners the world over.

Wherever you may go—from California to Maine, and in foreign lands, you will find that home owners, builders and operators of large buildings, factories and industrial plants are praising the economical and dependable performance of Johnson Oil Burners for every heating and power pupose.

You can safely recommend and use Johnson Oil Burners with absolute confidence that they will give enduring satisfaction. The experience of more than 23 successful years as manufacturers of oil burning equipment is behind every Johnson product.

This experience is at your disposal. The accumulated data of oil burning installations under every operating condition is available through our Engineering Service. Let us help you in the solution of your heating or power problems.

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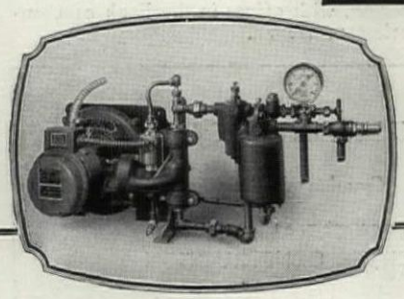
YOU WILL FIND OUR LOCAL REPRESENTATIVE'S ADDRESS IN YOUR TELEPHONE DIRECTORY



JOHNSON OIL BURNERS

Oil Burner Equipment for Every Heating and Power Purpose

Approved

Johnson Rotary Burners are approved by the New York Board of Standards, the Underwriters Laboratory, and by fire prevention bureaus everywhere.

Johnson Rotary Burners, with either manual, semi-automatic or full automatic control, are made in three styles and six sizes—giving a range of from 250 to 27,800 square feet of steam radiation or the equivalent.

We also manufacture low pressure oil burners and pumping equipment. Steam atomizing, natural draft, and whirlwind burners, also electric or steam driven oil pumping and preheating equipment.

REVIEWS AND ANNOUNCEMENTS

AMERICAN BLOWER CORPORATION, Detroit. "Ventilation News." A publication dealing with ventilation.

Doubtless with the idea of keeping the public well informed regarding its activities, this firm issues a bulletin which is "published from time to time in the interests of better ventilation." One of the recent numbers in particular should be carefully studied by architects, engineers, builders, and indeed by anyone interested in the large subject of building and building equipment. It presents half-tone views of many interiors which are ventilated by American Blower equipment,—kitchens, pantries, restaurants, barber shops, stores, etc.,—each cut showing the way in which the equipment has been installed and abounding in suggestions to those who value the benefits which the equipment gives but who wish the mechanism to be concealed. Other publications issued by the company, which are highly useful to architects, deal specifically with electric ventilating equipment for factories, theaters, billiard rooms, restaurants, garages, offices, stores, shops and bowling alleys.

FEDERAL CEMENT TILE COMPANY, Chicago. "Theaters and Theater Roofs." The importance of strength.

"The theater roof is charged with more than ordinary responsibility. The safety of human lives is at stake,—and the fireproof roof is ever on silent guard duty. Concrete is ultra fire-safe. In its perfected form as precast reinforced slabs, it represents the furthest advance in modern roof construction. Its great strength with light weight saves steel; it is proof against the elements, smoke, steam, rust; there is no maintenance cost whatever; it is speedily erected in any temperature; it is the lowest cost permanent roof obtainable today." This booklet deals with the roofs of theaters designed by prominent architects all over the country, "all representative of the many roofed with Federal,—flat or channel slabs for flat decks,—for sloping roofs, red interlocking tile requiring no composition covering. In like manner, Federal is widely used for other public buildings, such as schools, churches, auditoriums, gymnasiums, athletic field houses, and for general industrial and railroad buildings and many other structures."

JOHNS-MANVILLE CORPORATION. "Sound Absorbing Treatment in Churches and Religious Institutions."

"Churches present acoustical problems that are generally highly complicated, due to the variety of service to which they must be adapted, and to the fact that classical designs, only occasionally ideal from an acoustical standpoint, are so often followed. Speaking of the cathedral type in particular, Sabine says: 'It must be adapted to speaking from the pulpit and to reading from the lectern. It must be adapted to organ and vocal music, and occasionally to other forms of service, although generally of so minor importance as to be beyond the range of appropriate consideration. Most cathedrals and modern large churches have a reverberation which is excessive, not only for the spoken but for a large portion of the musical service. The difficulty is not peculiar to any one type of architecture. To take European examples, it occurs in the Classic St. Paul's in London; the Romanesque Durham; the Basilican Romanesque Pisa; the Italian Gothic Florence; and the English Gothic York. Many churches which are acoustically acceptable when maximum audiences are present, are too reverberant for comfortable audition with audiences of one-third or two-thirds capacity, and so are not practical for all conditions of use. The growth of the parish hall to its present institutional character has opened up many new acoustical problems and particularly so, where many diversified functions are being performed simultaneously under the same roof. In large cities, particularly, churches located on busy traffic arteries often present problems of extraneous noise that are very serious.'" This booklet makes a careful study or survey of the situation, and its conclusions and teachings would be of interest and value to any architect or engineer concerned with solution of problems in acoustics. The brochure illustrates quite a number of churches and chapels in which the "Johns-Manville Acoustical Treatment" has been made use of with excellent results.

THE SWARTWOUT COMPANY, Cleveland. "The Gospel of Fresh Air." The necessity of having it; how to secure it.

Important as it is everywhere, ventilation is particularly necessary in such buildings as factories, large garages and shops, monitor buildings, and places in which much process work is carried on, and research has established the fact that there is a definite relation between the extent to which ventilation is employed and the amount of work done in the area ventilated. This brochure describes and illustrates the mechanism for ventilating manufactured by this widely known firm, and presents data highly useful to architects and engineers who are responsible for securing proper working conditions in large buildings. The illustrations, which are many, show structures of quite a variety, and accompanying each there is an analysis of the ventilating system which is installed. The importance of the subject with which it deals and the completeness of the data which it gives should secure for the publication a place in every specification file. It can probably be obtained upon request.

STRUCTURAL GYPSUM CORPORATION, Linden, N. J. "Gypsteel Pre-cast Fireproof Roofs." Their advantages.

Among the many requirements which the roof of a manufacturing building must meet a few might be noted. (1) It should eliminate the fire hazard; (2) prevent the formation of condensation in buildings where conditions of high temperature and humidity ordinarily prevail; (3) minimize the needless loss of heat to the outside atmosphere—keep down the size, capacity and the original cost of the heating plant and reduce the operating expense, especially the coal consumption; (4) dispense with repair expenses, maintenance and renewals; (5) contribute the maximum reflection of light, both by day and by artificial illumination. This brochure deals fully with the design and construction of Gypsteel Roofs, illustrating their construction by diagrams, half-tone cuts and blue prints, and part of the booklet gives a list of buildings upon which Gypsteel Roofs have been installed, the list including paper and textile mills, boiler rooms, steel rolling mills, foundries, power and heating plants, garages, schools, hospitals, theaters and warehouses.

Ross B. Baze announces the opening of offices at Tulsa, Okla. He desires the catalogs and other publications of manufacturers.

Harry Howe Bentley has discontinued his office at 228 North La Salle Street, Chicago, and will handle his practice at 337 Woodland Road, Ravinia, Ill.

A. R. Chananie, formerly of Miami, has opened offices in the Leigh Building, Petersburg, Va. He would appreciate the samples and publications issued by manufacturers.

Nairne W. Fisher, of St. Cloud, Minn., has opened a branch office in the Federal Bank Building, Dubuque, Iowa, where he would be glad to receive the publications and samples of manufacturers.

James L. Montgomery and Randolph L. Patterson announce the forming of a partnership under the firm name of Montgomery & Patterson, with offices in the Bank of Commerce Building, Charleston, W. Va.

WALLS

that weather even a deluge!

YOU want your walls to do three things:—stand up permanently, shut out moisture, hold their beauty through the years.

When brick, limestone or sandstone walls are unprotected, they won't satisfy these desires. The elements will wear them down. The moisture will creep through them. They will become streaked and discolored.

Walls, protected by Hydrocide Colorless Waterproofing won't have any of these faults.

Simply apply Hydrocide Colorless to the exterior. This great preservative penetrates the brick or stone and makes it water-repellent. It completely shuts out the elements and keeps the interior dry through driving rains.

Hydrocide Colorless not only protects your walls against moisture; it prevents them from becoming discolored and preserves the natural beauty of the brick and stone work.

You can safely specify Hydrocide Colorless for application in cold weather. Since it contains no paraffin, it will never run in hot weather. Walls on which it is used can be easily painted. It will not collect dust, and when applied is absolutely invisible.

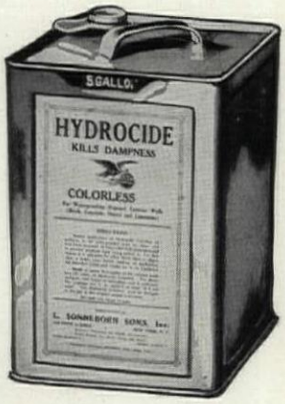
Many leading architects are adding to the life and beauty of their buildings by specifying this permanent waterproofing liquid.

Let us tell you about the famous structures that have been waterproofed with Hydrocide Colorless. Send coupon below for literature and free samples.

Hydrocide

Colorless Waterproofing

Protects Brick and Stone Walls from the Elements



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INDEX TO ADVERTISING ANNOUNCEMENTS

PART 1—ARCHITECTURAL DESIGN

PART 2—ARCHITECTURAL ENGINEERING AND BUSINESS

Does client satisfaction rise or fall when winter brings bills for fuel?

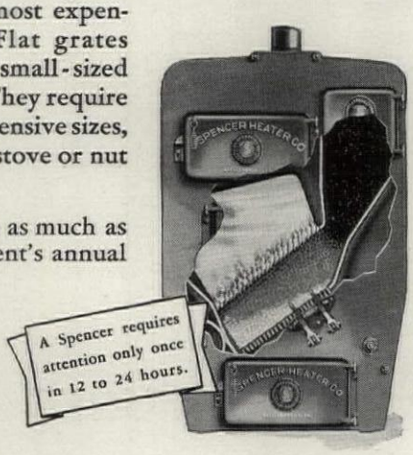
You specify weather-stripping, insulation, pipe covering, and other saving features for the homes that you design, for they are good.

Yet all the saving you can make by *saving* heat is more than lost by the waste in *making* heat, unless you know the Spencer.

Wasteful grates and saving gables

A flat grate heater in your client's cellar automatically commits him to buy the most expensive fuels. Flat grates won't burn small-sized fuels right. They require the most expensive sizes, such as egg, stove or nut anthracite.

You can save as much as half your client's annual bill for heat when you specify a Spencer Heater. The patented Spencer has a sloping Gable-Grate that is fed bygravitation from a water-jacketed Magazine. This exclusive combination of features is designed to burn No. 1 Buckwheat anthracite at an average cost of fifty per cent less than the so-called domestic sizes; or by-product Pea coke and any non-coking graded fuel at proportionate savings.



Guaranteed capacities

Specify Spencer Heaters for any type of home or building, with any type of steam, vapor or hot water system. You can know that the Spencer will not only save, but will also do a better job. Spencer capacities are guaranteed, not by an arbitrary rating, but by the actual, tested, direct cast iron column radiation tax. They can be guaranteed because heat travel and combustion space are correctly designed, contact surfaces are face ground, and the finished heater is precision made.

The Spencer has been a favorite with architects who know it for more than thirty years. Write for specifications, illustrations and guaranteed capacities of new Spencer Heaters. Spencer Heater Company, Williamsport, Pa. Division of Lycoming Mfg. Co.

Take a small roll of paper. Hold it slanting upward. Light it in the middle. Flames dart up and burn the upper half long before your fingers even feel the heat from fire creeping down. The Spencer Gable-Grate makes fire burn up-hill, the way it burns easiest and best.

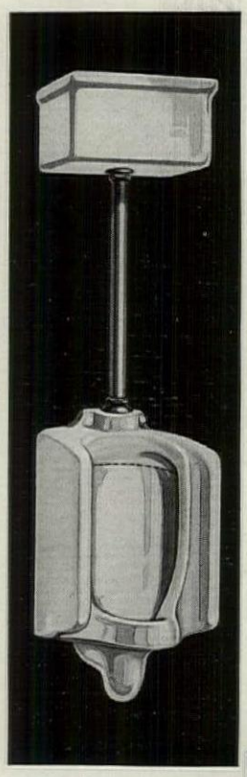
Sugar poured from a spoon piles up in a heap. Take some away from the bottom of the heap, and more rolls down. Coal does the same. Fire in the Spencer Gable-Grate takes fuel away from the bottom and more automatically rolls down to keep the fire bed uniform in depth.

SPENCER SAVES

SPENCER
steam, vapor or hot water
HEATERS

WE MAKE THEM ALL

and here's one we especially recommend



It's the Correcto No. 720, illustrated at left—a combination of rare quality vitreous china *with an installed cost very little more than for mediocre designs or inferior materials.*

The floor is left clear for cleaning, a very important advantage. Wide wing shields insure privacy and eliminate the necessity for costly marble partitions. An integral flushing rim gives even distribution of water and eliminates the corrosion found with metal spreaders. The integral trap has an accessible cleanout above the floor and saves the cost of a trap with additional piping, fittings and labor.

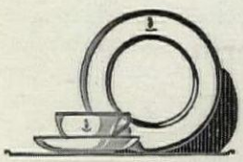
Illustrated below at left is the No. 726 Battery, supplied in 21″ or 24″ widths, center to center. At right is No. 725, the single stall, 18″ wide, with integral side wings. These designs, both of vitreous china, also have an integral flushing rim—assurance of perfect water action. There is no metal spreader. Consequently there is nothing to corrode.

Note the smooth roundness of design, eliminating pockets and corners.

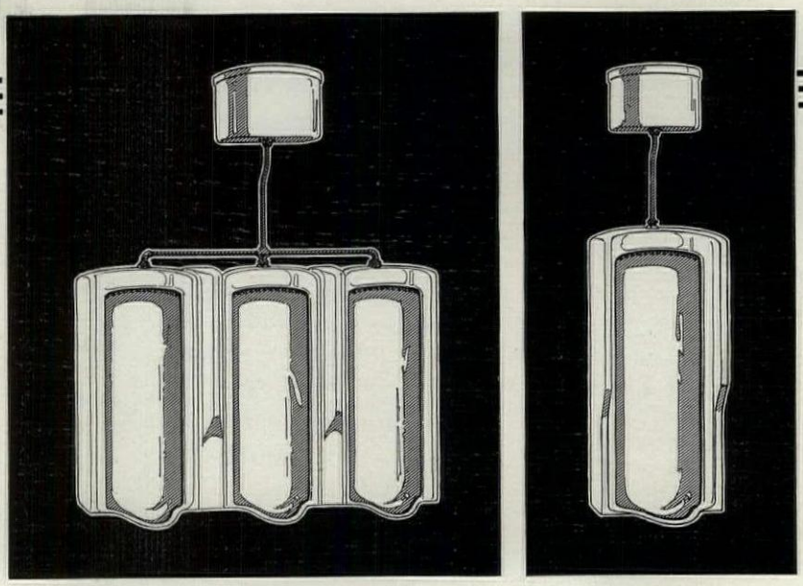
* * * * *

These, like all Eljer fixtures, are highest quality two-fired vitreous china, *guaranteed not to craze* or discolor. They withstand the Government Red Ink test without a whimper. Their surfaces remain pure white.

There are Eljer fixtures of all kinds to meet all conditions. There may be several in the Eljer Catalog that will be helpful right now. A copy will be gladly sent if you will write Eljer Company, Ford City, Pa., Plants at Ford City, Pa., and Cameron, W. Va.



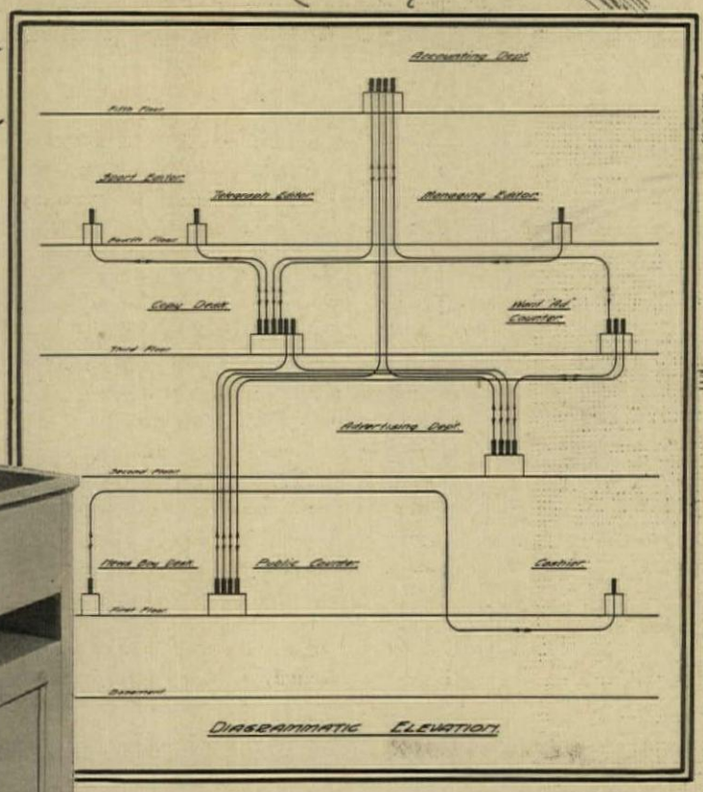
Eljer China is similar in texture to the finest French Table China—but with the added toughness necessary to withstand rough usage. Acidproof and rustproof.

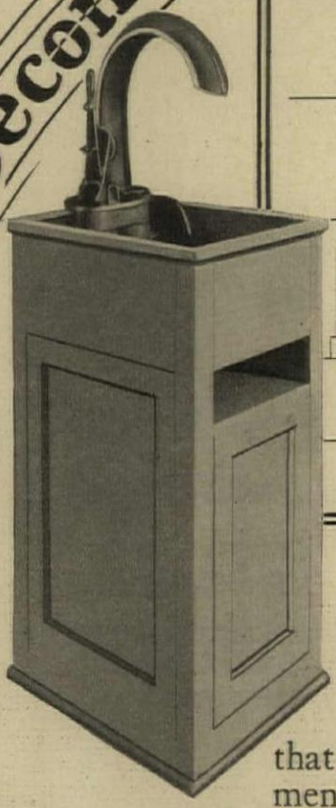


ELJER

VITREOUS CHINA PLUMBING FIXTURES

Traveling Five Floors in a Few Seconds



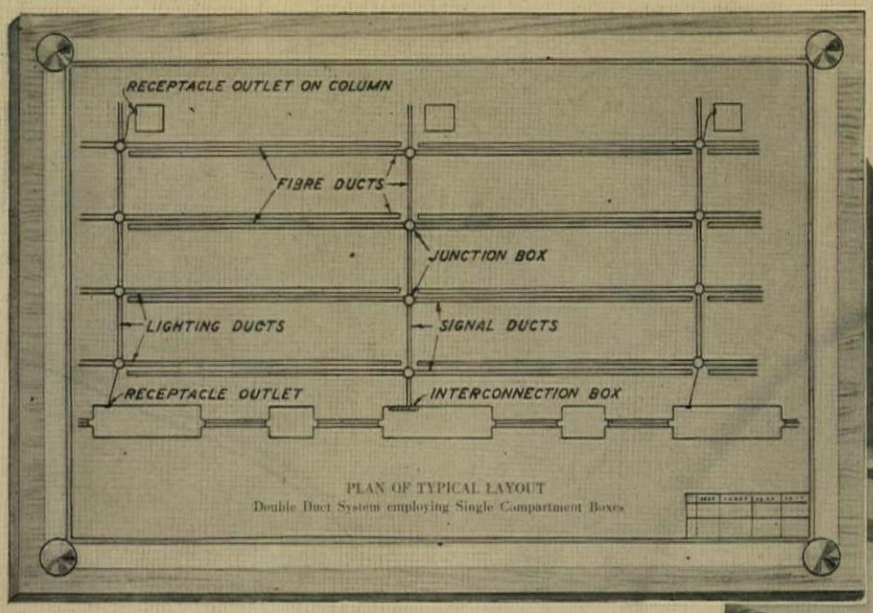


Pressure Up Delivery Gooseneck Terminal with air deflector. 2¼-in. and 3-in. only. Air does not discharge above desk. Overcomes objection to air blowing around top of desk. Air can be discharged under desk or through floor.

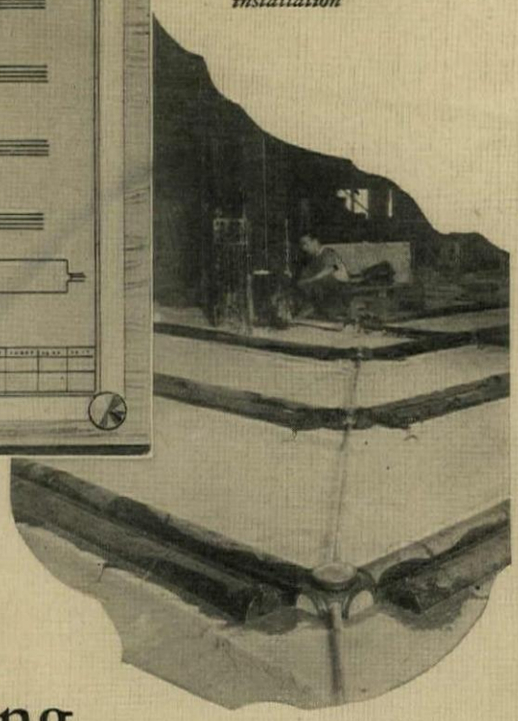
When the architects designed the new building for the Cincinnati Enquirer they did more than merely assemble bricks and mortar into a good looking structure that would protect those within from the elements without; they planned a highly modern efficient newspaper plant, and, as you can see from the above diagram, a Standard Pneumatic System played an important part in bringing in, effecting the speedy system of communication so necessary to a great modern daily. To architects who realize the worth while saving that can be effected for any industry by the installation of a Standard Pneumatic System of communication, we will be glad to send a detailed analysis of the installation shown here. Remember that payrolls prove that such installations pay for themselves, eventually.

STANDARD
CONVEYOR COMPANY
NORTH SAINT PAUL, MINNESOTA

New York Office, 420 Lexington Avenue
Chicago Office, 549 West Washington Street
Philadelphia Office, 3110 Market Street
Cleveland Office, 1108 Hippodrome Building
Buffalo Office, 908 Ellicott Square
Kansas City Office, 419 Manufacturers' Ex. Bldg.
Milwaukee Office, 209 Wisconsin Avenue
Los Angeles Office, 335 So. San Pedro St.
Seattle Office, 321 Lumber Exchange
Charlotte Office, 301 Builders Bldg.



Floor plan of typical layout with photographic view of Underfloor Duct in process of installation



Electrical Service for years to come is assured at the N. Y. Life Building

The Orangeburg Underfloor Duct Installed will Provide For All Electric Circuits

An essential in any modern building is adequate provision for electric circuits. By specifying Orangeburg Underfloor Duct, Cass Gilbert, architect, and Myer, Strong and Jones, advisory electrical engineers, of the New York Life Insurance Building, have made certain the necessary wireways, and provided for all future electrical requirements.

The selection of Orangeburg Underfloor Duct for this large building was made on the basis of its proven advantages in such buildings as the Federal Reserve Bank of New York, The American Telephone and Telegraph Building, and numerous other important structures.

Why the Orangeburg System is the Ideal Way to Provide Electrical Service

1. It is installed easily and inexpensively at the time of building, and yet provides for all future requirements.

2. When additional outlets are wanted, boring a small hole is all that is required for each outlet.

3. No matter how desks, machines or partitions may be changed, provision for electric circuits can be made quickly and economically.

4. Ducts are out of sight and out of way yet instantly accessible when required.

The Fibre Conduit Co.

ORANGEBURG, NEW YORK

Johns-Manville

CORPORATION

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