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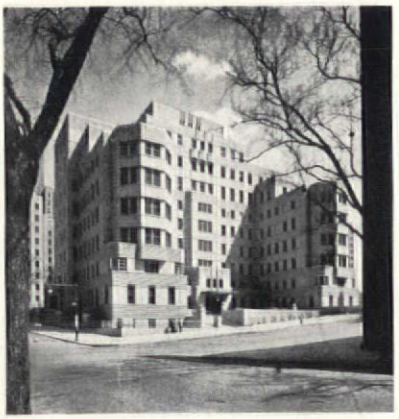

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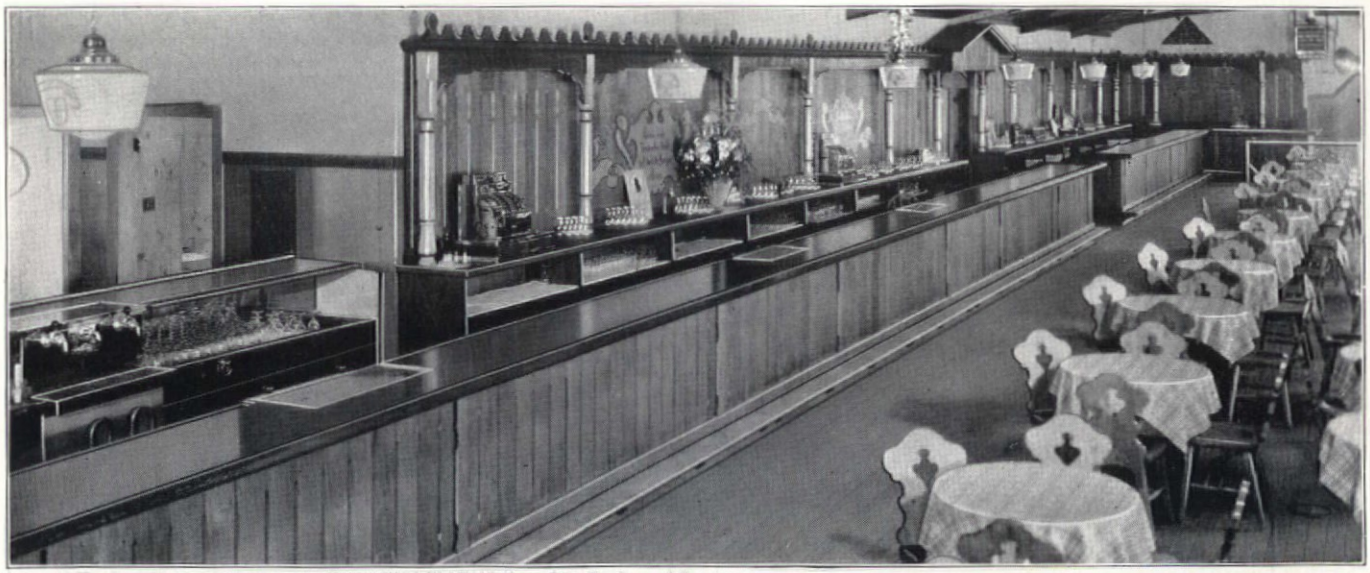

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This company has been actively identified with dispensing equipment and its installation for nearly half a century. Its manufacturing divisions produce bars, beer coolers, and other dispensing units in many styles and materials. Hardwood, polished stainless steel and marble are combined attractively.

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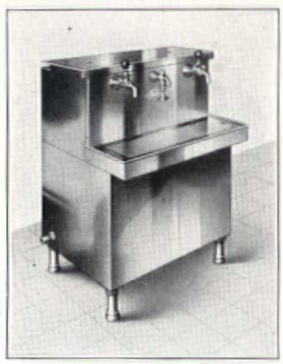
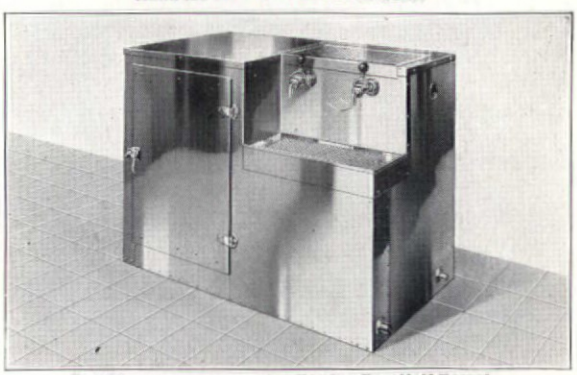


Red Diamond Beer Cooler for Two or Three Coils

Red Diamond Beer Cooler and Dispenser for Four Coils

Red Diamond Beer Service Bar for Two-Half Barrels. Wood (as shown) or Stainless Steel



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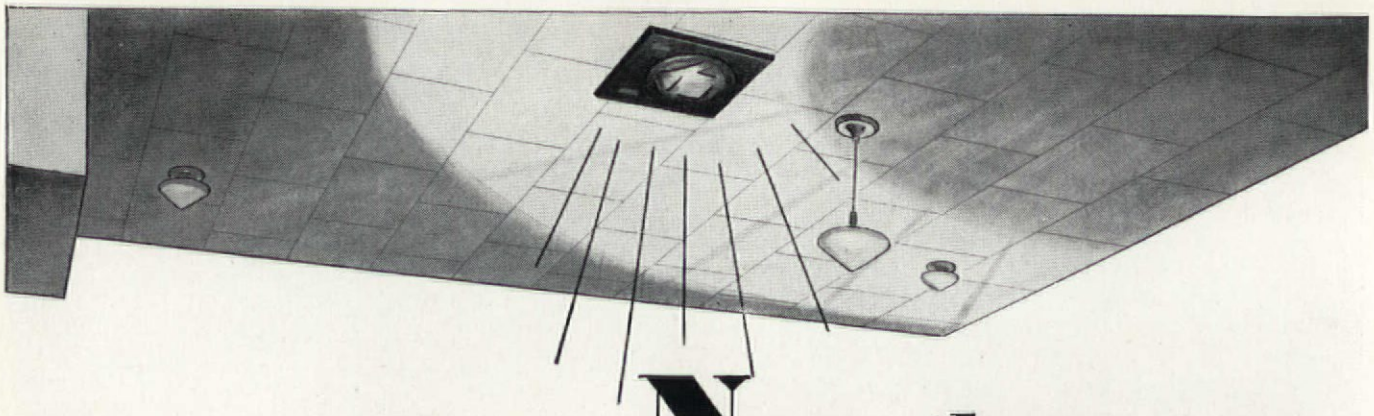
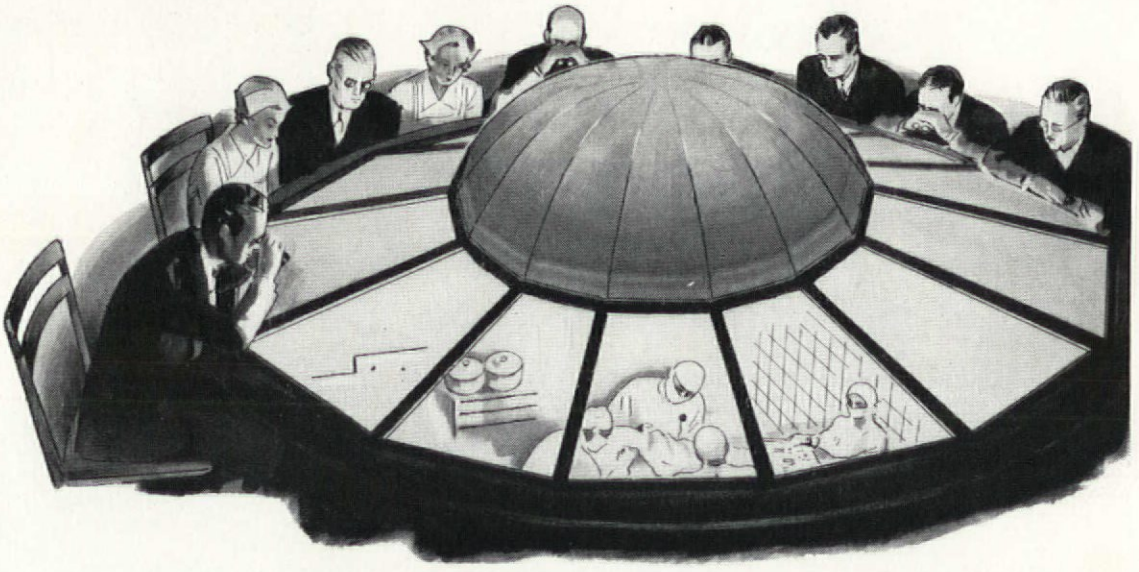


Now they can HEAR as well as see . . .



A lapel microphone on the tunic of an operating surgeon has made a new clinic—where even back row students in an operating amphitheatre hear every word. The speaker, unhindered in action and speech, talks quietly and faces in any direction. ¶ Students learn more when the operating theatre is thus equipped with a Western Electric Public Address System—like that at the Eye Institute of the Columbia Presbyterian Medical Center in New York. Here the loud speaker delivers the surgeon's words clearly to the students, watching through sound proof glass panels, directly above the operating table. ¶ This, like other Western Electric Public Address Systems, assures highest tonal quality and dependability. It is made by Bell Telephone makers.

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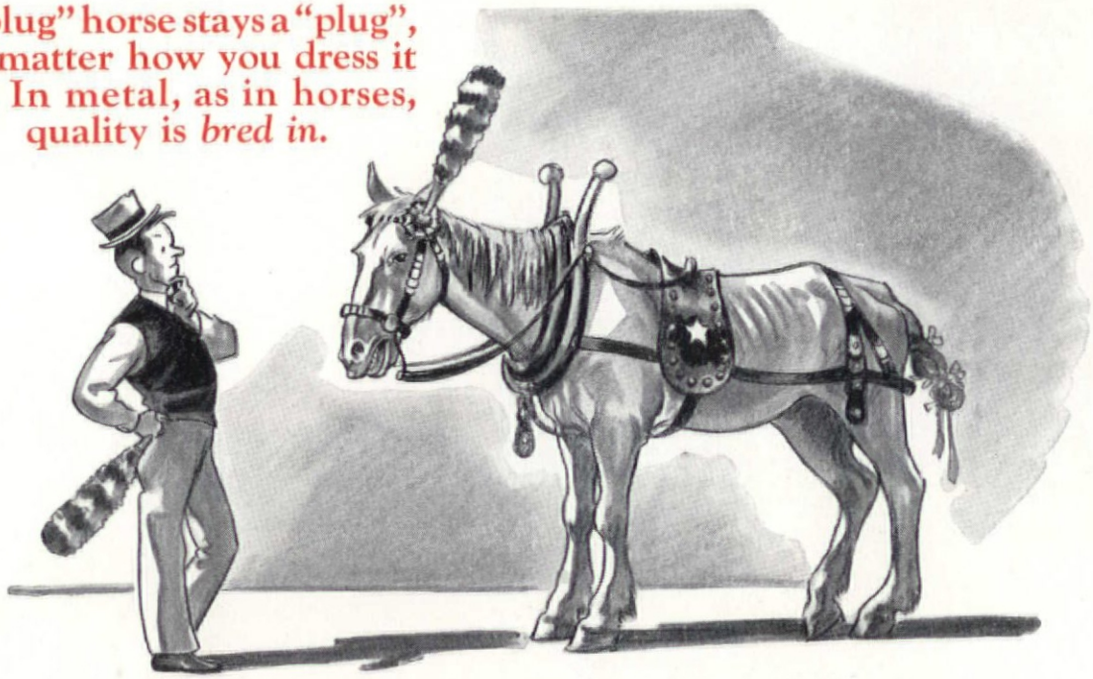

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Pick a *Thoroughbred* Metal

Fifty years ago, Reading Puddled Iron had PROVED that it has the endurance which some other kinds of metal are trying to attain today. Imitation "irons"... throwing together of various materials . . . have failed to produce a metal as good as Reading when specific uses demand *thoroughbred* performance.

Reading Puddled Iron is not a "cure-all." But its unique ability to resist a *variety* of destructive conditions puts it in a class by itself where those conditions exist. If you are buying metal for the uses shown on this page, you'll SAVE MONEY by insisting on Reading.

For Waste, Vent Lines, Down-Spouts

Waste, Vent Lines, and Down-Spouts of Reading Puddled Iron Pipe will outlive the building in which they are replaced. The alternating wet and dry conditions and the destructive atmospheric corrosion that mean swift death for ordinary ferrous metal have little effect on Reading Iron, due to the unique physical structure and chemical composition.

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Galvanized Standard Reading Puddled Iron Pipe assures *generations* of trouble-free service in most waters. In thousands of such installations, it has been proved that the life of Reading Pipe is from two to five times longer than that of ordinary pipe in practically every installation.

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Reading Puddled Iron possesses the toughness and workability of the old-time iron, because it is made by essentially the same processes. Used for ornamental purposes, Reading Puddled Iron means lasting beauty. Available in various grades, depending on the fineness or intricacy of the finished work.

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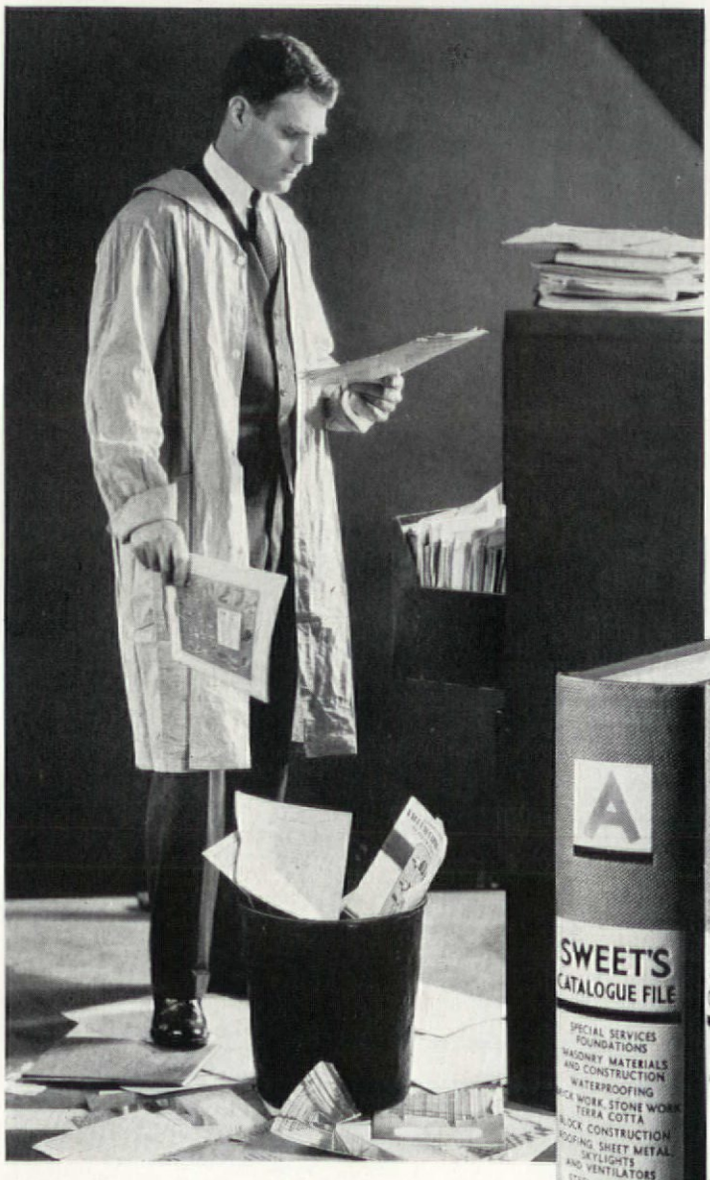

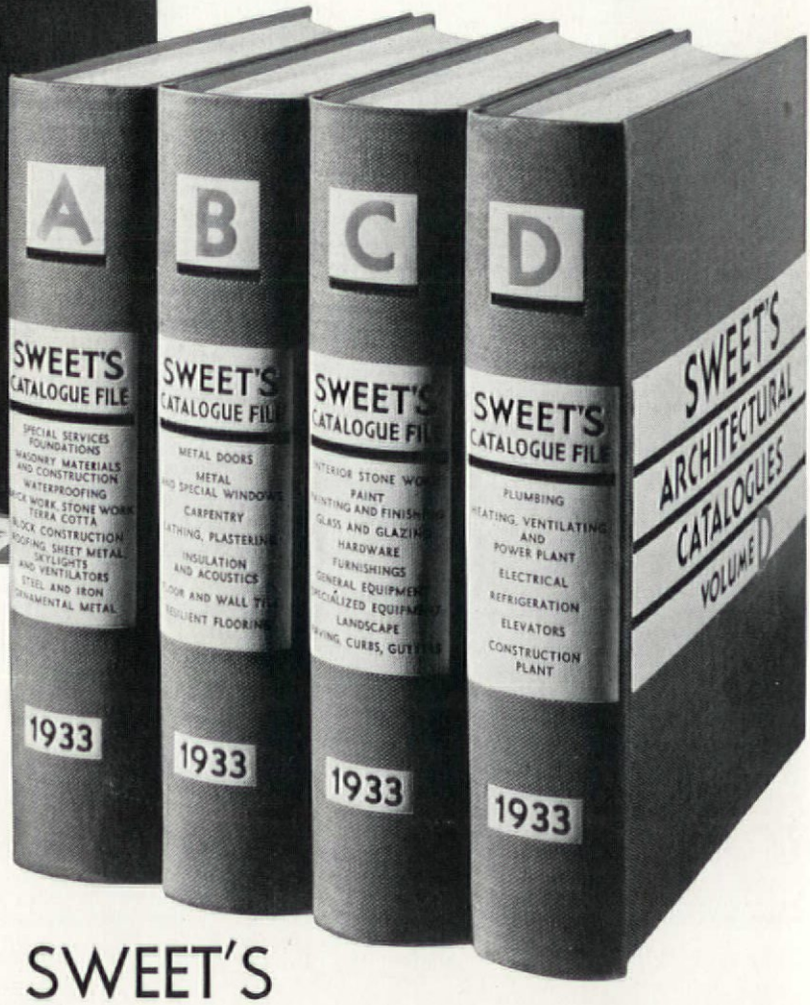

A new SWEET'S file is now being compiled

Sweet's Architectural Catalogues for 1934 is now under way. Our consulting architects have already begun the preparation of new catalogues for many manufacturers. During the next few months, the entire time of Sweet's staff, consulting architects, editorial, copy, sales and distribution departments, will be devoted to the production and later, the distribution of a comprehensive, new file of manufacturers' catalogues—Sweet's for 1934.

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At St. Meinrad's Abbey

These dish tables and washers in the kitchen of St. Meinrad's Abbey are made entirely of Monel Metal. They are part of the equipment installed by the JOHN VAN RANGE COMPANY, Cincinnati.

This view shows Monel Metal cook's tables and warmers, continuous canopy, cereal cooker and deep fat fryers on the right, and Monel Metal work table on left. JOHN VAN RANGE COMPANY installed this equipment. Crowe & Schulte, Cincinnati, were the architects for St. Meinrad's Abbey.

...*Ready to serve* 1800 *meals a day, for many years to come!*

Good as these pictures are, no illustration could do full justice to the splendid kitchen of St. Meinrad's Abbey, St. Meinrad, Ind. It's a masterpiece of skillful planning and time-saving equipment. Everything literally shines with silvery beauty and inviting cleanliness. Everywhere you look, lustrous surfaces of Monel Metal stand guard against rust, corrosion and wear!

Much credit for the fine appearance and efficiency of this kitchen is due the John Van Range Company whose engineers have drawn on their years of experience in planning outstanding Monel Metal installations for hotels, restaurants and other large institutions. With the aid of Monel Metal, these experts have created a food service department where 1,800 appetizing meals can be prepared daily under the most sanitary conditions, with a minimum of time, labor and cleaning expense.

Moreover, this equipment is built to last . . . made of Monel Metal to give years and years of low-cost service. It will never rust. It will never chip. It will never lose its bright, modern appearance . . . for it has the enduring strength of steel, with no coating to chip off or wear away.

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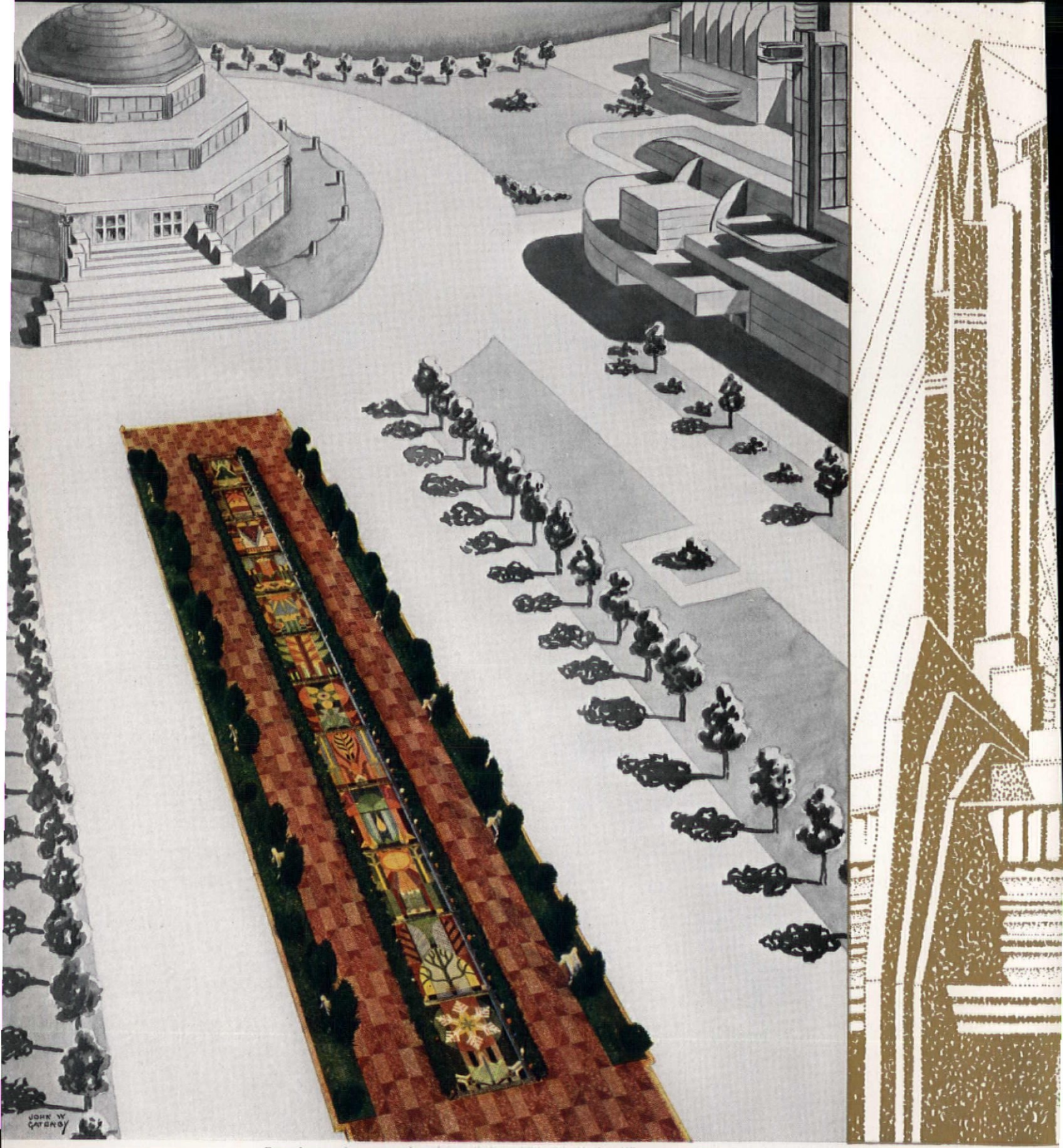
Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.



Reproduction of terrazzo esplanade installed as exhibit of the National Terrazzo and Mosaic Association, Inc., at A Century of Progress, Chicago, to remain as permanent promenade to famous Adler Planetarium. Ernest A. Grunsfeld, Jr., A. I. A., architect; John Norton and Tom Lea, designers; S. O. Stella, supt. of construction; all of Chicago.

IN twelve panels of rich design symbolic of the months, blended in nearly fifty color tones accentuated by a shallow sheet of water flowing over them, the central unit of this World's Fair terrazzo esplanade seems a magic carpet of color harmony. To the designer of beautiful floors and walkways, it *is* a magic carpet of suggestions and ideas for pattern and shade in fine terrazzo. And in its richness and variety of colors it is a magnificent illustration of the positive color values which white portland cement makes possible in terrazzo. For all units of this esplanade, including panels, curbing and walkways, Atlas White portland cement was used —the white cement for exact color control! Terrazzo contractors will be glad to discuss this installation with you and to give you full information on fine terrazzo. Or write

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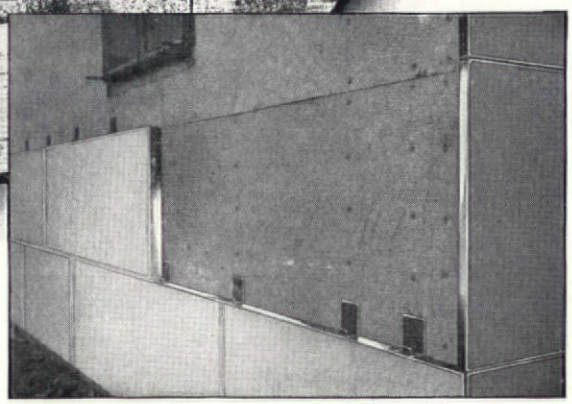

2 MODERN METALS *in the* WORLD'S MOST MODERN HOUSE...

At the Century of Progress in Chicago is a house of such original and charming design that millions of visitors will carry home a new conception of the adaptability of steel to practical residence construction, as interpreted by H. Augustus O'Dell and Wirt C. Rowland, Detroit, and Dwight James Baum, New York, Architects, in the Good Housekeeping Stran-Steel House.

Two modern metals, products of Republic Steel Corporation, play an important part in the construction of this world's most modern house—Toncan Enameling Iron and Enduro Stainless Steel.

The entire exterior is built up of light weight masonry units known as Glasiron Macotta. The face is porcelain enamel fused on Toncan Iron. The edges are protected with a small bead of Enduro. The metal is backed with concrete, making a durable, weather-proof panel—beautiful, without glare, non-fading, quickly erected, easily cleaned and permanent in every sense.

Republic offers a broad service to the building industry—a service that keeps pace with every modern construction development. When new conditions demand new steels, metallurgical science guided by Republic's experience can be depended upon to meet the need.

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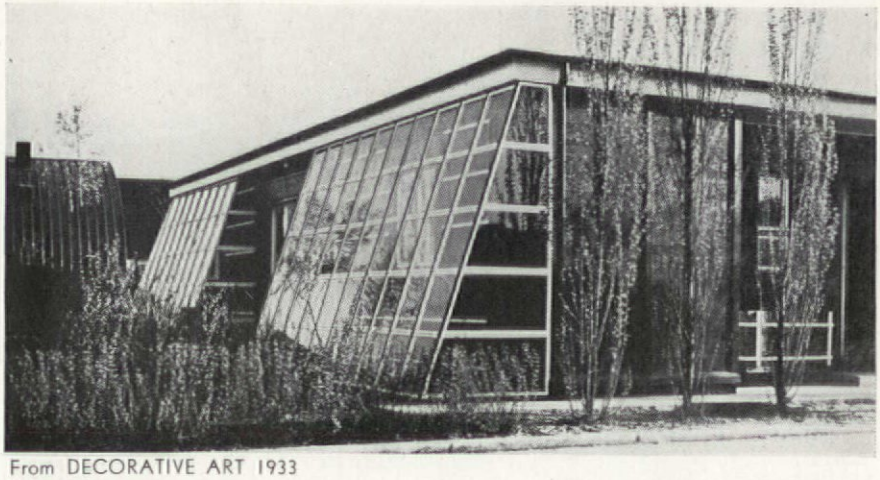
THE ARCHITECT'S LIBRARY

The "Expanding House" by Martin Wagner, architect, of Berlin. It can be rapidly put together with standardized wood sections; the kernel of the building consists of the living and sleeping room, to which other rooms can be added as desired. The glazed enclosures sloping from roof to ground form conservatories for plants.



From DECORATIVE ART 1933

A BIBLIOGRAPHY OF AESTHETICS AND OF THE PHILOSOPHY OF THE FINE ARTS (1900-1932). Compiled and edited by William A. Hammond. Longmans, Green, and Company: 55 Fifth Avenue, New York. 183 pages. $3.

Students of the fine arts will find this bibliography of importance. It brings up-to-date the classification of a large amount of literature which has appeared since the publication in 1905 of Volume III of Baldwin's Dictionary of Philosophy (Macmillan). The current work is published as a part (in advance) of a proposed General Bibliography of Philosophy, sponsored by the American Philosophical Association.

The purpose of the author, professor emeritus in Cornell University and consultant in philosophy in the Library of Congress, has been to prepare a bibliography of titles "selected with exclusive reference to their philosophical content." Historical and critical books on art are not included unless, in some respect or other, they are concerned with theoretical problems.

REMODELING AND ADAPTING THE SMALL HOUSE. By Harold D. Eberlein and Donald G. Tarpley. J. M. Lippincott Company: Philadelphia. 163 pages, with 127 illustrations and plans. $3.50

According to the preface, this book, another in the "Home-Maker Series," is intended for the owner or prospective owner who is considering the renovating or altering of his small or moderate-sized house. Much advice is given on various remodeling problems, including such abstract topics as "proportion" and "scale," "voids" and "solids." The examples illustrated are intended, according to the authors, "to show the scope of possibilities, even with material at first apparently not encouraging, and to stimulate imagination in a very practical way." Some of the incorporated material and illustrations, it is noted, have appeared previously in periodicals. There is no index.

DECORATIVE ART 1933. The Studio Year Book, edited by C. G. Holme. The Studio Limited, London; and The Studio Publications, Inc., 381 Fourth Avenue, New York City. 140 pages, illustrated. Cloth, $3.50; wrappers, $2.50

"The general standard of industrial design," comments the editor of the Year Book, "is not yet as high as it should be, and in many respects it is undoubtedly poor. What is illustrated here is still therefore exceptional." Not precisely exceptional, the reviewer might respond, but rather typical of the general confusion of purpose which characterizes contemporary design. Most of the interiors and furniture are hailed as "modern," but in sharp contrast with the few designs that are cleanly wrought the many are superficial and baroque. Notwithstanding the much-publicized theory of "functionalism," the work of most of these designers reveals a technique that is more emotional than rational. The net result, excepting a few instances, is a new aesthetic as meaningless as the *clichés* which have been discarded.

The work of many American as well as European designers is included in the volume. Care has been taken in the selection of photographs and the plates are uniformly good in quality. The accompanying captions are concise and informative.

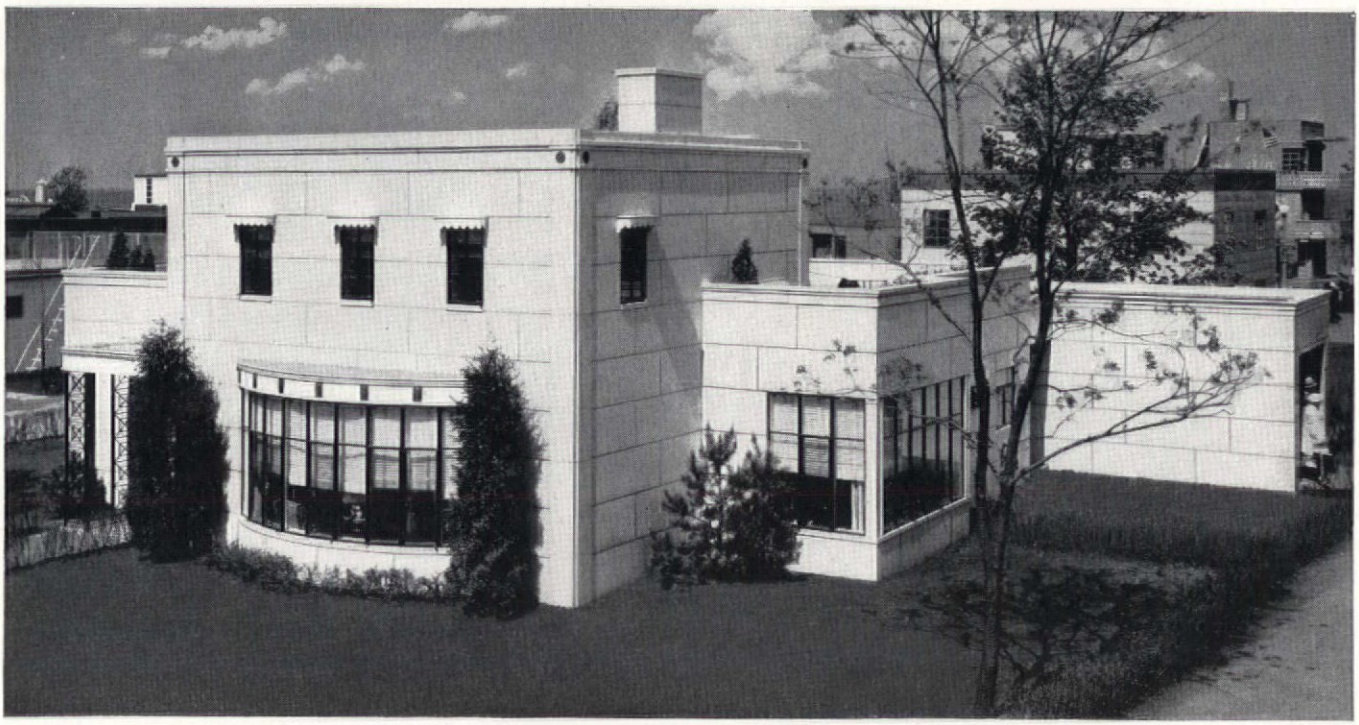
ARCHITECTURAL DESIGN. By Ernest Pickering. John Wiley & Sons, Inc.: New York. 311 pages, illustrated. $6.50

This volume is offered by the author, professor of architectural design in the University of Cincinnati, "as a textbook adaptable to various systems of teaching and a reference book for the drafting room in the school or office." The book, as Professor Pickering himself advises the reader, does not pretend to develop any new theories of design: throughout the *Beaux-Arts* influence is apparent.

The text is presented in five parts: (1) a historical background, (2) an analysis of the functions

●●●● at Chicago

● The Stran-Steel Good Housekeeping House at "A Century of Progress." Helen Koues, Director of Good Housekeeping Studio of Architecture and Furnishings supervised its building and furnishing. The Stran-Steel Corporation built it with modern methods and material. Glazed throughout with L·O·F Polished Plate Glass.



A majority of the buildings in the Home Planning Section of the World's Fair are glazed with L·O·F Polished Plate Glass and Quality Window Glass. It would be difficult to find more striking examples of this fact: that, although the cost of glass constitutes but a very small fraction of the cost of construction, the quality of glass influences the appearance of a building perhaps more than any other single item . . . especially when it is used so generously as it is in following the modern architectural trend.

● LIBBEY-OWENS-FORD GLASS COMPANY, TOLEDO, OHIO, manufacturers of Highest Quality Flat Drawn Window Glass, Polished Plate Glass and Safety Glass; also distributors of Figured and Wire Glass manufactured by the Blue Ridge Glass Corp. of Kingsport, Tenn

LIBBEY·OWENS·FORD
QUALITY GLASS

Interior of a concrete house in Breda, Holland, designed by G. Rietveld, architect.

From DECORATIVE ART 1933

of architectural elements, (3) a discussion of the principles of design, (4) a survey of the characteristics of old and new materials, and (5) methods of applying this information to current problems. The illustrations, which are numerous, include photographs of well-known structures as well as student *projets* and exemplary line sketches by the author.

THE VISUAL FATIGUE OF MOTION PICTURES. A summary and survey compiled and edited by Aaron E. Singer. Amusement Age Publishing Company: New York. 48 pages. $1.

Three factors—ventilation, illumination and seating—contribute chiefly to the visual fatigue of motion picture patrons, according to this small but compact volume. A series of current research reports, each condensed to a few paragraphs, give the views of well-known engineers, medical men, inventors, and manufacturers on such subjects as lighting, the eye, projection, education, ventilation, architecture, seating, etc. A survey of literature and research conclusions, describing year by year advances in the reduction of visual fatigue, and brought up-to-date, completes the book.

MODERN INDUSTRIAL ORGANIZATION. By Herbert von Beckerath. Translated by Robinson Newcomb, Department of Commerce, and Franziska Krebs, with an introduction by Professor F. W. Taussig of Harvard University. McGraw-Hill Book Company, Inc.: New York and London. 385 pages. $4.

Although this book does not directly concern architectural practice, it has however a significance to the building industry in view of the new Industrial Recovery Act provisions.

The author, a German economist and professor in the University of Bonn, gives a critical review and analysis of the development of industrialism in the various European countries and America, and considers in detail the influence of cartels and combinations and of government control of industry. His point of view is definitely anti-socialistic. "An exaggerated governmental interference with private industrialism," he concludes, "may lead to a breakdown of the present economic system. But it will not lead to socialism. Socialism presupposes a collectivist mentality which differs fundamentally from that possessed by industrial workers, for even those who belong to socialist parties are molded by the influence of an individualistic and materialistic century."

This individualistic and materialistic ideology of a democratic industrial society—a main thesis of the book—is evidenced by the demand for shorter working hours and higher wages, a double pressure toward a higher standard of living which at the same time increases the costs of production and limits capital accumulation. This conflict makes it questionable, Professor von Beckerath writes, whether industrialism in the old industrial countries can maintain itself in competition with industrialism in younger countries where the social claims of labor can still be subordinated to the requirements of production and where natural resources give industry an advantage in world competition.

The destiny of private industrial enterprises is determined largely by national and international competition on the basis of price and quality, and unless the consumer can be forced to make specific purchases the market will be controlled by those producers who are the lowest-cost manufacturers of articles that, considering their price, best conform to the consumers' wants. "Neither cartelization nor combination can change this situation," Professor von Beckerath believes, "as they merely concentrate competition in larger units and transfer part of the economic policy regarding consumable commodities from the market to the internal business management of the semi-manufactured stage."

THE SOURCE OF THIS PRODUCT PREDICTS ITS SERVICE

J&L PIPE

THE qualities which make for long-lasting, trouble-free pipe are many and varied. They result from properly coordinating the numerous factors involved in development, manufacture and servicing. That is why J & L Complete Ownership Control has so important a bearing on the quality and serviceability of J & L Pipe.

Straight joints, free from excess scale; accurate mill threads; couplings properly tapped; the right bending and free thread-cutting qualities; uniformly heavy galvanizing — all of these are results of painstaking procedure based on the experience gained by J & L in manufacturing iron and steel for 83 years.

Write for the 88-page catalog of J & L Pipe. It is a valuable handbook for pipe users, and will be sent to you without obligation on your part.

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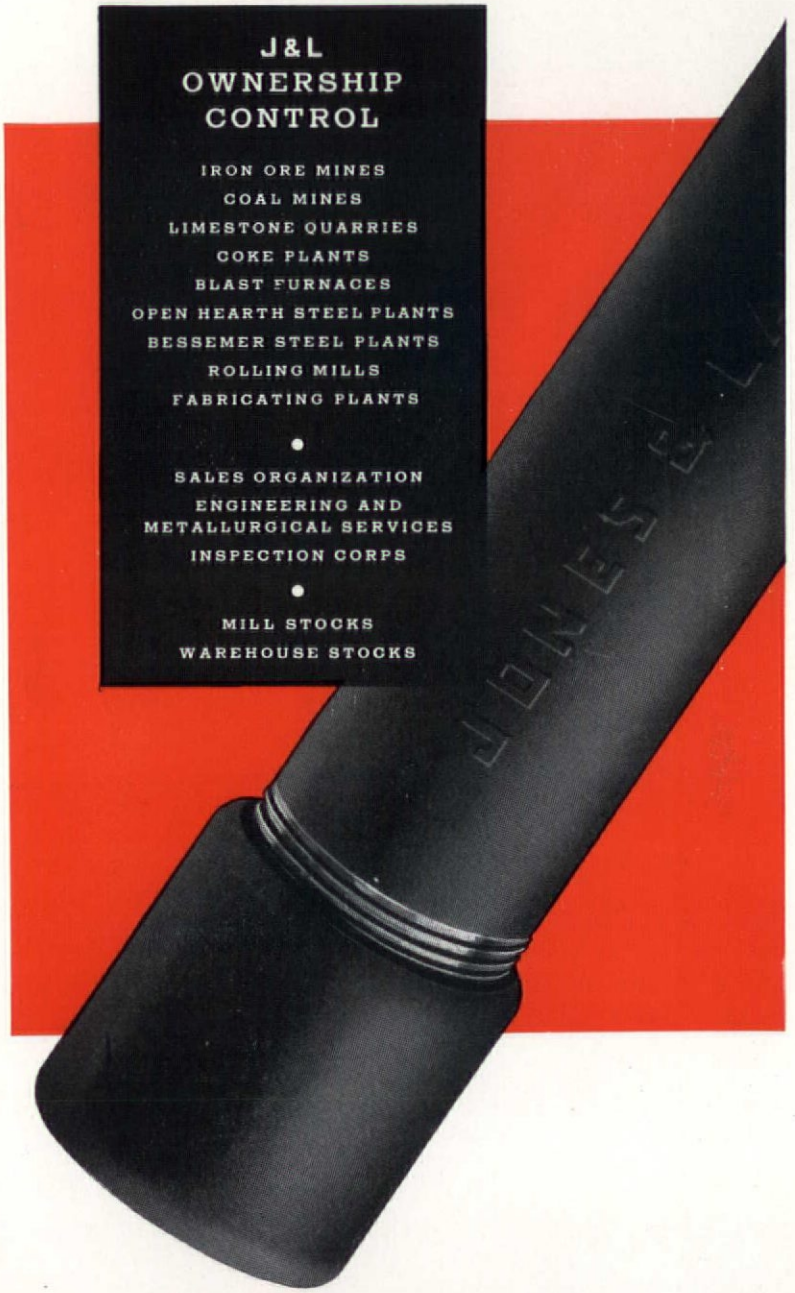

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ARCHITECTS' ANNOUNCEMENTS

Thomas Larrick and J. Howard Compton under the name of Larrick and Compton, architects and engineers, have opened an office at 816½ Massachusetts Street, Lawrence, Kansas.

P. A. Bartholomew, architect, has discontinued his Pittsburgh office, and is now located in his Greensburg office, First National Bank Building, Greensburg, Pennsylvania.

Ralph E. Hauszagh, architect, has moved from 6 North Michigan Avenue to 8 South Michigan Avenue, Chicago.

Frank D. Chase, architect, is now located at 307 North Michigan Avenue, Chicago.

Taussig, Flesch and Associates, architects, have moved from 506 So. Wabash Avenue, to 59 E. Van Buren Street, Chicago.

Kenneth W. Dalzell, architect, has moved his office from 263 Central Avenue, East Orange, New Jersey, to Budal Building, Depot Plaza, Maplewood, New Jersey.

Walter W. Ahlschlager, architect, is located at 120 East 41st Street, New York City, instead of at 295 Madison Avenue.

Clinton and Russell, architects, have moved from 17 John Street, New York City, to 60 Wall Tower.

George H. Bugenhagen, architect, is now located at 204 Seventh Avenue, S.E., Minot, North Dakota.

J. Howard Hess, architect, has been engaged as the City Engineer with offices in the City Hall at Minot, North Dakota.

Ernest Boyd, architect, Jamestown, North Dakota, has closed his office and is now connected with the North Dakota State Highway Department at Valley City.

A. Eugene Cellar, architect, has opened offices for the practice of architecture at 7 Laura Street, Jacksonville, Florida.

Thomas Williams, architect, announces the opening of an office at 6 West 8th Street, New York City.

George Nichols, architect, announces the removal of his office to 144 East 30th Street, New York City.

CALENDAR OF EXHIBITIONS AND EVENTS

Until August	Chicago Architectural Exhibition League Show at the Architects Club, 1801 South Prairie Avenue, Chicago.
Until November 1	"A Century of Progress," International Exposition at Chicago.
July 29-August 14	International Congress for New Building, Marseilles-Athens. Sessions to be held on board S.S. "Neptos." Subject of study: "The Functional City." Discussions under leadership of Gropius and Le Corbusier.

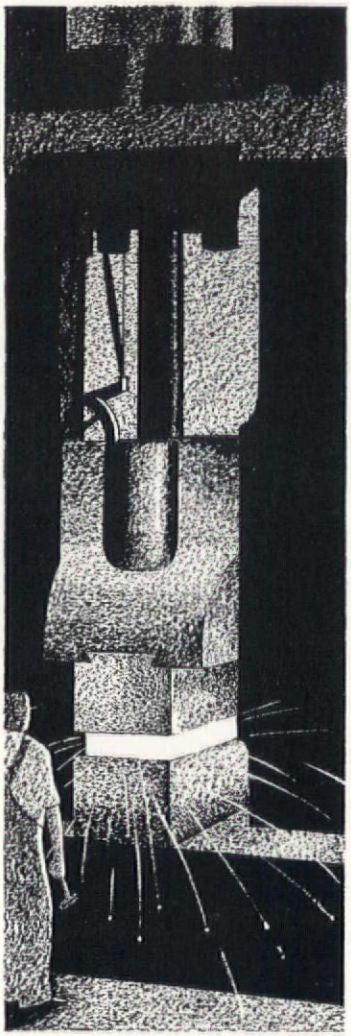
The skyscrapers which comprise New York City's sky line will be the basis of a course in architecture at the summer session of Columbia University, according to Director John J. Coss.

A reorganization in the course of training at the School of Architecture of Harvard University is announced by Professor George H. Edgell, Dean of the School. Included in the plan, which becomes effective in the academic year 1933-34, is the revision in the courses on design and construction, and the addition of four entirely new courses, dealing with composition, functions of buildings, city planning, and professional practice.

Four measures affecting the interests of architects and engineers have recently been passed by the New York State Legislature and signed by Governor Lehman. These measures amend the multiple dwelling law by restoring completely and establishing legally the right of licensed professional engineers to file plans for multiple dwellings and other buildings or structures; amend two sections of the engineers' licensing law to protect the public by stopping existing evasions of the professional practice statutes; permit the engineers' board to take effective disciplinary action against engineers found guilty of unprofessional conduct; and parallel for architects, through amendments to the architects' law, gains equivalent to those granted engineers.

The Committee on Preservation of Historic Monuments of the American Institute of Architects (Leicester B. Holland, Chairman) has launched a move for the preservation of historic American monuments. Architects in every section of the country will cooperate in compiling a national list of buildings, either of architectural importance or of notable historic interest. The Committee has done excellent work in calling attention to the need for preserving rather than restoring buildings.

Ernest P. Goodrich, consulting engineer, has been appointed head of the engineering division of the sanitation department of the City of New York. His work will comprise the completion of Ward's Island sewage disposal plant and the construction of new incinerators to permit the city to cease dumping garbage at sea.



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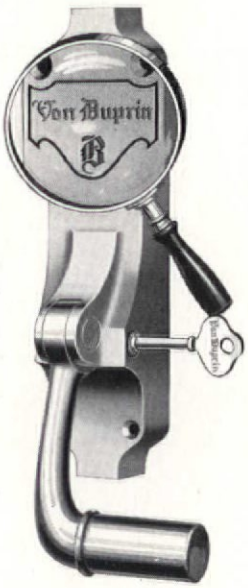

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FEATURES IN THE AUGUST ISSUE

SERVICE STATION FOR STAEBLER OIL COMPANY, ANN ARBOR, MICHIGAN
WOODWORTH AND LOREE, ARCHITECTS

Barsotti

STADIUM IN FLORENCE, ITALY
LUIGI NERVI, ARCHITECT

PROGRESS TOWARD BUILDING RECOVERY: a record of the progress being made in building recovery, both local and national, and a summary of information on the possibilities of Federal aid to localities undertaking building programs.

HOUSING PROGRAMS IN PHILADELPHIA by Bernard J. Newman, Managing Director of the Philadelphia Housing Association. Facts concerning housing needs.

PORTFOLIO OF MODERATE-SIZE HOUSES.

BUILDING FOR THE INSURANCE COMPANY OF NORTH AMERICA, New York City: Shreve, Lamb and Harmon, architects. This new building has been referred to by Lewis Mumford as a pattern for the office building.

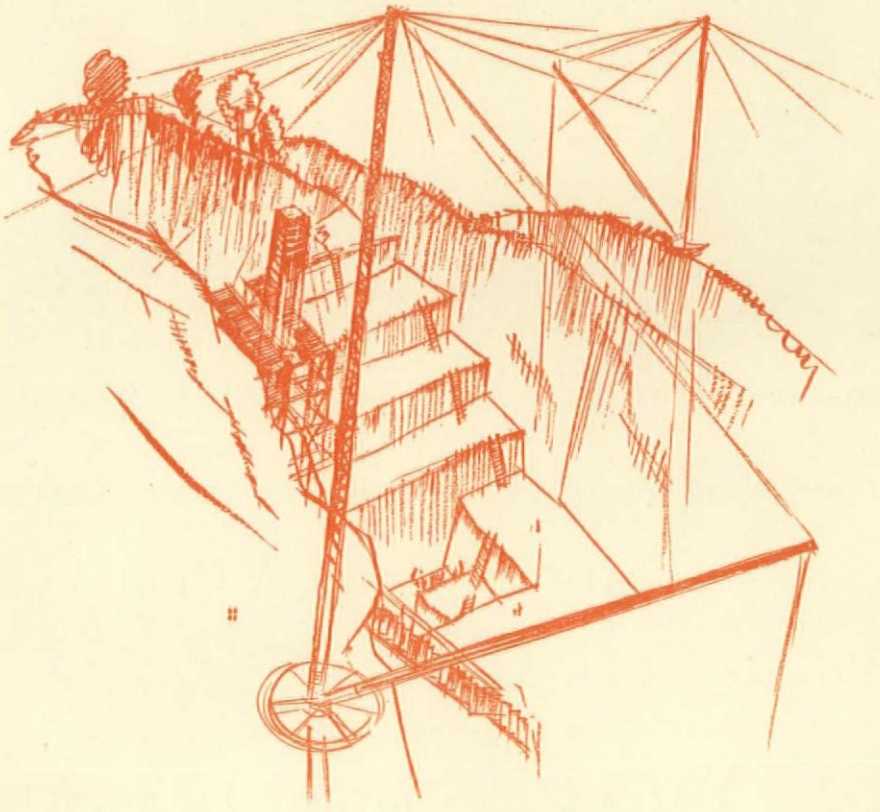
STADIUM IN FLORENCE, ITALY: Luigi Nervi, architect. A large civic play area for 35,000 persons.

FILLING STATION FOR STAEBLER OIL COMPANY, Ann Arbor, Michigan. Woodworth and Loree, architects.

TECHNICAL NEWS AND RESEARCH: "Reducing Heat Losses —Part Two: Choice of Materials" by Theo. F. Rockwell, Department of Heating and Ventilating, Carnegie Institute of Technology. A continuation of the article in the July issue.

THE H. E. FLETCHER COMPANY

of West Chelmsford, Massachusetts



ANNOUNCE THEIR ACQUISITION AND OPERATION OF ONE OF THE FINEST "MILFORD PINK" GRANITE QUARRIES IN NEW ENGLAND AT MILFORD, MASSACHUSETTS ★ THIS ADDITION TO THEIR PROPERTIES COMBINED WITH THE UNLIMITED FACILITIES AND MODERN EQUIPMENT FOR FABRICATION IN THEIR MAIN PLANT AT WEST CHELMSFORD, IS A FURTHER EFFORT OF THIS COMPANY TO AMPLIFY THEIR SERVICE TO ARCHITECTS AND ENGINEERS ★ STOCK FROM THIS LONG DISUSED QUARRY WAS EMPLOYED IN THE FAR-FAMED PENNSYLVANIA RAILROAD STATION, NEW YORK CITY, McKIM, MEAD AND WHITE, ARCHITECTS ★ ★ ★ AND NOW THE H. E. FLETCHER COMPANY IS PROUD TO MAKE THIS NOBLE STONE ONCE MORE AVAILABLE TO USERS OF FINE GRANITE. ★ AT THE PRESENT TIME STOCK FROM THIS QUARRY IS BEING FABRICATED AT WEST CHELMSFORD FOR TWO IMPORTANT NEW STRUCTURES IN WASHINGTON, D. C. ★ THE ARCHIVES BUILDING, JOHN RUSSELL POPE, ARCHITECT ★ AND THE UNITED STATES SUPREME COURT BUILDING, CASS GILBERT, CASS GILBERT, JR., JOHN R. ROCKHART, ARCHITECTS.

PHOTOGRAPHS OF NEW YORK

BY SAMUEL H. GOTTSCHO

TIMES SQUARE

AT DUSK LOOKING SOUTH

FROM FORTY-SEVENTH STREET


HELL DIVERS
Ronald COLMAN
Arrowsmith
Helen HAYES
ASTOR THEATRE
HELL DIVERS
GAIETY
SINCLAIR LEWIS FAMOUS
NOVEL BECOMES THE
GREAT AMERICAN PICTURE
GAIETY
SINCLAIR LEWIS MOST
DRAMATIC STORY NOW
STIRRINGLY SCREENED
BY SAMUEL GOLDWYN
VAN RAALT

THE ARCHITECTURAL RECORD

JULY, 1933 VOLUME 74 — NUMBER 1

PUBLIC WORKS PROVIDED BY INDUSTRIAL RECOVERY ACT

The National Industrial Recovery Act opens up a new field of activity for the building industry by removing legal obstructions in the way of large slum clearance and low-cost housing projects, and by authorizing substantial subsidies for such projects. The provisions with respect to codes of fair competition should enable the building industry to rid itself of wasteful practices, including bid-peddling, that now constitute a hazard to owners as well as to contractors. The general purpose of the Act is to promote industrial employment through a public works program of $3,300,000,000 in two years, of which about $800,000,000 is expected to be under contract before the end of 1933. Architects in private practice will be commissioned to design public buildings. The volume of public construction assured for the second half of this year promises to be reinforced by rising activity in private construction, in view of the upward trend of privately financed building and engineering contracts during May and June.

The National Industrial Recovery Act contains this declaration of policy: "To remove obstructions to the free flow of interstate and foreign commerce which tend to diminish the amount thereof; and to provide for the general welfare by promoting the organization of industry for the purpose of cooperative action among trade groups, to induce and maintain united action of labor and management under adequate governmental sanctions and supervision, to eliminate unfair competitive practices, to promote the fullest possible utilization of the present productive capacity of industries, to avoid undue restriction of production (except as may be temporarily required), to increase the consumption of industrial and agricultural products by increasing purchasing power, to reduce and relieve unemployment, to improve standards of labor, and otherwise to rehabilitate industry and to conserve natural resources."

Title I of the Act is devoted mainly to such topics as administrative agencies, codes of fair competition, agreements and licenses, oil regulation and the like. Title II deals with public works and construction projects and sets forth the program for industrial revival in terms of appropriations and categories of work authorized.

Public Works Administration

Under the provisions of Title II a Federal Emergency Administration of Public Works has been established with powers vested in the Honorable Harold Ickes as Federal Emergency Administrator of Public Works. Mr. Ickes is Secretary of the Interior, and in this office has, since the enactment of the Industrial Recovery Act, played an important role in guiding the policies of the Public Works Administration, being on the Cabinet Committee appointed for the purpose. He comes to his new tasks and wide powers with a fund of information and experience that should insure speedy action and sound procedure. It is of large moment to the building industry that the Honorable L. W. Robert, Jr., Assistant Secretary of the Treasury in Charge of Public Buildings, is seeking the best available talent among architects and engineers to aid in the design and construction of Federal buildings; the utilization of the services of professional architects and engineers should assure the soundness of specific projects comprised within the vast program now about to start, providing also standards of design higher than attainable otherwise.

Funds Available for Construction

An expenditure of $3,300,000,000 for new construction of all descriptions is specifically provided for during the two years ending June 15, 1935,

Keystone View

Hugh S. Johnson

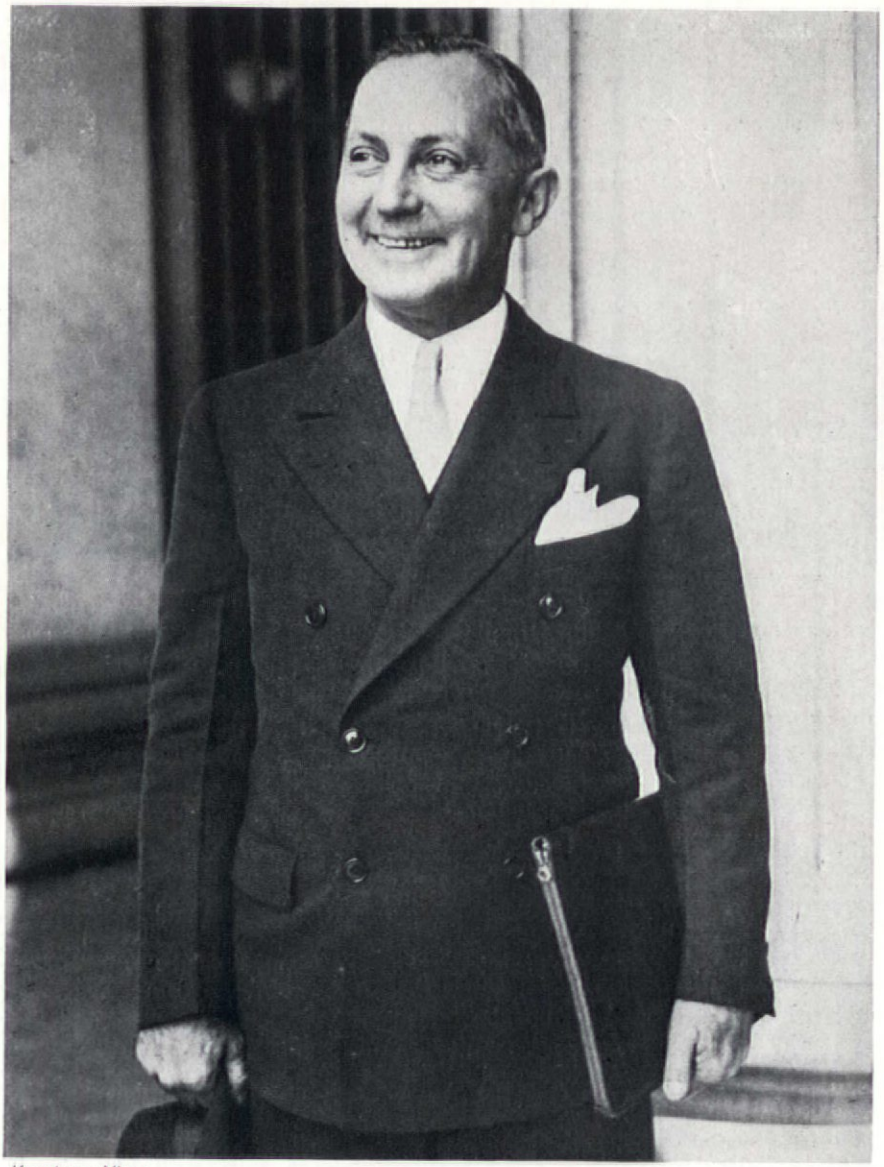
industrialist, who has been selected by President Roosevelt as Administrator of the industrial control phases of the national recovery program

unless the President shall by proclamation or the Congress shall by joint resolution declare that the national emergency, declared to exist at the time the measure was enacted, has ended. The Administrator, under the direction of the President, is instructed and empowered to execute a comprehensive program of public works which shall include construction repair and improvement of public highways and parkways, public buildings, public utilities, and river and harbor developments in the public interests.

Low-Cost Housing and Slum-Clearance

The Administrator is further instructed and empowered to construct, reconstruct and modernize low-cost housing and slum-clearance projects and to make grants to public bodies in furtherance of such projects. He is empowered, upon such terms as the President shall prescribe, to make direct grants up to 30 per cent of the cost of labor and materials employed to states, municipalities, or other public bodies, such as counties, school districts, townships, and even quasi-public corporations like limited-dividend housing corporations for the construction, repair, or improvement of any project. The Administrator, in execution of his powers, can acquire by purchase or by the exercise of the power of eminent domain any real or personal property in connection with the construction of any such project, and sell any security acquired or any property so constructed or acquired or lease any such property with or without the privilege of purchase.

Of the total $3,300,000,000 appropriation authorized for effectuating all of the purposes of the Industrial Recovery Act, at least $575,000,000 is specifically set aside for definite ends, chief among which is the sum of at least $400,000,000 for direct grants to the several states for emergency construction of public highways and related projects such as bridges, including the elimination of hazards to highway traffic, grade crossings,



L. W. Robert, Jr.

architect and engineer of Atlanta, Georgia, who has been appointed Assistant Secretary of the Treasury in Charge of Public Buildings.

Keystone View

relocation of highways and the like. $100,000,000 is earmarked for the purpose of carrying out the Agriculture Adjustment Act and the functions conferred upon the Farm Credit Administration. $50,000,000 is set aside for national park highways and trails; $25,000,000 is earmarked for aiding in the redistribution of the overbalance of population in our industrial centers. The Naval program is not earmarked but it is probable that this will involve an additional $200,000,000.

Immediate Activity Expected

Because of the necessity of putting men back to work and the relative speed with which the highway phase of the program can be undertaken, it appears reasonable to expect that all of the $400,000,000 of such work will be under contract during the next 12 months. It appears altogether probable that before the first of August contracts for new highways and similar projects to be undertaken by states with the grants from the Federal Government will total at least $100,000,000.

In addition there is approximately $200,000,000 in self-liquidating construction projects of various descriptions which have been approved for loans by the R.F.C. and which have been turned over to the Administrator for action; these should materialize into contracts before August 1, 1933. An additional amount of at least $200,000,000 will likely be approved for loans during August and September, while for the remaining months of 1933 the rate of approvals inclusive of all projects is likely to average $100,000,000 per month. Hence it is seen from this that the new program can conceivably produce a contract volume of $800,000,000 for the last six months of 1933.

How much of this total will be for building as apart from engineering construction is difficult to estimate but it appears fairly safe to assume a total for building of at least $250,000,000. Incidentally at least 30 per cent of the total (more than $900,000,000) to be expended for construction under

the provisions of the Act will probably be devoted to buildings as differentiated from pure engineering.

Selection and Financing of Projects

It is to be expected that the provisions of the law will be interpreted liberally, with special emphasis on the needs of unemployment relief and the need for distributing jobs and consumer purchasing power as rapidly as possible. To effectuate the purposes of the legislation the administration of the Act is to be decentralized with district administrators in each of twelve regional districts appointed because of their intimate knowledge of local conditions. These district administrators will, through their own efforts in collaboration with local agencies of government and local Chapters of the American Institute of Architects, provide local construction programs for approval by the Administrator at Washington.

Naturally such a program involves the all-important question of financing. On this question, too, the law will receive liberal interpretation. Specifically the law provides that in extending any aid or grant to any public body the Administrator "may consider whether action is in process or in good faith . . . designed to bring the ordinary current expenditures thereof within the prudently estimated revenues thereof. . . . In his discretion the Administrator may extend any of the benefits of this title to any state, county, or municipality notwithstanding any constitutional or legal restriction or limitation on the right or power of such state, county, or municipality to borrow money or incur indebtedness."

Grants and Terms in Aid of Construction

It is contemplated that public bodies desiring to avail themselves of the opportunity of constructing needed projects may dispose of their entire bond issue covering such projects to the Federal government at par and accrued interest with a stipulated rate of amortization. Obviously this mode of financing construction by public bodies has been necessitated by the almost utter inability of such bodies to sell their obligations in the usual manner. Thus, the authorized program of aids and grants to States, counties, and municipalities substitutes the Federal government for what under past conditions constituted the municipal bond market.

In view of the fact that many public bodies cannot obtain monies by sales of their obligations in the customary way and cannot pay interest, amortize such bonds, or even pay rental on properties which they might lease from the Federal government, the Administrator is empowered to grant such public bodies an amount not to exceed 30 per cent of the cost of labor and material employed in the project permitting the public body to apply the grant to the cancellation of such obligations of amortization, interest or rental as they mature. Thus, on a million dollar project where the cost of materials and labor approximated $900,000, a grant of as much as $270,000 could be made by the United States. In this illustration the public body could use the grant to pay interest or amortize their obligations to the government that were issued to pay for the project. The acceptance of a grant by a public body will not jeopardize its ability to dispose of its obligations to the Federal government.

Community Needs and Local Surveys

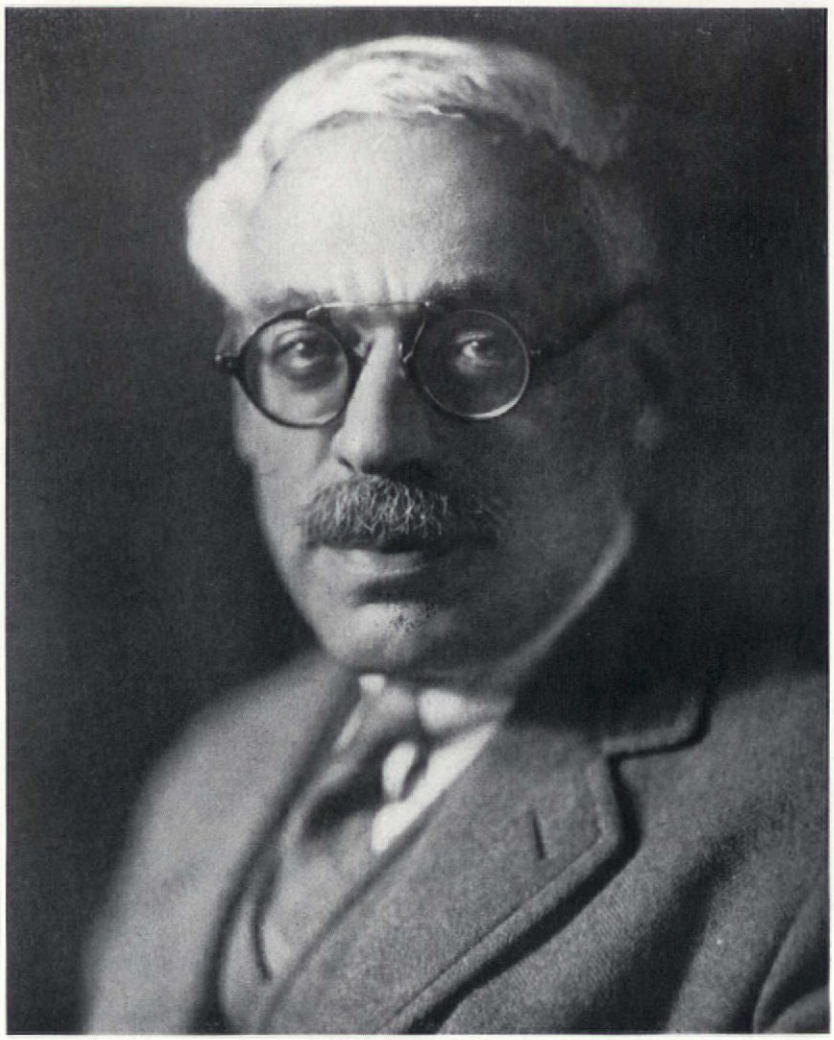
Under the provisions of the Act a very sizable amount of slum clearance and low-cost housing will doubtless be undertaken by quasi-public corporations established for those express purposes. The Act provides that the power of eminent domain may be invoked in ridding our industrial centers of slum areas; that may prove to be the one avenue open to give full force and effect to the provisions concerning slum clearance and low-cost housing. Robert D. Kohn, former president of the American Institute of Architects, chairman of the National Committee for Trade Recovery, and a nationally known authority on housing, has been appointed to the public works administration to be in charge of housing and slum clearance projects. It is also reported, though not officially confirmed, that funds will be appropriated for research and local surveys of housing and rehabilitation needs. The economic and sociological studies of housing conditions, community needs, and city plan requirements undertaken by architects and associated groups in such centers as Cleveland, Pittsburgh, Boston, Providence, Richmond, Kansas City and Detroit will provide a technique and methodology to the Administrator which affords large promise for the success of slum clearance.

Organization of the Building Industries

While the public works program outlined in Title II of the National Industrial Recovery Act is the matter of most immediate interest, the provisions of Title I relating to the organization of industries by trade association groups are not being overlooked. Already the general contractors, the plumbing and heating industries, the lumber, cement and steel industries are at work on codes of fair practice to submit first to their respective trade groups and later to General Johnson for Government acceptance. The aim of such codes will be to eliminate unfair practices within the several industries, such as bid-peddling, secret deals with manufacturers of materials and with labor, special discounts and the like. Irresponsible factors, whether they be material manufacturers, contractors, architects, or labor, would tend to disappear if this feature of the Act works as anticipated. Granted the existing complexity and lack of integration in the group of professions and businesses usually referred to as the construction industry, the working out of organization and trade association policies under Title I of the Act becomes a matter fraught with utmost significance for the future organization of construction activities.

Robert D. Kohn

a past-president of the American Institute of Architects and general chairman of the Construction League of the United States, who has been appointed to the public works administration to be in charge of housing and slum-clearance projects.



A. I. A. ASSISTS IN SELECTING ARCHITECTS FOR PUBLIC WORKS

Under the public works section of the National Industrial Recovery Act appropriating $3,300,000,000 for public works and construction projects, there is opportunity for the employment of private architects in federal, state, and municipal projects of many types, Ernest J. Russell of St. Louis, president of the American Institute of Architects, points out in the May issue of *The Octagon*. His statement praises the appointment of Lawrence Wood Robert, Jr., architect and engineer of Atlanta, Georgia, to the office of Assistant Secretary of the Treasury in Charge of Public Buildings.

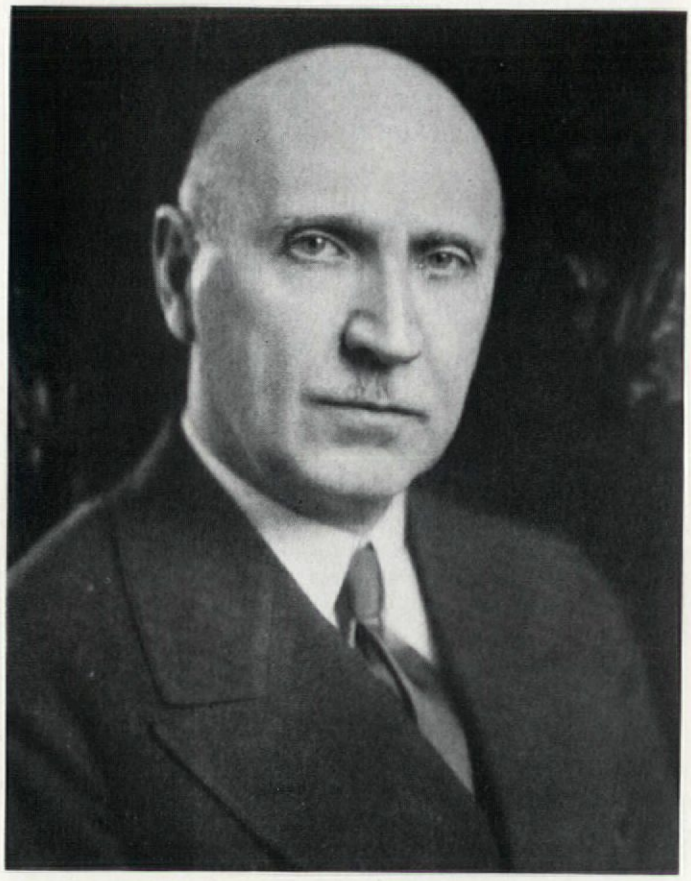
Recognition of Architects and Engineers

A number of conferences, Mr. Russell reports, have been held between officers of the Institute, American Engineering Council and Mr. Robert, and there has been a full discussion of the question of Federal employment of private architects and engineers under the jurisdiction of the Treasury Department.

"Mr. Robert has volunteered the information," the statement continues, "that in the present emergency he intends to recognize the professions to the fullest extent. He frankly states that he expects services of the highest character, and that they shall be rendered most expeditiously. He further states that he expects to scrutinize the qualifications of architects, and that he is particularly concerned with their ability to render structural, electrical, and mechanical engineering service. If it is deemed desirable, he expects to appoint engineers to serve with architects in order that the buildings may be of the highest type and representative of the best efforts of the designing professions. The cooperation of the designing professions and the recognition accorded to them by the new Assistant Secretary are of great encouragement."

Program for Selecting Architects

The American Institute of Architects and the American Engineering Council have been asked by



Mr. Robert to furnish lists of competent architects and engineers in all parts of the United States.

This task, with respect to the architectural profession, has been taken in hand by Louis LaBeaume of St. Louis, chairman of the Institute's Committee on Public Works. The presidents of the sixty-seven Chapters of the Institute, Mr. Russell announces further, have been asked to cooperate with Mr. LaBeaume.

After a complete list of architects competent for appointment to Government work has been compiled by or on behalf of the Institute, it will be submitted to the Treasury Department. Thereafter, the Department may secure more detailed information concerning the qualified architects, either directly or through the Institute.

A.I.A. Activities in Washington

On May 19 the secretary of the Institute, Frank C. Baldwin, sent each Chapter president an advance copy of the Industrial Recovery Bill, then pending as legislation. Attention was directed to the two major provisions of the bill—one relating to codes of fair competition and federal regulation of industry, and the other to an appropriation of $3,300,000,000 for public works and construction projects. Under the public works section there should be opportunity for the employment of private architects in government, state and municipal projects of many types. "The subsection which provides for construction under public regulation or control of low-cost housing and slum clearance projects," Mr. Russell points out, "is of particular significance to the architects in many cities."

Mr. Russell also commends the services of Robert D. Kohn who has spent many weeks in Washington since early March representing the point of view of the architectural profession. Mr. Kohn, a past-president of the Institute, is now chairman of the Institute's Committee on Housing and general chairman of the Construction League of the United States. At the invitation of Cabinet members he took an active part in the drafting of the Industrial Recovery Act.

Above:

Ernest J. Russell

president of the American Institute of Architects.

Below:

Louis LaBeaume

chairman of the Institute's Committee on Public Works.

A RISE IN PRIVATE BUILDING PRECEDES INCEPTION OF PUBLIC WORKS PROGRAM

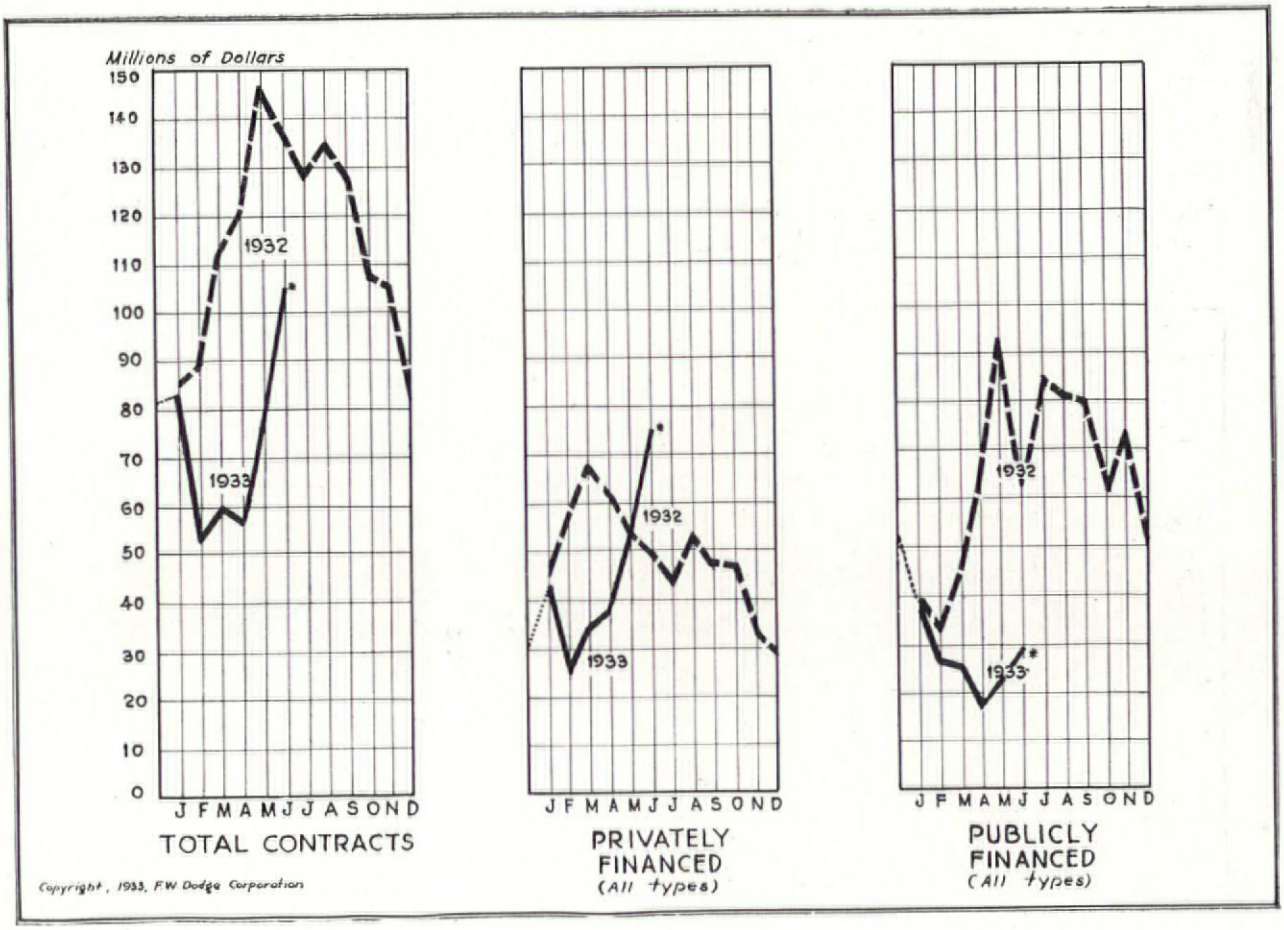
The encouraging improvement that has taken place in private building work, anticipating by some weeks the inception of the Federal public works program, is a very timely aid to the effectiveness of the Federal program. New public projects, instead of as in recent years partially filling big deficiencies of waning private building volume, now constitute an added stimulus to the already upward moving construction industry, and through it to increased employment and business recovery.

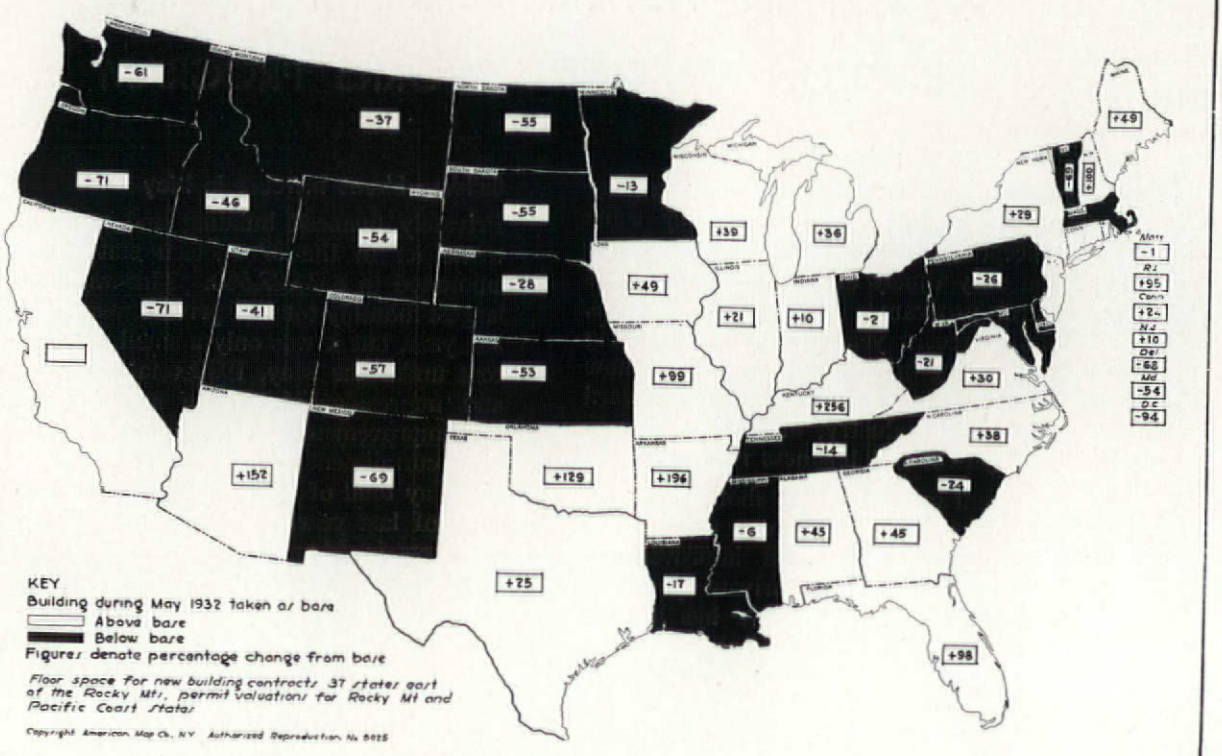
The Government program itself should influence private building activity. It will create employment and confidence, as well as local improvements which will themselves encourage private operations in their immediate vicinity. There has already been a moderate rise in building material prices, which tends to encourage modernization projects, new small-house projects and other classes of needed work. Real estate activity generally seems to be awakening, and continued gradual improvement of the mortgage situation should result from the Home Owners' Loan Act.

Building Shows Increase in May

Privately financed building and engineering contracts let in the 37 eastern states during May amounted to $53,487,500. This was not only the largest monthly total of private work since May of last year, but it was only a small fraction of 1 per cent under the May, 1932 total. Both residential and nonresidential private work participated in this improvement. It was only the recent temporary curtailment of Government work that kept the May total of all contracts below the figure for May of last year. Publicly financed construction contracts in May of this year amounted to only $23,684,200 against $92,548,200 in May of last year. The end of May found this year 51 per cent behind last year in publicly financed construction and only 30 per cent behind in private work.

The widespread improvement in May is shown graphically on the map (page 10). Out of the 37 eastern states 21 had larger totals of new floor space contracted for in May of this year than in





Building Map for May, 1933

May of last year; two of the 11 western states showed similar favorable comparisons on the basis of building permit records. The states with these favorable May records are shown in white on this map. Improvement is indicated very generally in the eastern seaboard states.

Increase Continued in June

Advance figures for June indicate that the upward movement of private work is continuing on an augmented scale. Private contracts let in the first half of the month reached a total of $44,751,400, a 15-day total which is larger than the volume for any entire month since last October. It included two large industrial projects valued at $7,000,000 each. Such large-scale projects may not be duplicated in the second half of June, but even without them the first half would indicate a June total of private work well above that of May. The advance figures for June also indicate continued increase in

CONSTRUCTION CONTRACTS AWARDED IN 37 EASTERN STATES: 1932-1933

	1932			1933		
	PUBLICLY-FINANCED	PRIVATELY-FINANCED	TOTAL CONTRACTS	PUBLICLY-FINANCED	PRIVATELY-FINANCED	TOTAL CONTRACTS
January	$39,344,200	$45,454,200	$84,798,400	$39,479,700	$43,876,300	$83,356,000
February	33,672,600	55,373,200	89,045,800	26,636,500	26,075,800	52,712,300
March	44,812,400	67,422,100	112,234,500	25,206,200	34,752,300	59,958,500
April	60,529,800	61,175,000	121,704,800	17,639,200	38,933,800	56,573,000
May	92,548,200	53,673,000	146,221,200	23,684,200	53,487,500	77,171,700
June	64,268,200	48,806,800	113,075,000	28,821,000	74,434,400	103,255,400
July	85,264,000	43,504,700	128,768,700			
August	81,102,400	52,885,700	133,988,100			
September	80,100,700	47,426,000	127,526,700			
October	60,925,800	46,348,100	107,273,900			
November	73,087,100	32,215,200	105,302,300			
December	52,012,000	29,207,300	81,219,300			
Year	767,667,400	583,491,300	1,351,158,700			

residential building contracts, always a precursor of general recovery.

Future Trend

The statistical table on page 10 and the charts of public and private work on page 9 point out very strikingly the strength of the recent upward movement. Since it took a crisis involving the complete breakdown of the nation's banking system to reduce construction volume to the extreme low levels of last February, March and April, it seems entirely probable that activity will not slump again to such extreme low levels.

HOUSING DEMAND SHOWN BY CLEVELAND INVENTORY

A definite potential demand for one-family houses in the Cleveland area is the logical conclusion of extensive factual data gathered by the Cleveland Committee on Real Property Inventory and made public by the National Conference on Construction. These facts are contained in the first annual report of the Committee, which includes the results of the vacancy-occupancy survey taken in October, 1932, tabulations of real estate transfers, mortgages, foreclosures and other information pertinent to Cleveland's present status and its plans for future development. Employees of the Cleveland post office did the field work for the inventory, entering some three million items on 30,000 city-block record cards.

Potential small-house demand is shown by several important facts. In the first place, family dwelling units of all kinds showed a general vacancy ratio of 9 per cent, offset by 4 per cent of extra families doubled up. Second, vacancies in one-family houses were relatively lower than in any other class of buildings, residential or nonresidential; this vacancy ratio was only 4 per cent, compared with 13 per cent in two-family houses and multiple dwellings combined. In the third place, doubling up was greatest in one-family houses, amounting to 6 per cent, or more than the vacancies in this class. In fact, if the 12,635 families doubled up in all classes of buildings were to seek separate quarters immediately they would not only occupy all the vacant one-family houses, but would reduce the vacancy ratio in other housing classifications to 10, instead of the present 13 per cent. In 53 census tracts out of a total of 321 there were more extra families doubled up than there were vacant dwelling units.

Another important fact brought out is the rate of Cleveland's population growth since the 1930 census was taken. The inventory showed 299,677 families resident in the Cleveland Metropolitan District in October, 1932, compared with 298,316 in April, 1930, when the census was taken. Without this more recent enumeration, Cleveland would have had to fall back on the customary estimating procedure of the Census Bureau, which is to project forward the rate of growth of the preceding ten years. Such an estimate would have called for 314,100 families in October, 1932; to have used this estimate might have led to serious errors in planning for Cleveland's needs. At this time, when the nation's population curve is flattening and when there has been a marked movement away from the cities, accurate information as to population movements from year to year, such as Cleveland has tabulated, is essential to every metropolitan community. Cleveland's inventory shows that, in spite of a population trend away from large industrial centers, her population is still increasing, though at a reduced rate.

Practical applications of the survey data have already been found in Cleveland's plans for rehabilitation of her seven blighted districts, which plans include the low-cost housing projects now seeking loans from the Federal Government. For the guidance of Cleveland's real estate, building and mortgage-financing interests, detailed statistical data on occupancy and vacancy, absorption of vacant lots, new construction and demolitions by 321 census tracts are published in the report. This specific information on small areas naturally shows wide variations with some sections in healthy condition, some on the down grade, and others in various in between conditions.

The principal import of the survey to people outside the Cleveland area is the fact that this inventory is the first one made under the recommended practice of the National Conference on Construction, the United States Department of Commerce and the Chamber of Commerce of the United States as a means of developing local construction-inventory technique and as a demonstration of the practical utility of such a program for all cities of 100,000 population and up. The completeness of Cleveland's survey and the broad factual basis of its rehabilitation and housing programs go a long way toward justifying the proposal that Cleveland be made the laboratory for developing city rehabilitation.

The National Conference on Construction, 1615 H St., N. W., Washington, D. C., is prepared to furnish to business groups in other cities full information as to the inventory procedure so successfully carried out in Cleveland. The Cleveland Committee on Real Property Inventory is headed by Raymond T. Cragin, chairman, 420 National City Bank Building; its survey was carried out under the technical direction of Howard Whipple Green, Supervisor Sixth District of Ohio, 15th Decennial Census of the United States, 1930, whose address is 1900 Euclid Avenue, Cleveland.

HOME OWNERS' LOAN ACT PROVISIONS

Government aid under the Home Owners' Loan Act of 1933 is designed for home owners in distress and facing foreclosure or unable to refinance their obligations through the customary borrowing channels. The Act establishes the Home Owners' Loan Corporation, a government agency, to deal with distressed home owners who occupy their homes or who hold them as homesteads although temporarily not occupying them. Aid is restricted to homes valued at $20,000 or less and built for four families or less.

There are four principal functions of the Home Owners' Loan Corporation: (1) to refund with bonds of the Corporation existing mortgages covering up to 80 per cent of the total home value; (2) to make direct loans in cash up to 40 per cent of the total value where the present mortgagee declines to accept bonds of the Corporation; (3) to make direct loans in cash up to 50 per cent of the total value of unencumbered homes; and (4) to exchange bonds and advance cash to redeem or recover homes lost by foreclosure or voluntary surrender to mortgagee since June 13, 1931.

The law contemplates primarily the refunding of mortgages and not their liquidation in cash. Sufficient funds are not available to take over any large percentage of the home mortgage indebtedness of the country.

Refunding of Mortgages by Bonds

The Act authorizes taking up mortgages on homes (of record on June 13, 1933) by the exchanging of bonds of the Home Owners' Loan Corporation. Interest at 4 per cent on these bonds will be guaranteed by the United States for a period of eighteen years. These bonds will cover the mortgage due, and the Act permits payment in cash of any accrued taxes and assessments and for necessary repairs and maintenance, and the incidental cost of the transaction—provided the total amount does not exceed $14,000 or 80 per cent of the value of the property, whichever is smaller—all of this to be refunded in a single mortgage and paid off, principal and interest, over a period of fifteen years. An interest rate of 5 per cent is charged. The owner may have an extension on the principal for a three-year period. It is possible to refund not only a first mortgage but a second, or any other lien, up to a total of 80 per cent of value.

Taking Up of Mortgages in Cash

In order to bring about this refunding, it is necessary for the lender to accept bonds of the corporation in place of the mortgage now held. Loans are authorized to take up mortgages in cash when the owner of the mortgage will not accept bonds, and the home owner cannot obtain funds elsewhere in ordinary lending channels. The loans shall be carried directly by the Home Owners' Loan Corporation at 6 per cent interest and shall be paid off, principal and interest, over a fifteen-year period. These direct loans are limited to 40 per cent of the value of the property.

New Loans in Cash

The law provides for making loans in cash on non-mortgaged homes for payment of accrued taxes, assessments, necessary repairs and maintenance, but not exceeding 50 per cent of value. The interest charge to the home owners is not to exceed 5 per cent a year.

Redeeming Foreclosed Homes

The Corporation is authorized to exchange bonds and to advance cash, subject to limitations, in order to redeem or recover homes lost by the owners by foreclosure or forced sale by a trustee under a deed of trust or under power of attorney, or by voluntary surrender to the mortgagee within two years prior to such exchange or advance.

The Home Owners' Loan Corporation is to have a capital stock of $200,000,000 subscribed for and to be paid by the United States Treasury. It has authority to issue $2,000,000,000 of bonds, running eighteen years, at 4 per cent interest, with the interest but not the principal guaranteed by the United States Government.

The Federal Home Loan Bank Board shall make rules for property appraisals to carry out the intent of the Act. Definite regulations will be used to accomplish this purpose.

Provision is made for the organization of Federal Savings and Loan Associations under regulations prepared by the Federal Home Loan Bank Board. The Associations would serve communities not now served by their own thrift and home financing institutions. These Associations are to represent cooperative mutual savings funds and substantially all of the funds will be loaned on homes in the respective communities.

Organization of the Federal Savings and Loan Associations will be by Federal charter, but operation and management will be local. The Home Owners' Loan Act stipulates that the United States may subscribe to and pay for stock in the associations up to $100,000 in any one association, paying for stock dollar for dollar as association members pay money therein. The associations will be members of the Federal Home Loan Bank System and may obtain funds from the Bank for lending on homes.

MORTGAGE RELIEF AND SMALL HOUSE BUILDING

Architects will of course want to know whether the Home Owners' Loan Act may be expected to promote small-house building. Mortgage bankers and others interviewed by this magazine agreed generally on the following points: (1) the liquidity of thrift institutions which lend on small homes will be increased, but it is impossible as yet to say how large the total increase will be or how it will be distributed geographically, (2) the refunding provisions of the Act will improve the market for existing houses in distress, partly by withdrawing some from sale and partly by enabling the rest to be sold on terms favorable to buyers and (3) the attitude of bankers towards new building will depend not so much upon the money realized from refunding as upon the demand for housing. The demand is certain to increase with increased employment and rising wages and prices. The Act therefore supplements and reinforces other measures in the Administration's recovery program.

An official of the New York State Banking Department said that in his opinion thrift institutions and trustees will be permitted to accept the bonds of the Home Owners' Loan Corporation as legal investments. If such lenders are inclined to accept the bonds of the Home Owners' Loan Corporation in place of defaulted or distressed mortgages now held, acceptance of the bonds will probably depend on their cash conversion value and on how much of a writedown on the mortgages may be made in the new appraisals.

The policy that the Corporation will follow in respect to cash advances and cash loans is not fully apparent. The statement issued by the Chairman of the Federal Home Loan Bank Board at the time the bill was approved indicates that liquidation in cash cannot be made on a very large scale.

The principal instrument for mortgage relief will be the bonds; and the extent of the relief will be controlled by the value and marketability of the bonds and the appraisal policies to be pursued in the administration of the Act. The reduction in interest and increase in the time span of mortgages refunded should have a tendency to improve the value and marketability of properties refinanced by the Home Owners' Loan Corporation.

HOUSING DEVELOPMENT FOR CHRYSTIE-FORSYTH AREA
LOWER EAST SIDE OF NEW YORK CITY
SLOAN AND ROBERTSON, ARCHITECTS

N. Y. ARCHITECTS APPLY FOR FEDERAL LOAN ON HOUSING PROJECT

Sloan and Robertson, architects, have applied for a loan under the public works section of the National Industrial Recovery Act on a proposal for a housing development on the city-owned Chrystie-Forsyth area in the Lower East Side of New York City. The loan asked for is $8,295,000 or two-thirds of the capitalized value of the project.

Three housing proposals for this site have been submitted to the Board of Estimate in Manhattan. Of these the Sloan and Robertson project has been accorded the most favorable reception, apparently because it promises the city an almost immediate return on its investment since payment of taxes and land rental during construction is included in the proposal.

The project, as proposed, consists of five 12-story units containing 6,831 rooms. Of the seven blocks which have already been purchased by the city and cleared for housing purposes, five would be occupied by buildings and the other two would be landscaped and used as a park.

FINANCIAL SET-UP OF THE CHRYSTIE-FORSYTH HOUSING PROJECT

The Site

The entire area of the site amounts to 307,200 square feet, of which the proposed buildings will occupy 210,575 square feet and the park area 96,625 square feet. The applicants offer to pay an annual rental of $159,605 and taxes amounting to $77,727 or a total of $237,332 each year. It may be pointed out that this equals the current tax rate on the amount paid by the city for the site although the leasehold is capitalized for loan purposes at approximately $10.40 per square foot.

The Buildings

It is proposed to erect five twelve-story fireproof apartment buildings containing 1,926 apartments, divided as follows: 44 one-room apartments; 328 two-room apartments; 848 three-room suites; 553 four-room suites and 153 five-room suites. In all there would be 6,831 "rooms" with a gross floor area of 210 square feet per room.

Elevators would be of the dual control type allowing for both automatic and manual operation. At least one elevator in each unit would be operated by an attendant. The entire development would contain 16,577,948 cubic feet of construction and is estimated to cost $9,252,593, including taxes and land rental for the first year. The rentals would average $10.75 per room per month, counting bathrooms and dining alcoves as half rooms. This rental is based on the payment of 5 per cent interest on the funds to be borrowed.

It is asserted by the applicants that funds may be obtained at a sufficiently low rate to place the rentals at $8.50 per room per month. The set-up provides for 2,312 front feet of store space which would be rented at from $85 to $250 per front foot per year.

Capital and Financing

The cost set-up submitted in the proposal is as follows:

Land rental first year	$ 159,605
Taxes first year (during construction)	77,727
Architects' and builders' fees	207,735
Building construction at 50 cents per cubic foot	8,207,526
Foundations	250,000
Miscellaneous (landscaping, legal, etc.)	350,000
Total	$ 9,252,593
The value of the leasehold is estimated at	3,192,100
Total Value	$12,444,693

The operating statement is based on the payment of 5 per cent interest and, after the first year, 2 per cent amortization. The first year's operating statement, however, allows a 20 per cent vacancy for rooms as against a 5 per cent vacancy for other years.

The operating statements for both the first and second years are as follows:

Operating Statement, First Year

Income

Rooms 6,831 @ $129	$ 881,199
Stores	258,600
Basement	25,620
Doctors' offices (26 @ $1,200)	31,200
Income from submetering current	112,750
Total income	$ 1,309,369

Expense

Land rental	$ 159,605
Taxes	77,727
Maintenance at $40 per room per year	273,240
Interest on loan at 5 per cent	414,750
Amortization at 2 per cent per year	
Room vacancy at 20 per cent	88,118
Store vacancy at 25 per cent	64,650
Doctor's office vacancy at 25 per cent	7,800
Loss on submetering	56,375
Basement vacancy	25,620
Total expenditures	$ 1,167,885

A net balance before Federal taxes and reserves amounting to $141,484 is arrived at from the above estimates.

Operating Statement, Second Year

Income

Income same as first year	$ 1,309,369

Expense

Land rental	$ 159,605
Taxes	77,717
Maintenance	273,240
Interest	414,750
Amortization	165,900
Room vacancy at 5 per cent	44,059
Store vacancy at 10 per cent	25,860
Office vacancy at 10 per cent	3,120
Basement vacancy at 10 per cent	2,562
Submetering loss	43,500
Total expense	$ 1,210,323

A balance before Federal taxes and depreciation reserve amounts to $99,046 or slightly more than 10 per cent.

THE NEW EYE HOSPITAL COLUMBIA-PRESBYTERIAN MEDICAL CENTER

By GEORGE NICHOLS, formerly of James Gamble Rogers, Inc., Architects

The founders of the Columbia-Presbyterian Medical Center in New York City envisioned in their undertaking a gradual expansion of general hospital and medical school facilities into a community of closely related institutions, each covering a specialized division of the medical field. The establishment of the Institute of Ophthalmology and the recent completion of a new hospital for the treatment of diseases of the eye mark the accomplishment of another step in this program.

The initial sponsors of the Medical Center project were the Presbyterian Hospital and the College of Physicians and Surgeons of Columbia University. Before building plans assumed final form, provisions were made to include Sloane Hospital for Women, Squier Urological Clinic, and a future out-patient department, now known as Vanderbilt Clinic. This group was opened for service in 1928. Other buildings have since been erected for the Babies' Hospital, the School of Nursing, the School of Oral and Dental Surgery, the Neurological Institute, the State Psychiatric Hospital, and a Dormitory for Medical Students.

The Institute of Ophthalmology is the latest accession to the Medical Center. Its foundation not only provides additional hospital accommodations, specially adapted to ophthalmic service, with increased facilities for medical and nursing instruction and training; but it provides as well for a staff division of research, equipped with appropriate and extensive laboratories, and also establishes residential fellowships for advanced study in all departments of Ophthalmology.

Location

The new Eye Hospital of the Institute occupies a site at the corner of Fort Washington Avenue, facing south on West 165th Street. It is the first of a projected series of buildings along that frontage, which is expected to include several small hospitals devoted to orthopedics, heart disease, tuberculosis, etc. The building, like all other outlying units, is connected with the main group by a pedestrian tunnel which affords protected communication between all departments of the Center. Through this tunnel it receives supplies of all sorts, and is served by the main kitchens, the laundry, and other centralized utilities. Heat and power are brought from the central plant through pipes and conduits located in a gallery above the tunnel ceiling. The tunnel permits the out-patient service of the Institute to be advantageously located as a department in the Vanderbilt Clinic, and the research laboratories to occupy a floor in the new wing of the College of Physicians and Surgeons, in effective contact with the related work and special equipment of that institution. With the exception of the out-patient clinic and the research laboratories, the eye hospital is designed to house all the activities of the Institute of Ophthalmology.

Planning

Proper care of the patient being of paramount importance in hospital design, the plans of the patients' floors have been considered the master plans of the building, to which the plans of other floors are accommodated. The widely different requirements of ward and private floors have been harmonized, and the size, shape and fenestration of a plan satisfying these combined requirements have determined the mass and aspect of the building. The general plan is U-shaped, with the ward wings inclosing a court opening to the south, approximately 90 feet in width and 57 feet deep. This disposition gives to all patients' rooms the desirable east, south and west exposures, the north front being occupied exclusively by rooms for service and other functions for which direct sunlight is not essential.

The main entrance is located in the south court, and is approached from 165th Street by a driveway and walks designed to overcome the somewhat disadvantageous grades of the adjacent street and avenue. The Ward Patients' Hall is approached through the main entrance. A separate driveway and path on the Fort Washington Avenue side give access to the Private Patients' Hall. The ambulance entrance opens from a driveway from 165th Street, on the easterly side of the building. The depression of this driveway below surrounding levels affords desirable privacy. An important feature of the general ground plan of the Medical Center is the disposition of the buildings of the main group about a great central garden. The garden entrance of the Eye Hospital opens from the central hall in the second story, upon a bridge spanning the north area at garden level.

Exterior Design

The exterior is a straightforward expression of the plan and its functions. The more important activities of the institution are indicated in the

façades, and the major elements of the program are so disposed as to form the centers of interest and the controlling motifs of the elevations. The building has eleven stories above the basement. Essential space is gained in the lower stories by projections beyond the lines of the general plan. The requirements of the seventh and eighth floors permit reduction by set-backs, and the ninth story again sets back to permit the use of the resulting roof areas as sun decks in conjunction with the solariums occupying the central portion. Above the ninth story the two stories containing mechanical equipment are reduced to a tower-like terminal feature.

The walls are faced with the gray-buff speckled brick used in the buildings of the main group, and trimmed with buff Indiana limestone. A similar brick of a more pronounced yellow tone has been mixed at random with the gray brick, the proportion of yellow brick increasing regularly toward the top. Entrances and other focal elements are emphasized by simple devices in pattern brickwork, and axial and rhythmic accents are provided by the same means, although but one specially molded shape is used. The use of the same and similar materials establishes harmony of color and relationship with the main group.

Conditions of level and size, however, precluded a repetition of the architectural pattern of the earlier buildings, the predominating dimension of which is that of great height accentuated by a vigorous vertical treatment. The Eye Hospital stands upon ground at a lower level, and its modest height is somewhat less than its breadth.

A horizontal effect is achieved by closely spaced projecting brick courses for the entire height of the basement story, and by bands of similar formation filling the space between the heads and sills of windows in the stories above. These bands occur at such intervals as to divide the building height into spaces of pleasing vertical proportions. Narrow projecting string courses run through these spaces at window sill and head levels. Taking advantage of the diminution in size of the steel frame in successive tiers, the wall face is set back two inches at the third-story sills, and again at the sills of the seventh story. Above this level the external angles of the building are chamfered, and these chamfers increase in size with successive stories. This, with the slight set-backs in the wall face, effects a subtle correction of the overhanging effect of plumb walls. This correction is further enhanced by a lessened projection of the band courses in each successive tier. The vertical chamfers of the external angles merge at the top with the horizontal chamfers and pitches of the wall copings, producing a softened skyline which is broken only by the terminals of the vertical motives in the tower and by subordinate axial accents elsewhere.

Basement Plan

The westerly wing of the basement is above ground, by reason of the sloping site, and contains an extension of the first-floor suite of offices for the private practice of the staff. The waiting room of this suite is accessible from the first-floor hall by a special stairway, and is connected with the general waiting room of the adjoining X-ray and optical departments. The easterly basement wing provides space for the future development of complete kitchen facilities. The subsidiary mechanical plant is located adjacent to its tunnel connections. The remainder of the basement is occupied by locker rooms for nurses and for the domestic staff and by rooms for linen storage, linen sorting and other services.

The First Floor

The first floor is planned to separate the ward and private services. The Ward Patients' Hall is approached from West 165th Street through the south court. Surrounding the Ward Patients' Hall are the superintendent's office, information desk, social service office, and the doctors' registry and locker room. The examining, emergency, treatment and admission facilities are immediately adjacent. The easterly wing of the first floor contains dining rooms for nurses and for doctors, with service rooms between. The pantry is designed for use either by waitresses or for cafeteria service. The dietitians' office opens from the dining room corridor.

The decorative treatment of the Ward Patients' Hall is a simple clothing of the essential structural and functional elements with appropriate finishes, the forms and proportions of which are developed in character with the exterior of the building. The floor is of Venetian mosaic. The walls are wainscoted with Tavernelle marble, and the principal features are emphasized by the use of a slightly darker and more vigorously patterned variety of marble from the same quarry. The frieze and ceiling are laid with aluminum leaf dulled with a painted over-glaze.

The illumination of this hall, and of all other spaces and rooms occupied by patients, has been accomplished without presenting unshielded lamps to direct vision. This has been done by the design and selection of appropriate fixtures in preference to concealed source illumination, which, unless unduly elaborate, is not adapted to hospital standards of cleanliness.

The Private Patients' Hall is entered through a portico and vestibule approached from Fort Washington Avenue. The administrative offices and the information desks are located between the Private and Ward Halls, centralizing control and minimizing personnel. An extension of the Private Patients' Hall to the west terminates in a bay window overlooking Fort Washington Avenue and provides additional waiting-room space serving the private practice suite in the westerly wing.

The Private Patients' Hall and Waiting Room, and the adjacent corridors have rubber floors, in the colors and patterns of marble pavements, and

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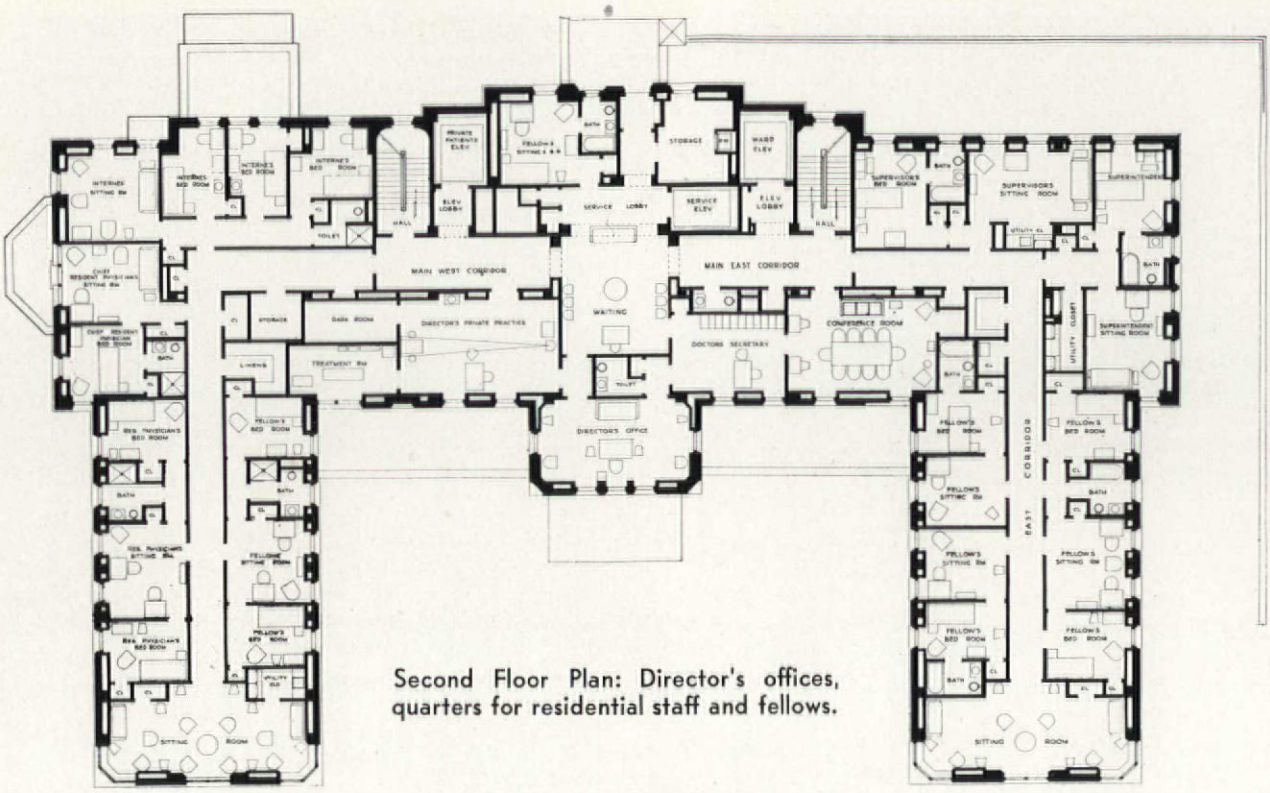
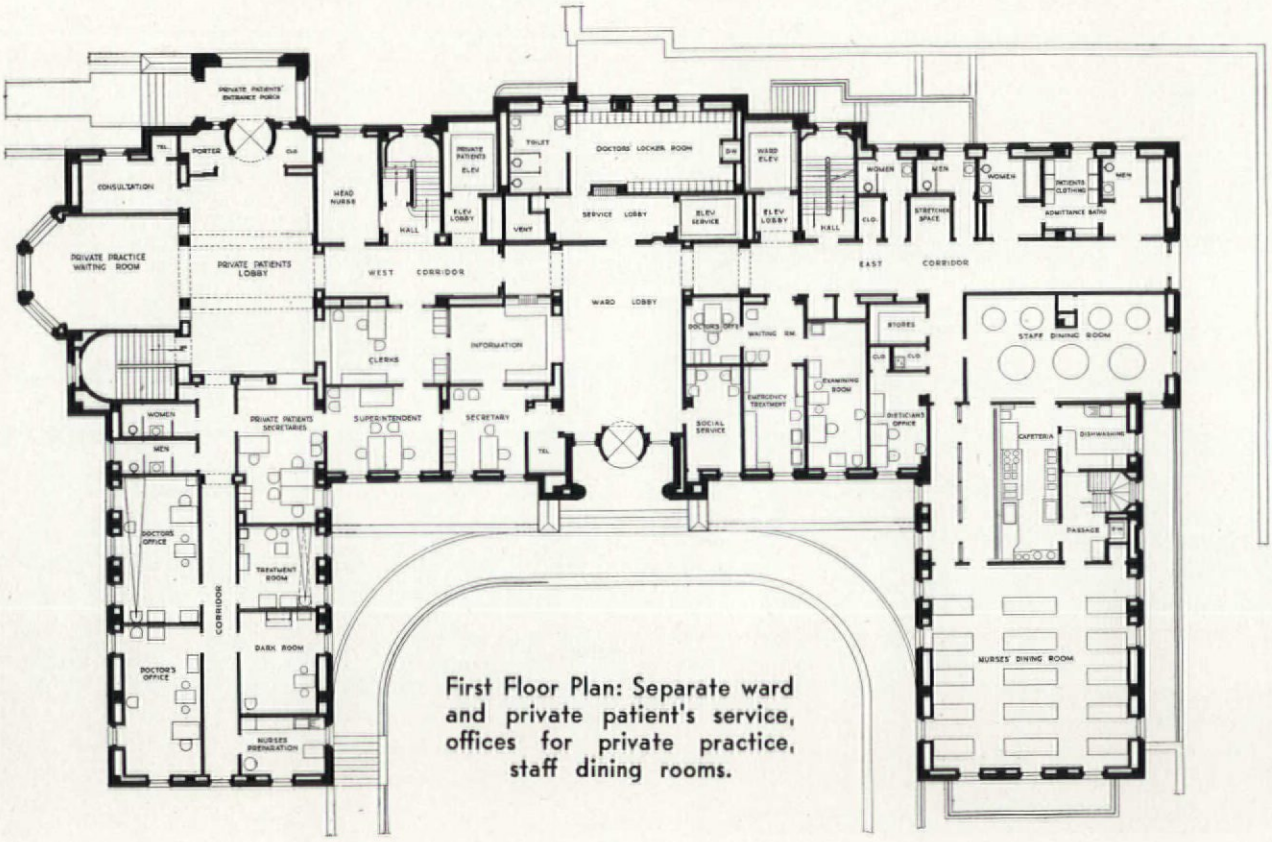


Second Floor Plan: Director's offices, quarters for residential staff and fellows.



First Floor Plan: Separate ward and private patient's service, offices for private practice, staff dining rooms.

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a wall base of Catalan red marble. From base to ceiling the walls are finished in white oak Flexwood of natural color. Panels and wall patterns are produced by the contrasted grain of the wood, and by curtain-like forms in the surfaces above the openings. Plain pilasters of small projection separate the wall panels, contributing vertical emphasis and a recall of structural elements.

The ceilings of the Private Hall and adjacent spaces are embellished with novel forms and patterns, consistent with the general decorative scheme. They are finished in a golden metallic leaf, heavily glazed with color. Narrow elements of the gilded and colored ceiling ornament are carried down into the wood surfaces of the over-door panels and through the soffits to continue in the ceilings beyond.

The Second Floor

The offices of the director of the Institute are located on the second floor. The waiting room of the suite is centrally placed and accessible from both private and ward elevators and stairways. The garden entrance opens from this room. The director's private office occupies a central bay, projected into the south court above the main entrance, forming the principal feature of this façade. The administrative rooms of the suite open from the east side of the waiting room and private office. The rooms for professional practice are grouped on the west side. The remainder of the second floor is devoted to quarters for the professional staff and fellows in residence, and for the superintendent and supervisor. There is a club lounge at the south end of each wing and the variously arranged suites of sitting rooms, bedrooms, and baths accommodate fifteen persons.

The Upper Floors

The third floor is allotted to male patients, and contains two twelve-bed wards and six single-bed wards, with the usual related rooms for nursing work and service. The wards for women and children are on the fourth floor. A ten-bed cubicled ward and an isolation suite of three beds are provided in the west wing for children. A twelve-bed ward for women occupies the east wing and there are six single-bed wards in the central section. Nurses' stations, and where possible the utility rooms, command a view of adjacent wards. Ward visitors use the easterly elevator. The waiting room is nearby, and the nurses' station on this side is arranged for visitors' information and control in addition to its usual functions. Each single-bed ward has a wardrobe closet, and also its own toilet room, in which is a wall cabinet for the utensils of nursing care.

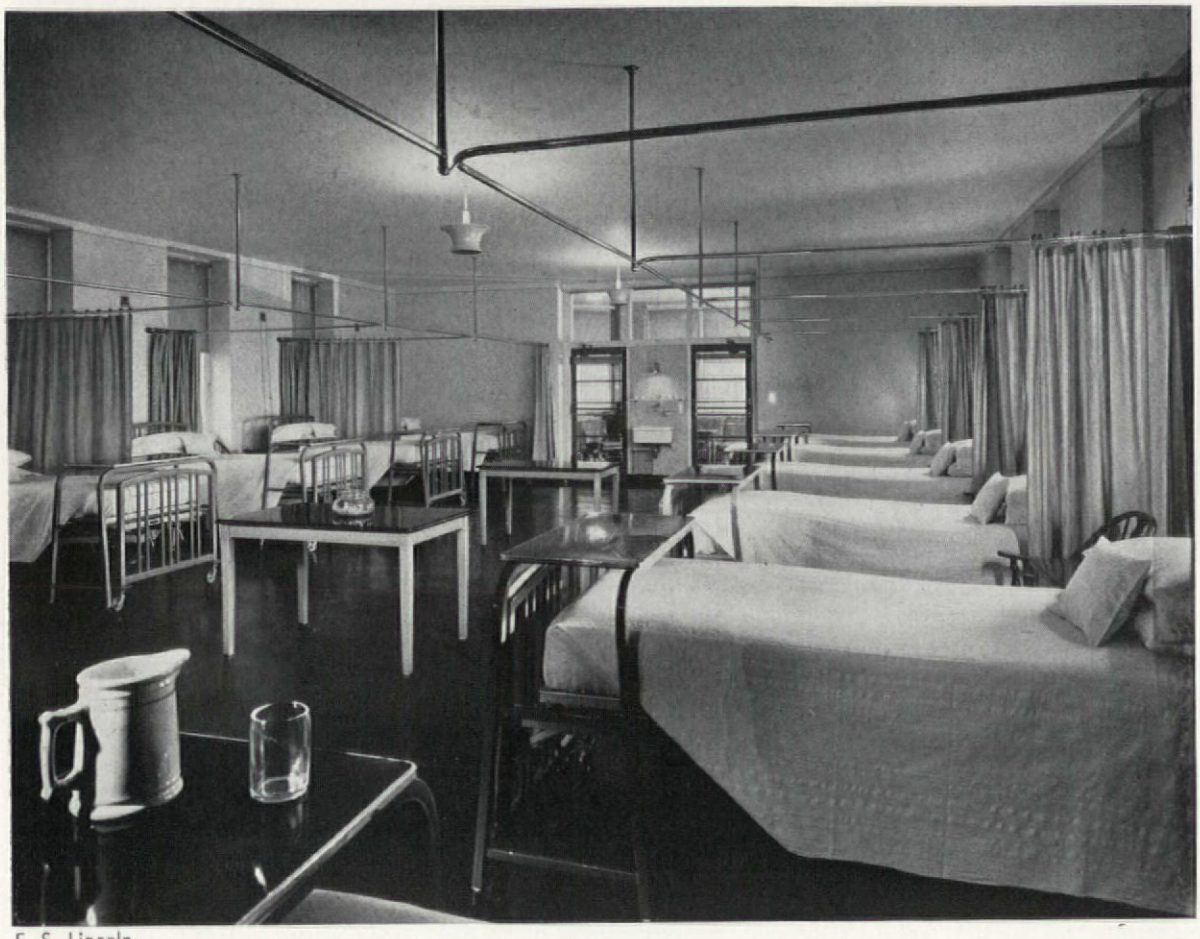
Provision is made for the future expansion of patients' accommodations by the inclusion of an extra floor, which is utilized as temporary housing for thirty-three nurses. This expansion space is located in the fifth story, between the ward and the private floors. This will permit the extra floor to be arranged for and added to either service, as future demands may require. This floor has been inexpensively but completely finished. In its construction the floor slabs have been dropped to the underside of the floor framing in all sections where piping must be extended for the future equipment of either a ward or a private room floor, in order that this may be accomplished without disturbance of the ceilings below. The ceilings throughout this story are of plaster board, clipped to the permanent furring, and easily removable for future changes in electrical conduits and outlets or other overhead mechanical work. Common sitting rooms occupy the southerly ends of the two ward wings, and a visitors' parlor opens from the central hall.

The sixth story contains the private rooms, and separated therefrom a semi-private section. The private section provides four rooms with baths and eight rooms with toilets. Two of the large rooms have a smaller room adjacent, with communicating doors, for use by patients with special attendants. The semi-private section has seven single rooms and three double rooms, each with toilet. In the easterly wing provision is made for accommodations of moderate cost by glazing the corridor partitions and providing a special nurses' station centrally located in a recess of the corridor so that six beds may be under the observation of a single nurse. Curtains on the partitions provide privacy when required, and each room has the same toilet and wardrobe equipment as other rooms.

Each of the three patients' floors has a treatment room, dark room for examinations, rooms for visitors and consultation, and complete facilities for nurses' work and service. Although compactly planned, adequate space is provided for all essential functions, and these are located and arranged for convenient and efficient service with a minimum of travel.

Special Provisions

The special requirements of eye patients have been carefully considered and are reflected in the arrangement of the ward and private-room floors. The average time in hospital is relatively brief, and in the severest cases not more than five or six days are spent in bed. In the majority of cases only one eye is affected and the patient is dressed and active during the greater part of his stay. Hence it is desirable to provide, particularly on the ward floors, ample public sitting rooms and also to arrange for the service of meals at table as well as at the bedside. Combined sitting and dining rooms, in which meals can be served, are located directly across the corridor from the service pantry. Between meals, the tables are folded and stored in shallow wall cabinets, and the room is available as a sitting room. Afflicted eyes being protected by masks and bandages, sunlight is as desirable for eye patients as for other sick people. Sun rooms are accordingly provided at the southerly ends of the ward wings. Since eye patients are particularly susceptible to drafts, these rooms are inclosed and



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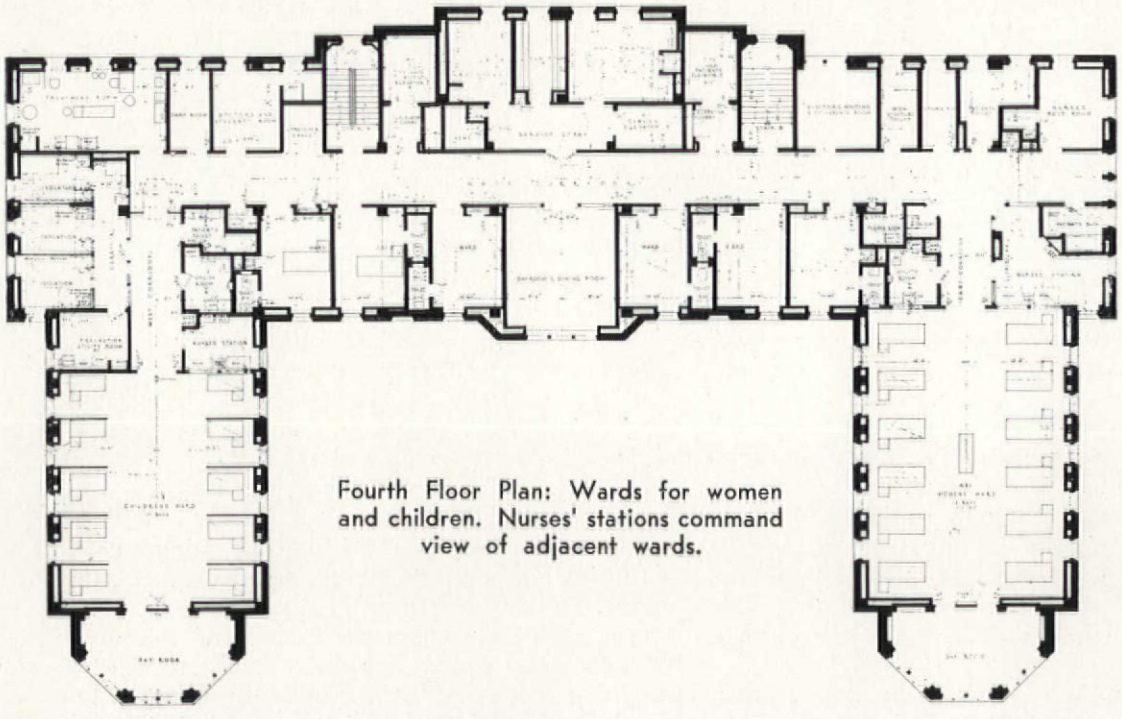
Typical Ward.



Fourth Floor Plan: Wards for women and children. Nurses' stations command view of adjacent wards.

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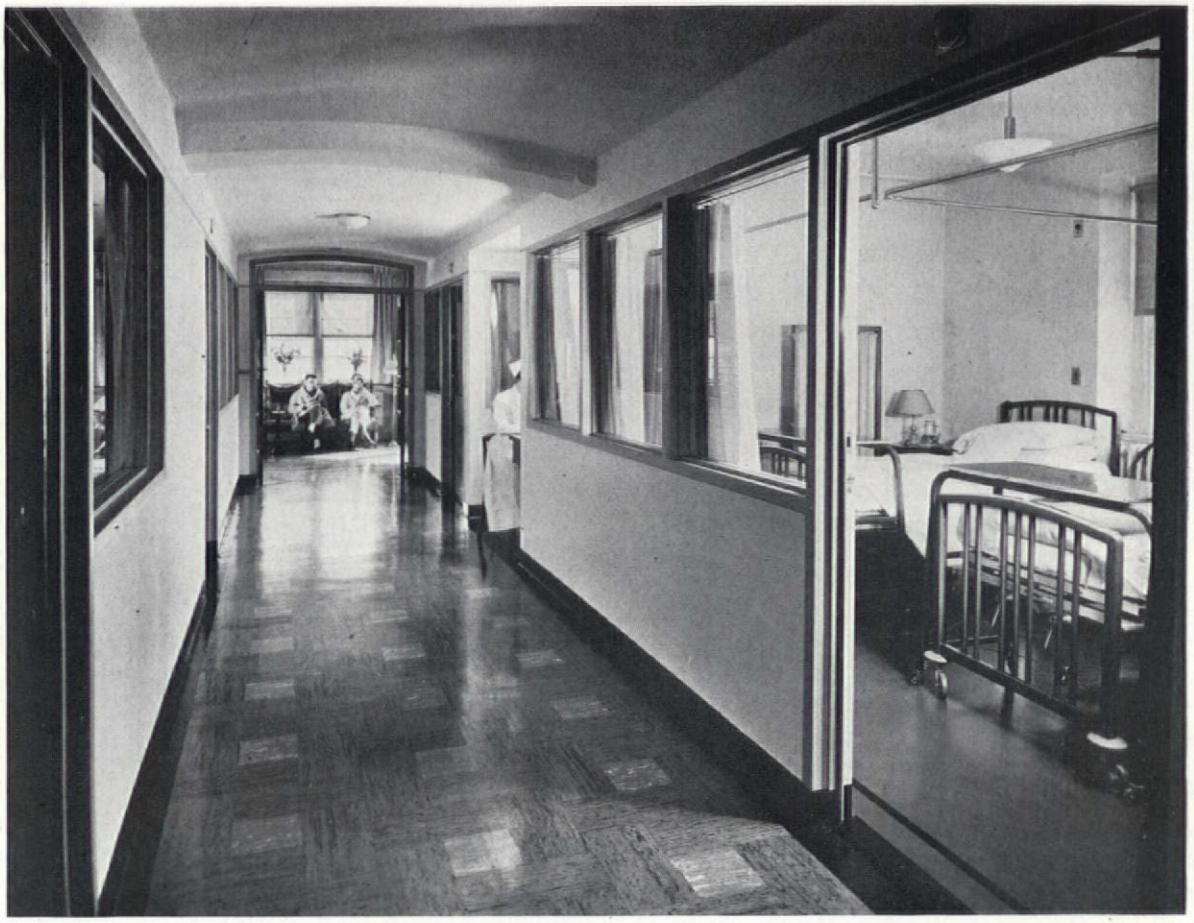

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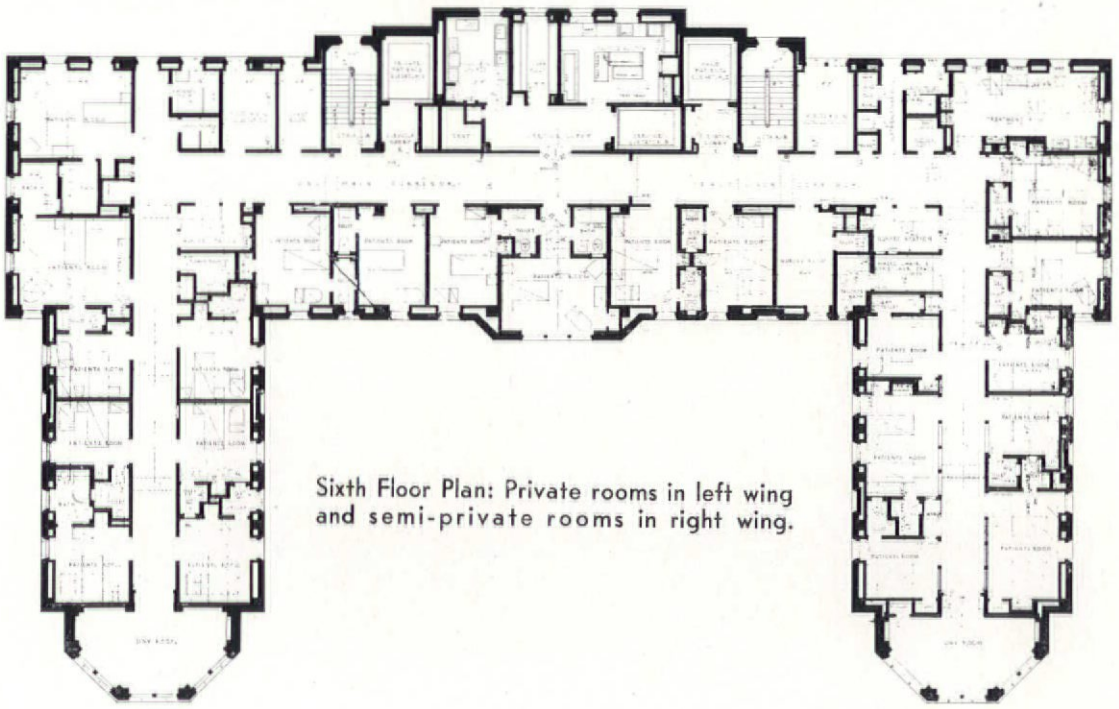
Semi-Private Rooms.



Sixth Floor Plan: Private rooms in left wing and semi-private rooms in right wing.

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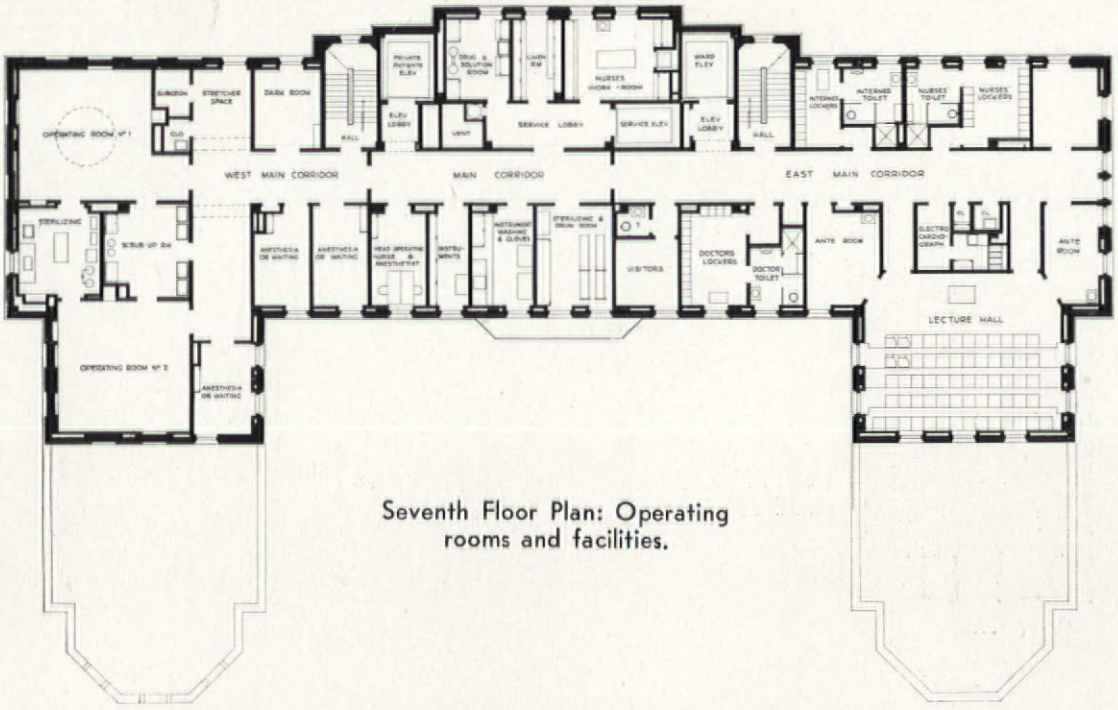
Ward Patients' Hall.



Seventh Floor Plan: Operating rooms and facilities.

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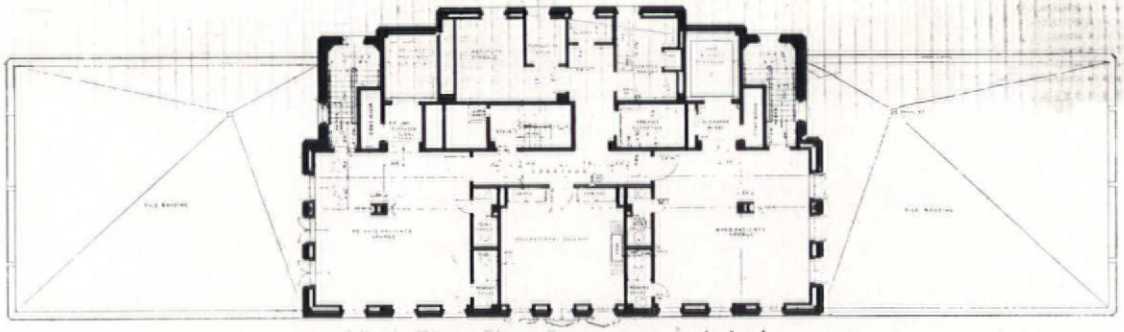
F. S. Lincoln

Private Patients' Hall.



Ninth Floor Plan: Sun rooms and decks.

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heated, although the windows are as large as possible.

Sound Transmission Control

Temporary deprivation of sight results in a nervous tension which is aggravated by noise. Therefore, the elimination of noise-producing sources and the prevention of sound transmission, which is receiving increasing attention in the design of general hospitals, is of special importance in those devoted to eye treatment. Structural methods and materials possessing sound absorbent properties have been employed; floor, wall and ceiling finishes of similar qualities have been used, and hardware and equipment as nearly noiseless in operation as possible have been selected. But a major reduction of noise at the source can be accomplished by suitable plan arrangement. It will be noted that the principal service functions are isolated from the main corridor by a separate service lobby, into which open the service elevator, ward pantry, linen room, linen chute and nurses' workroom. The passenger elevators are withdrawn as far as possible from the corridors, not only to afford space for

waiting passengers, but to remove in some degree the noise of conversation and of the elevator doors.

All patients' room doors have been provided with shock and sound absorbing strips presenting a continuous felt surface to the door on closing. These strips are adjustable for wear on the top and sides of the doorway and the bottom strip rises with the opening of the door and falls to close contact with the floor when the door is shut. Movement of the door is controlled by a liquid spring and check, normally closing the door gently when released, but capable of automatically holding the door open at an angle of 90 degrees, 45 degrees or 10 degrees when arrested at those points. The door is held in a closed position by a specially-designed noiseless bullet catch. It is opened from the outside by simple pressure and pulled open from the inside by an arm hook of the usual hospital type. Doors so equipped cannot be slammed by drafts and can be opened by attendants carrying a tray or other articles. The doors are equipped with a dead bolt operated by key for locking the rooms when not in use.

Furnishings

With the exception of the public rooms on the first floor, the decoration and furnishing of the building has been directed by the women of the special house committee. Each floor has its special dominant color. An individual and homelike scheme of decoration and furniture has been developed for each private room. The fixtures and tiling of adjoining baths and toilets are in corresponding colors.

Operating Facilities

The major portion of the seventh floor is occupied by the operating suite, which comprises two operating rooms with scrub-up and sterilizing rooms between and four anaesthesia or waiting rooms, one of which can be completely darkened. Adjacent to the operating suite are the office of the head operating nurse and rooms for sterilizing, glove preparation, instrument storage, drugs and solutions, room for the manufacture of dressings and a waiting room for patients' relatives. Locker and dressing rooms for doctors, internes and nurses are next in proximity.

At the easterly end of the floor is a room equipped for the treatment of cases involving ear, nose and throat complications, rooms for electrocardiograph machine and developing, and a lecture hall seating thirty students.

The eighth floor is devoted to routine and teaching laboratories, which have been planned and equipped to afford complete and convenient facilities for the investigation and demonstration of all ophthalmic processes. A laboratory and study for resident fellows, a record and conference room, and the departmental library are located on this floor. The observation gallery above the operating suite is approached from this level.

Observation Gallery

Special facilities for the observation of operations by medical students have been provided in teaching hospitals in various forms. In earlier hospitals the dangers of infection and the general inconvenience resulting from observers crowded about the table and looking over the surgeon's shoulder were lessened by placing the observers on a movable bank of elevated seats or stands. The next advance was a permanent gallery, approached by steps from the operating floor. Such galleries were often placed in front of the windows, as affording the best lighting conditions for the observers, but in that position they were a serious impediment to light for the operating table. This was partially overcome by increasing the height of the room, thereby raising and increasing the size of the windows, also by locating the operating suite at the top of the building, where skylights could be constructed. In more recent developments the location of the observation seats under the windows has been abandoned, and they are now commonly placed in galleries projected from the inner walls, and made accessible from the floor above. But in their best form such galleries do not provide ideal facilities for observation. Even when the operating room is made as small as possible, the distance of the observers from the table is too great. If the gallery is built low to reduce this distance, the angle of sight is unfavorable, and vision is obstructed by the surgeon and his assistants. Such galleries provide only a few positions with good view.

The director of the Institute, Dr. John M. Wheeler, was desirous of including in one of the new operating rooms provisions for students' observation which would overcome these disadvantages, and be superior to operating rooms previously constructed. Examination of many hospitals in this country, and particularly in Europe, which were reported to be provided with the desired facilities, failed to reveal anything other than familiar provisions for ordinary surgical work.

The novel design of the room as built results from a consideration of the basic requirements without reference to any devices previously constructed for the purpose. The familiar scheme of a lofty room, lighted by a great window and encumbered with student observers seated in elevated banks or galleries, has been discarded. In its place is a room of moderate height with no windows.

Ample, shadowless illumination is accurately focused upon the operative field by a circle of sixteen Holophane units sunk in the ceiling. Within this circle of lights the ceiling is open, and the opening is extended upward as a cylindrical well, which rises into the room above and is closed at the top by a low dome. The lower circumference of the dome is pierced by a continuous ring of openings glazed with safety plate glass.

Sixteen observers can be seated around this dome and look directly down upon the operating table, which is less than ten feet below their eyes. A circular pit is formed in the floor construction sur-

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Sun Room of Children's Ward.

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rounding the dome, to bring the observers down as close as possible to the operating table. The angle of vision is such that all seats have an equal and clear view of the operative field, unobstructed by the surgeon's hands. By the use of binoculars almost microscopic vision is possible. All procedures throughout the operating room are visible.

The observation room in which the students are seated is approached from the floor above the operating room, and is completely isolated from it except as to vision. Septic hazards are thus eliminated. The noise and disturbance of observers in the operating room are avoided. The complete separation of the two rooms makes possible the separate air conditioning of each. While in use the observation room is lighted only sufficiently for access to seats. No special preparation or clothing of observers is necessary. Their movements or conversation cannot inconvenience the operation.

The surgeon's descriptive remarks accompanying the operation are transmitted to the students by a small microphone concealed underneath the lapel of his gown. The speaker is located on the ceiling of the observation room. The surgeon's preliminary lecture before the operation is transmitted by this same speaker from a microphone in the surgeon's retiring room, adjacent to the operating room.

Operating Rooms

There are two operating rooms, only one of which is designed for observation. Both are equipped with requisite appliances of the most modern type.

The floors are of terrazzo, divided into small squares by a welded network of brass strips grounded to the steel frame of the building. A dragging chain on the wheeled stretcher carriages, and a similar contact on the operating table insures insulation from static sparks. All switches are of sparkless type. The walls are covered with gray mat finish tiles. Hospital-type radiators sunk in wall recesses are employed to lessen the load on the air conditioning plant by offsetting the cold transmitted by the outside walls. The ceilings are of sound absorbent plaster. The illumination of the second operating room, which is not equipped for observation, although accomplished by Holophane units sunk in the ceiling, similar to those under the observation dome, is designed to fulfill other conditions. The ceiling immediately above the table is free from lights. The units are arranged in radial lines, focused upon the operative area, and are sufficient in number to permit cutting out sectors behind the surgeon if desired.

Solariums

Two solariums, one for private and one for ward patients, occupy the ninth story, and each opens upon a spacious sun deck. A pantry for the service of intermediate meals and beverages is provided. Toilet facilities and a room for occupational therapy work are located between the two solariums.

The tenth and eleventh stories house the water tanks, the machinery for elevators, ventilation, refrigeration and other purposes, and terminate the building.

VOICE TRANSMITTERS IN THE EYE HOSPITAL

By JAMES O. OLIVER

The placing of the observation room above the operating room, and completely separating it except for vision through the glazed ceiling dome, obviously required a voice transmission system by which the surgeon's explanations and lectures could be brought to the students. It was essential that the microphone be conveniently placed to receive the surgeon's voice, yet not so as to interfere with his work.

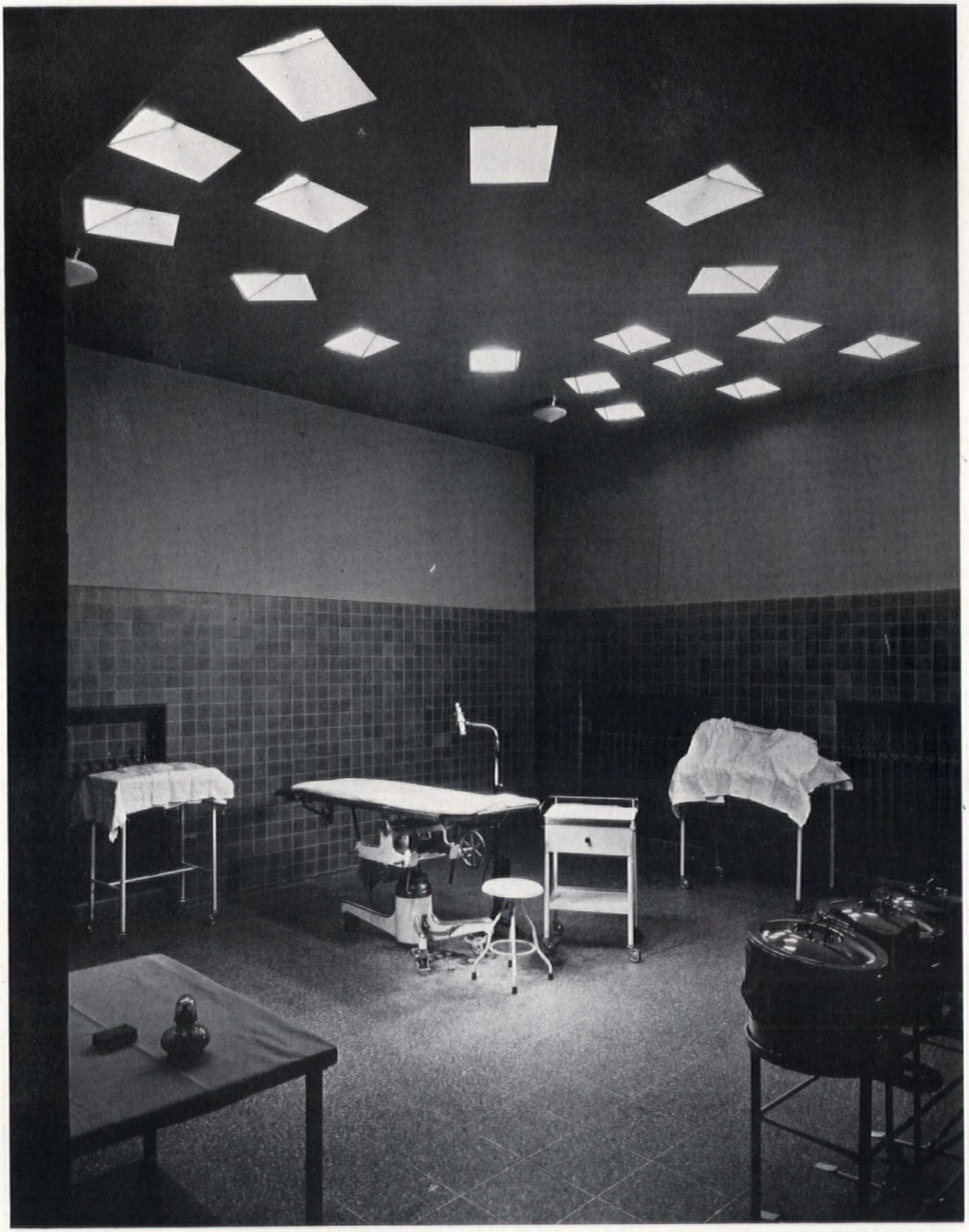
Experiments were made with different types of microphones. Those of large size, suspended from the dome above the surgeon's head, proved unsatisfactory, as they transmitted every noise produced in the operating room. A miniature Western Electric microphone of the lapel type recently developed was found to be best adapted to the requirements.

This microphone is pinned to the surgeon's gown, or the gown of his assisting surgeon, and the wire is passed underneath the gown from the back of the neck; the microphone is covered by the gown and never in the way. The construction of the microphone and its location at a constant distance from and close to the speaker's voice minimizes acoustic difficulties. Good speech transmission results.

The observation room ceiling has been given an acoustic treatment for improved reception.

As a further aid in student instruction, the doctor is enabled to talk from an adjoining room while preparations are being made for the operation, thus giving the student an explanation of the work about to be done before he views it.

The installation includes a Western Electric No. 59-A type amplifier, installed in a control room off the observation room, and a Western Electric surface type speaker. The engineering and installation of the system were the work of the Graybar Electric Co., Inc., in association with James O. Oliver & Co., Inc.



South Operating Room: Acoustical plaster ceiling, gray tile walls, terrazzo floor.

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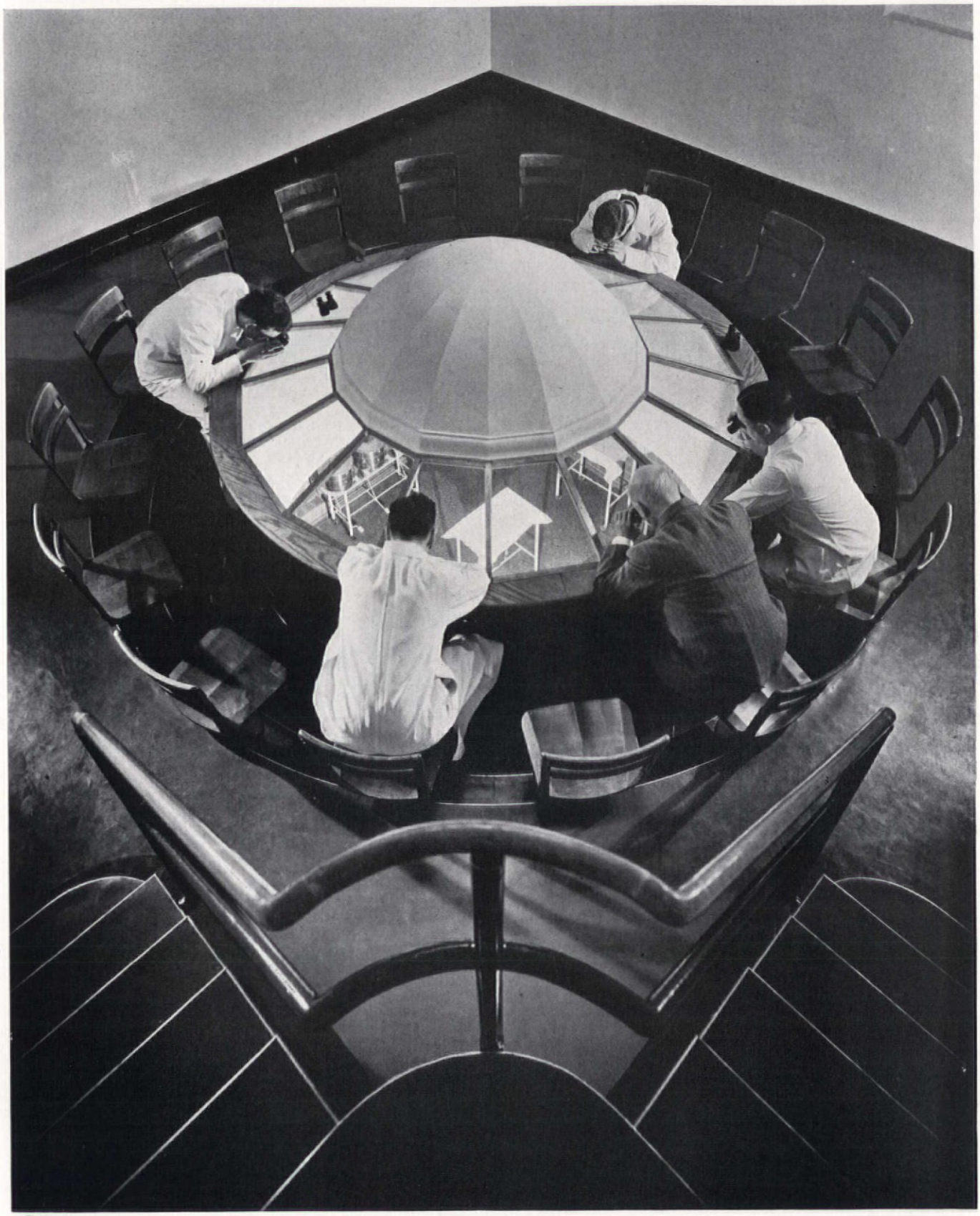
OPERATING ROOM IN THE EYE HOSPITAL

North Operating Room.

The operating room is completely separated from the students' observation gallery overhead. The surgeon's remarks are transmitted by a small microphone worn under his gown.

AND, DIRECTLY ABOVE, AN OBSERVATION GALLERY



Observation Gallery.

Sixteen observers can be seated around the dome and look directly down on the operating table less than 10 feet below their eyes. All seats have an equally clear view of the operative field.

OPERATING ROOM LIGHTING IN THE INSTITUTE OF OPHTHALMOLOGY

By HENRY L. LOGAN

The lighting systems developed for the operating rooms of the new Institute of Ophthalmology by the engineers of the Holophane Company are departures from past practice and strictly functional solutions of the problems presented. The Institute has two operating rooms, both used exclusively for operations upon the eye. The operative field in ophthalmic surgery is exceedingly small, and the requirements to be met in providing for its satisfactory illumination are greater than those for other surgical procedures.

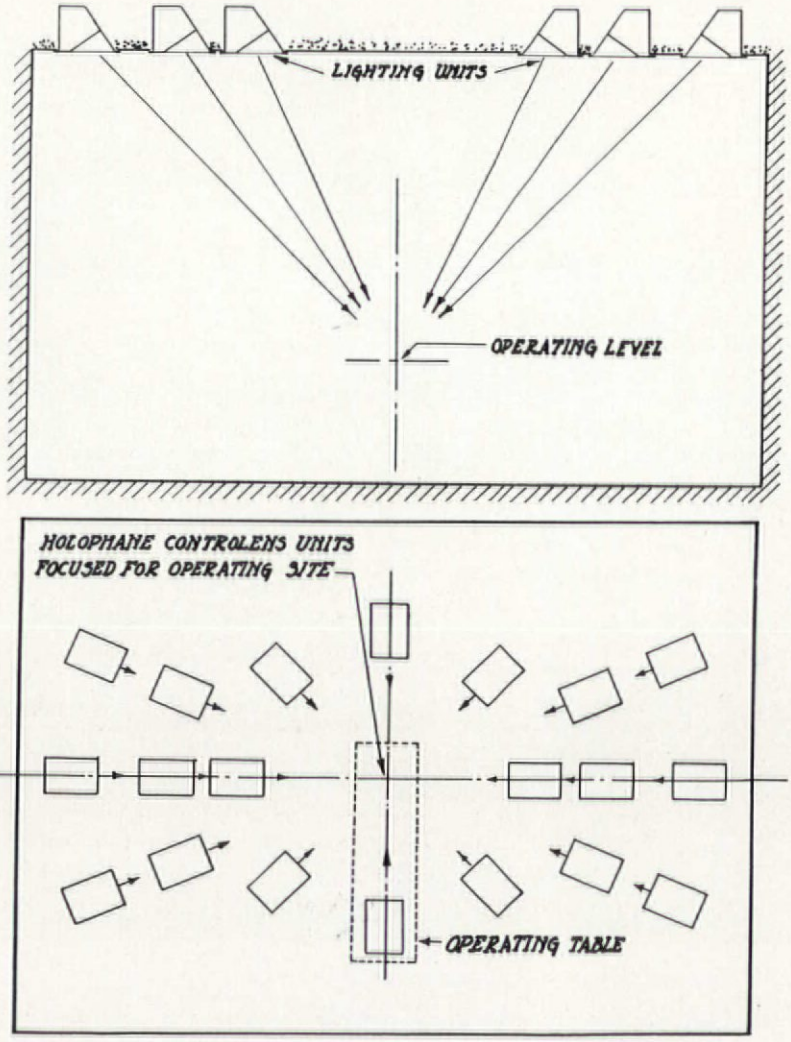
Lighting Criteria

In all operating rooms proper lighting of the operating table involves consideration of the following essential factors:

1. Adequate intensity (usually considered 1000 foot-candles measured on the horizontal).
2. A light source of sufficient size to prevent perceptible obscuration by the surgeon's hands or instruments.
3. A light source so disposed in the room and of such a nature that it does not interfere through glare or otherwise with the surgeon's full use of the illumination it provides.
4. Absence of annoying heat accompanying the high intensity illumination.
5. Durable and practical mechanical constructions, of standard replaceable parts, easily maintained.
6. Cost.

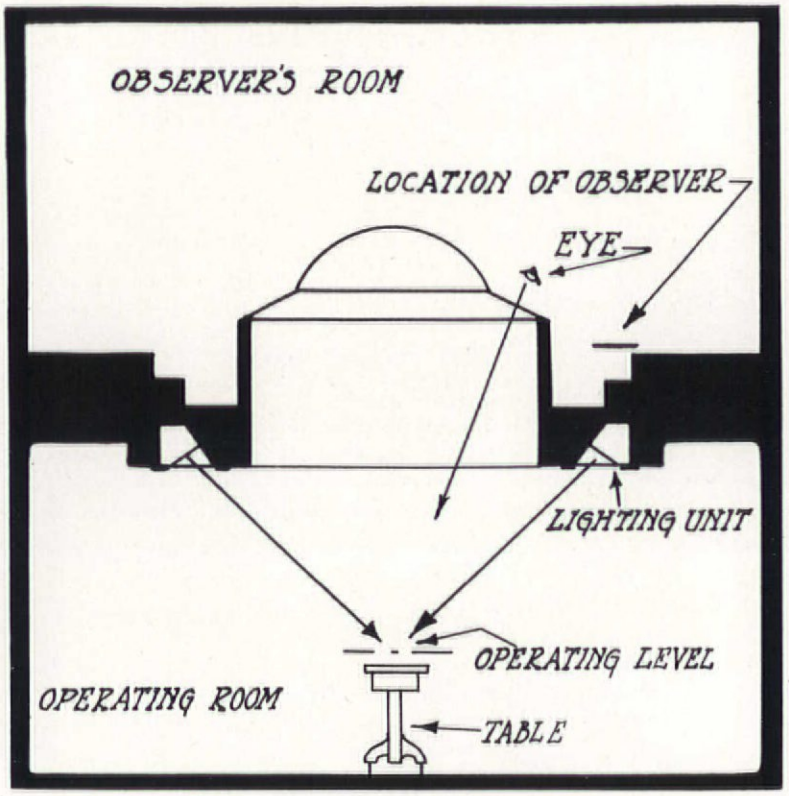
To these, ophthalmic surgery adds:

7. Increased illumination to provide for photography which, because of the smallness of the field and the difficulty of accommodating sufficient students, is used in instruction to supplement direct observation.



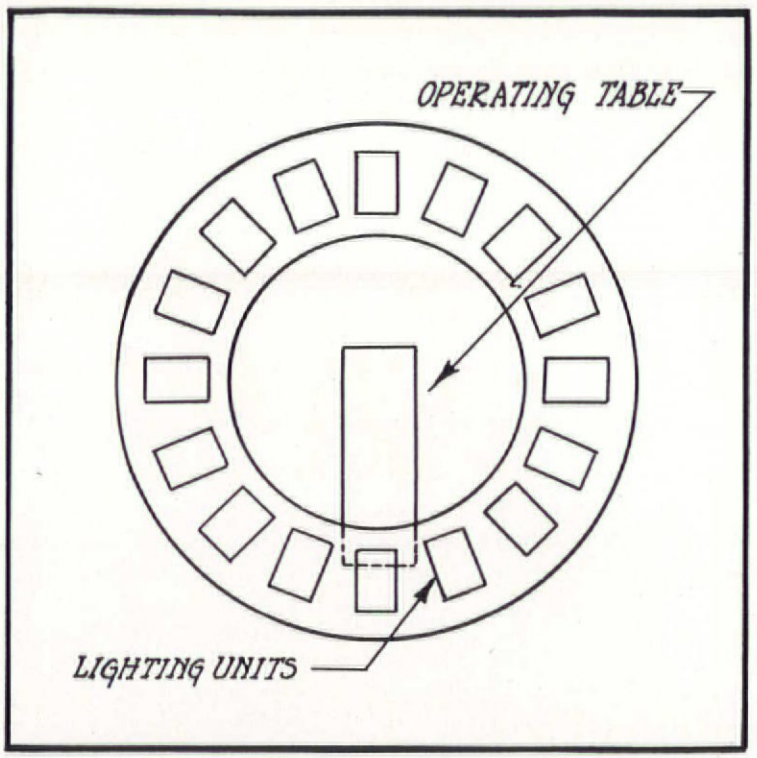
FIGURES 1 AND 2

Section and plan of South Operating Room, showing Holophane multiple spot lens system of illumination. No lights are in the patient's direct field of vision as he looks upward. The lighting units, however, are focused accurately on the patient's eyes and the crossing of the light rays gives a complete, shadowless diffusion without glare.



FIGURES 3 AND 4

Section and plan of the north operating room, illustrating special provisions for observation by students. A circular pit in the floor construction of the observation gallery brings the observers down as close as possible to the operating table. This observation room has its own entrance and is entirely separated from the operating room, permitting the surgeon to operate with safety and freedom from noise and septic dangers. A lapel microphone transmits his explanations to the students.



A circle of Holophane lighting units set flush in the ceiling under the observation gallery is of a diameter which places the light sources in the dead space between the patient's and the surgeon's normal fields of view. The position of the lights likewise does not interfere with the vision of the observers.

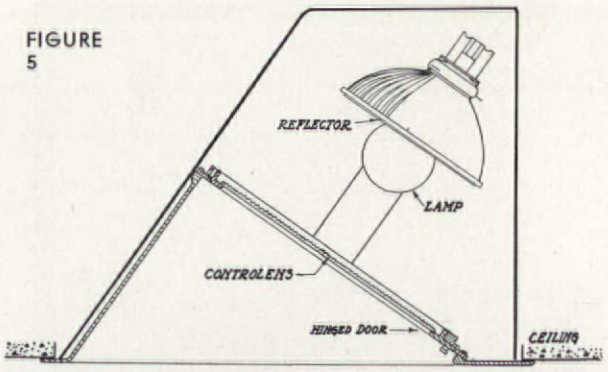
8. Protection of the patient from glare, when operated on while conscious, as frequently happens in ophthalmic work.
9. The further restriction on the location of the light sources necessary to permit the free and convenient use of photographic apparatus.

The south operating room is traditional in form and size but, as with the north room, uncommon in being devoted to ophthalmic work only. The first six conditions were readily met by the use o Holophane flush ceiling *controlens* units and the remaining three by the special arrangement and number of units described in the following paragraphs.

Lighting Arrangement

There are no lights in that area of the ceiling

FIGURE 5



Section through Holophane controlens unit, specially designed to concentrate a series of high intensity, superimposed beams on the operating area.

within the patient's direct field of view as he looks upward. The units are located on axial lines radiating from a point directly over the operating site so that their beams are directed and focused accurately on the eyes of that patient (see Figures 1 and 2). They are sufficiently close together to establish that continuous, inclined plane of light which is least obstructed by the surgeon's hands. The beams are so arranged that as they come together at the operating site their crossing occupies a globular volume in space, about 12 inches in diameter, anywhere in which the intensity is at a maximum, thus allowing some latitude for varying locations of the patient's eyes. This arrangement, the number of light sources, and the crossing of the rays brings about complete diffusion and insures the free passage of a sufficient number of rays to the subject so that no shadow interference occurs.

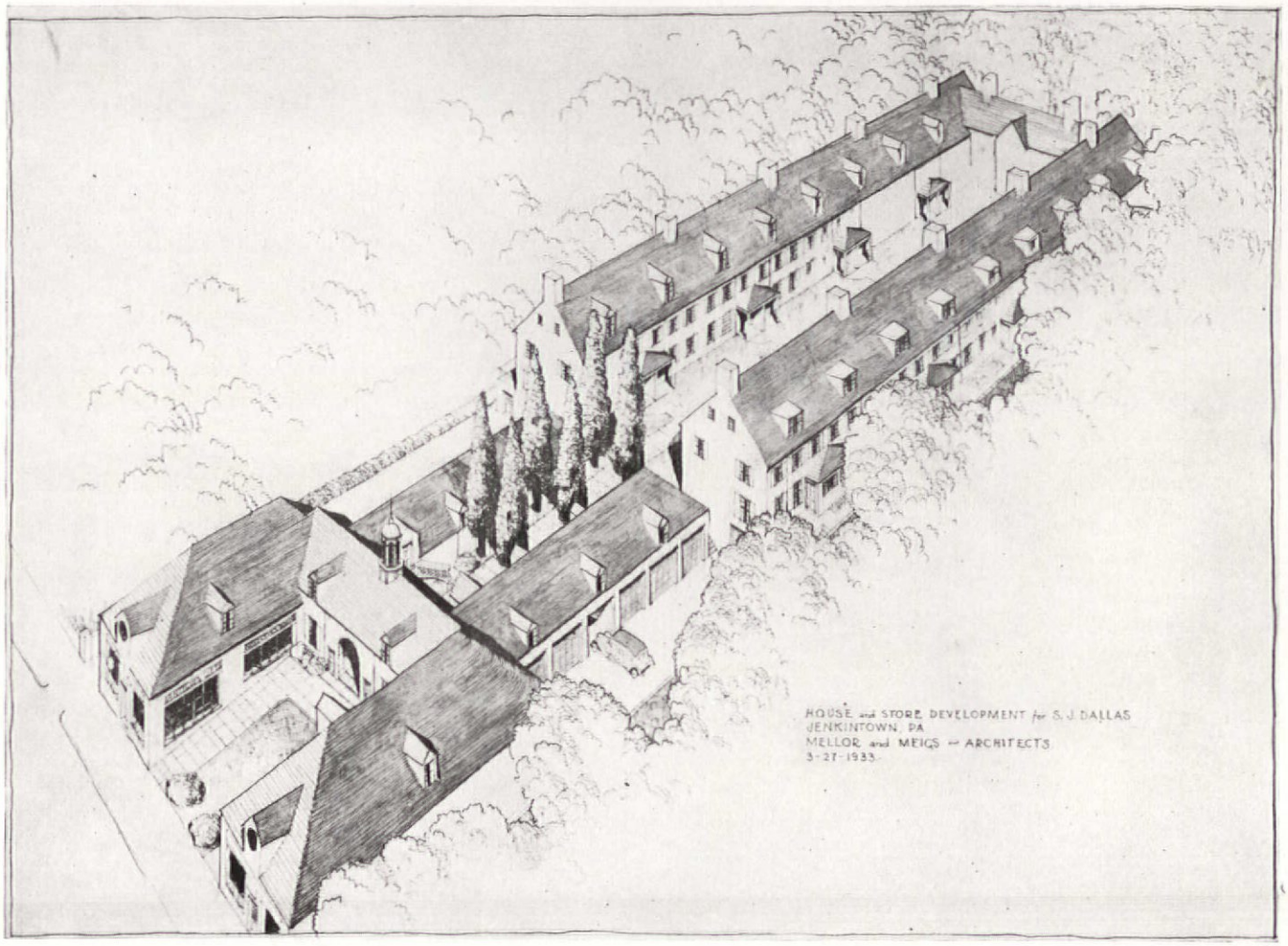
The number of units in the wedge-shaped areas on each side of the table is greater than in sectors in front of and behind the surgeon, so that the greatest intensity of light is thrown from the direction best adapted to the surgeon's requirements. There is a sufficient number of units on each side so that the units on one side may be cut out and ample illumination received from the other when the surgeon works from the opposite side of the table, as he sometimes does. The use of flush ceiling units (see Figure 5), in place of a suspended lighting fixture removes a possible source of septic contamination and obviates touching or handling of such a fixture to bring it into proper adjustment. There is nothing to prevent the use of photographic cameras in close proximity to the patient. The absence of a hanging fixture frees the surgeon from the sensation of surrounding obstructions. There is sufficient light for photography. There is no glare or heat near the table. Obscuration of illumination by surgeon or assistants is impossible.

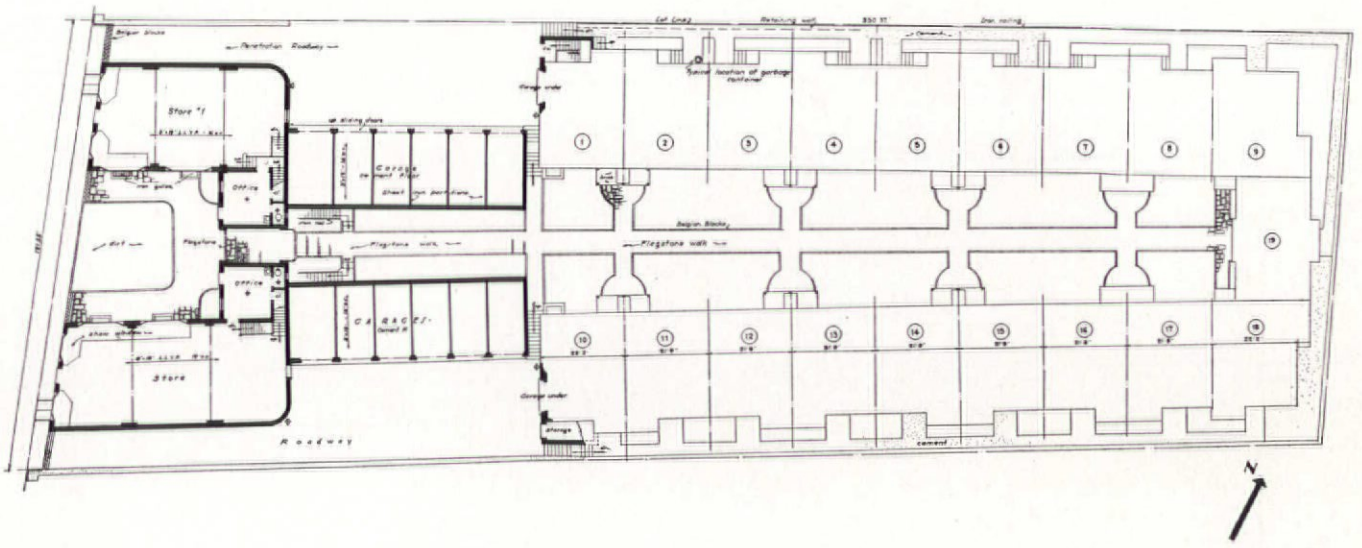
Observation Provisions

The north operating room has special provisions for observation by medical students. In the design of this room the architects of the building, James Gamble Rogers, Inc., have developed a unique construction for this purpose. The operating room is two stories high, (see Figures 3 and 4) with the observation gallery in the second story directly over the operating table. The observers look down on the operation through a glass dome in the operating room ceiling. The observation room is entirely separated from the operating room, and is entered from the floor above. This design makes possible for the first time a perfect view of an operation by a number of students, each of whom can see as well as the surgeon. It also removes the discomfort to the surgeon and the hazard to the patient caused by observers standing in close proximity to the table, which has heretofore been necessary in eye operations. It permits the surgeon to operate with safety and freedom and removes the septic dangers accompanying the seating of numerous observers in open galleries. By the use of a microphone in the operating room and a loud speaker in the observation room the surgeon's explanations are more distinctly heard by the students than if they were present in the operating room itself.

The illumination of the operating table by a circle of lights was an integral part of the architects' scheme in its initial stages. A collaborative study of the principles of illumination involved, the structural problems and the practical requirements established the controlling factors of the design. The most effective position of the lighting units was determined to be in the ceiling of the operating room, in a circle of such diameter and so located as to place the light sources in the dead space between the patient's and the surgeon's normal fields of view. A suitable ceiling height for the operating room having been determined, the angular requirements of the light beams established the diameter of the circle. This position of the lights removes them entirely from any possibility of their interference with the vision of the observers, who look down inside the cone of light whose apex and focus is the operative field.

The Holophane units (see Figure 5) were especially designed to concentrate a series of high intensity, superimposed beams on the operating area, proceeding from every point of the circle. The multiplicity of sources provides the required light and at the same time the necessary diffusion and freedom from interfering shadows. The control is sharp so that the light does not rise to the level of the surgeon's eyes to cause glare, while there are so many separate beams that the surgeon and his assistants cannot block out enough either to shadow their work or to cause a perceptible diminution of the light. As mentioned before, the location of the lights places them outside the patient's direct field of view as he looks upward. They are, so to speak, below his "discomfort horizon." Their location also shields them from the view of the observers, and, as there is nothing hanging directly over the table to act as an obstacle to vision from above, the students are, so to speak, in the circle of light, *looking with it,* and enjoying the most favorable visual conditions possible.





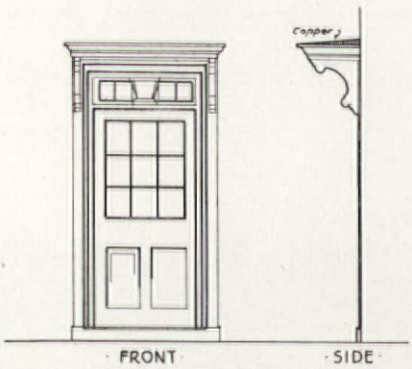
HOUSE AND STORE DEVELOPMENT FOR JENKINTOWN, PENNSYLVANIA

MELLOR AND MEIGS, ARCHITECTS

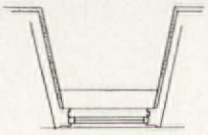
WORKING DETAILS

HOUSE AND STORE DEVELOPMENT JENKINTOWN, PENNSYLVANIA

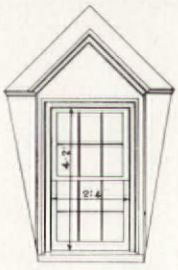
MELLOR AND MEIGS, ARCHITECTS



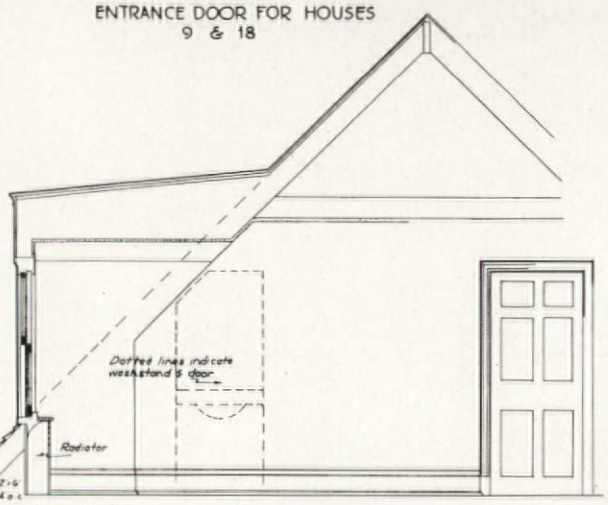
ENTRANCE DOOR FOR HOUSES 9 & 18



PLAN

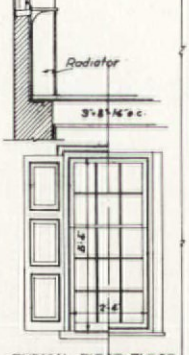


TYPICAL DORMER

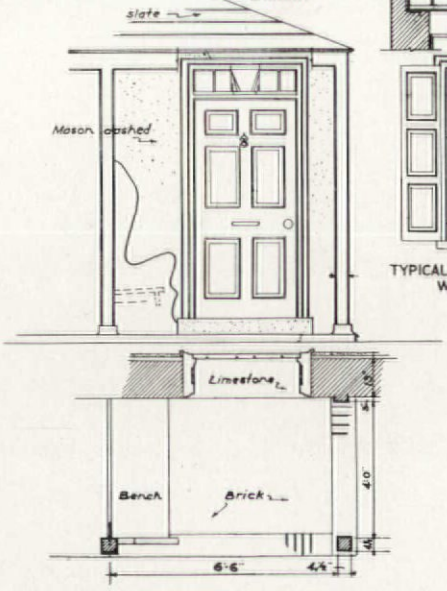


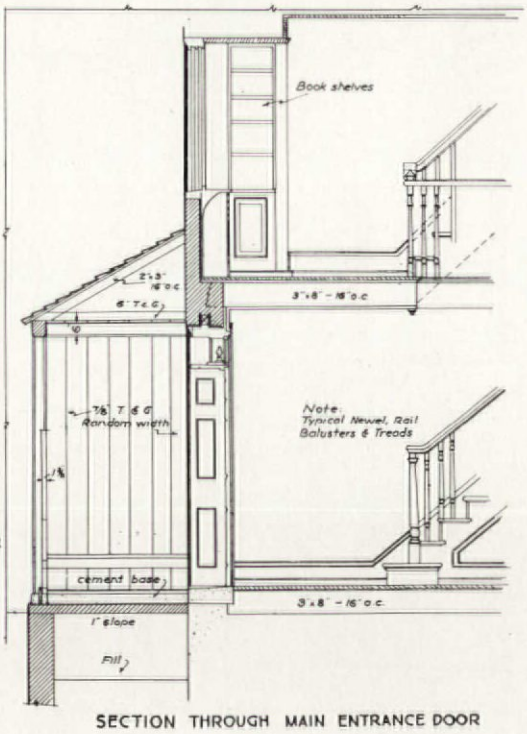
TYPICAL SECOND FLOOR WINDOW

Note:
On each house a 2½ porcelian number to be cemented to glass.
North side - 1 to 17, odd nos.
South side 2 to 18, even nos.



TYPICAL FIRST FLOOR WINDOW



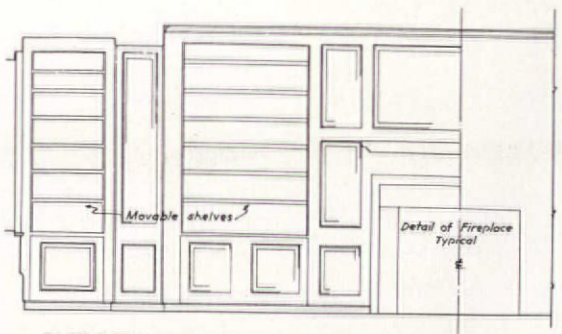


SECTION THROUGH MAIN ENTRANCE DOOR

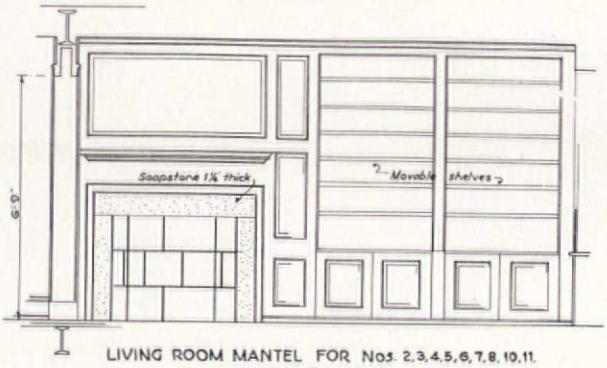
TYPICAL PLANS AND DETAILS

HOUSE AND STORE DEVELOPMENT FOR JENKINTOWN, PENNSYLVANIA

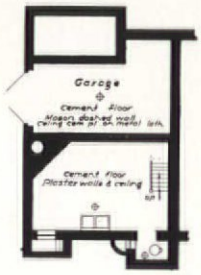
MELLOR AND MEIGS, ARCHITECTS

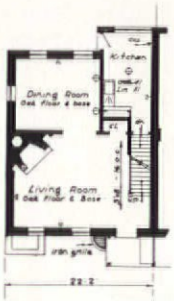


PART DETAIL OF LIVING ROOM SIDE FOR HOUSES NO. 9 & 18

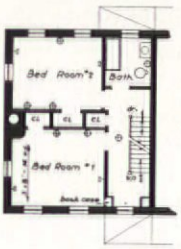


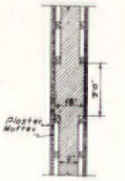
LIVING ROOM MANTEL FOR Nos. 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16 & 17



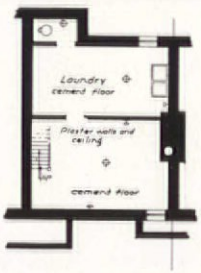


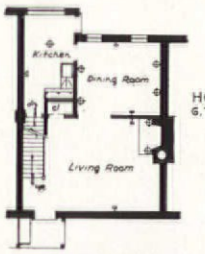
HOUSES NOS. 1 AND 10



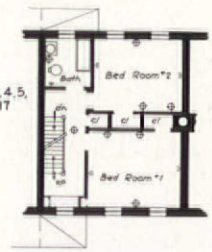


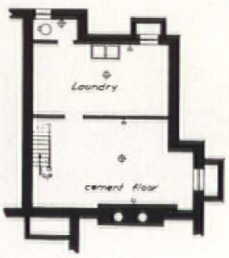
DETAIL OF PARTY WALL





HOUSES NOS. 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17

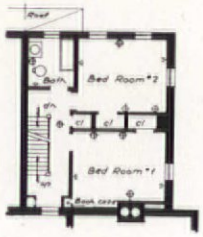




CELLAR PLAN

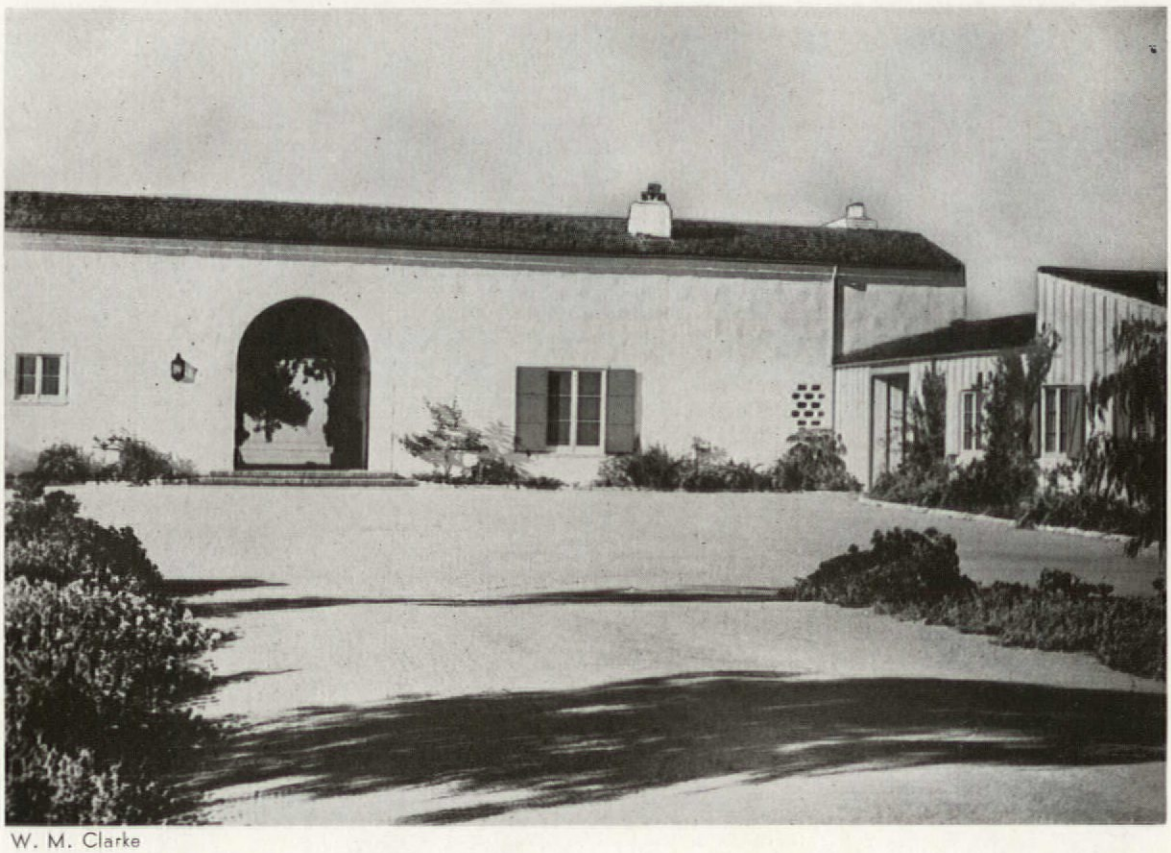
FIRST FLOOR

HOUSES NOS. 9 AND 18

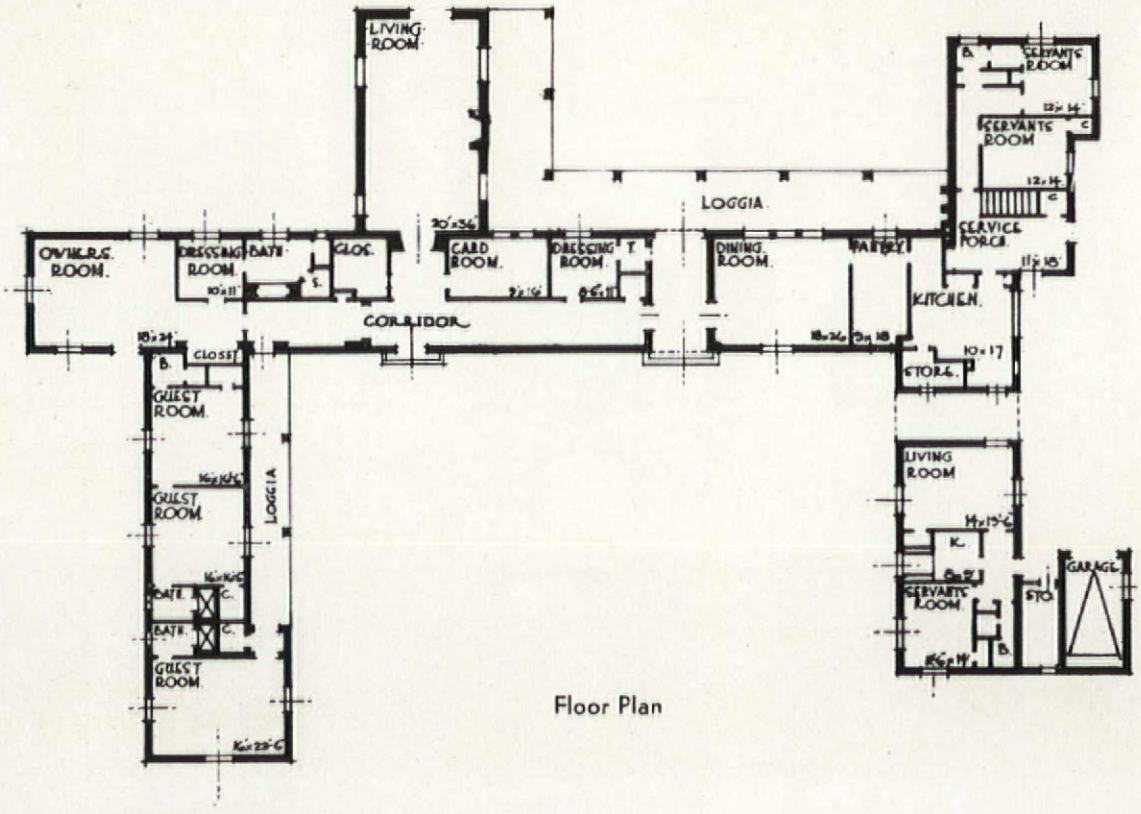


SECOND FLOOR

THIRD FLOOR

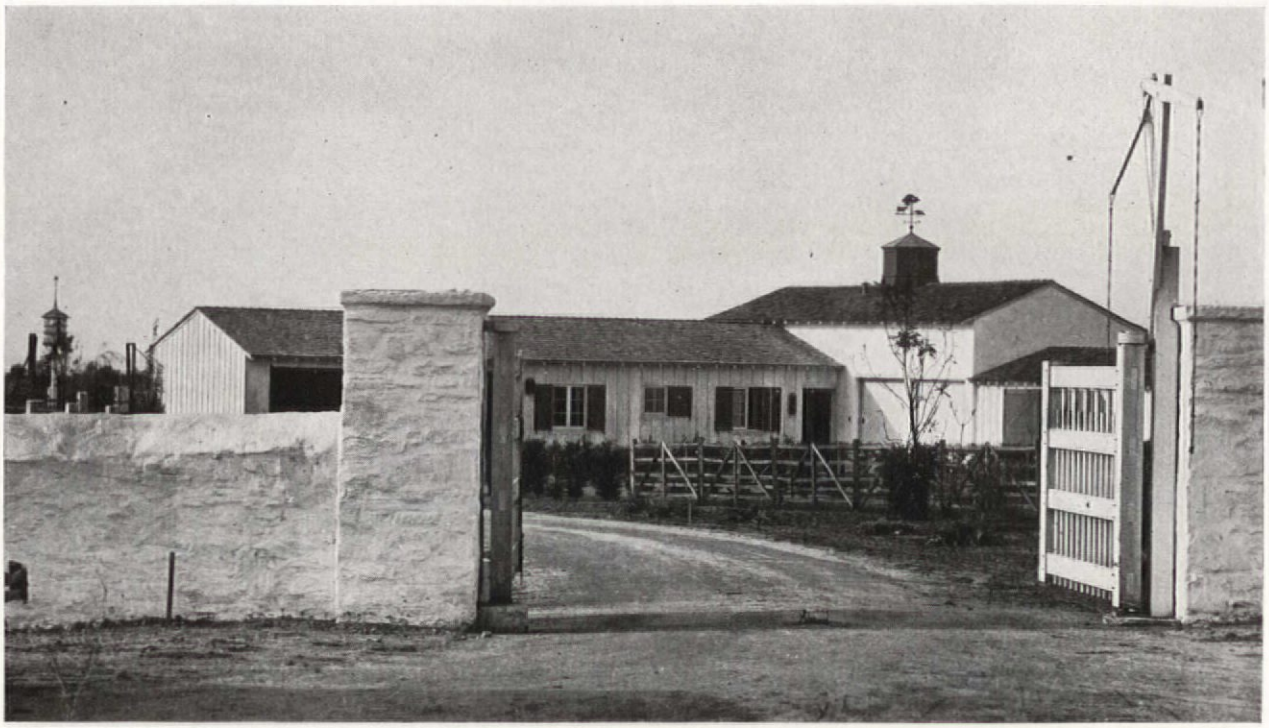


W. M. Clarke



Floor Plan

HOUSE OF BEN R. MEYER
SANTA BARBARA, CALIFORNIA
GORDON B. KAUFMANN, ARCHITECT



J. W. Collinge

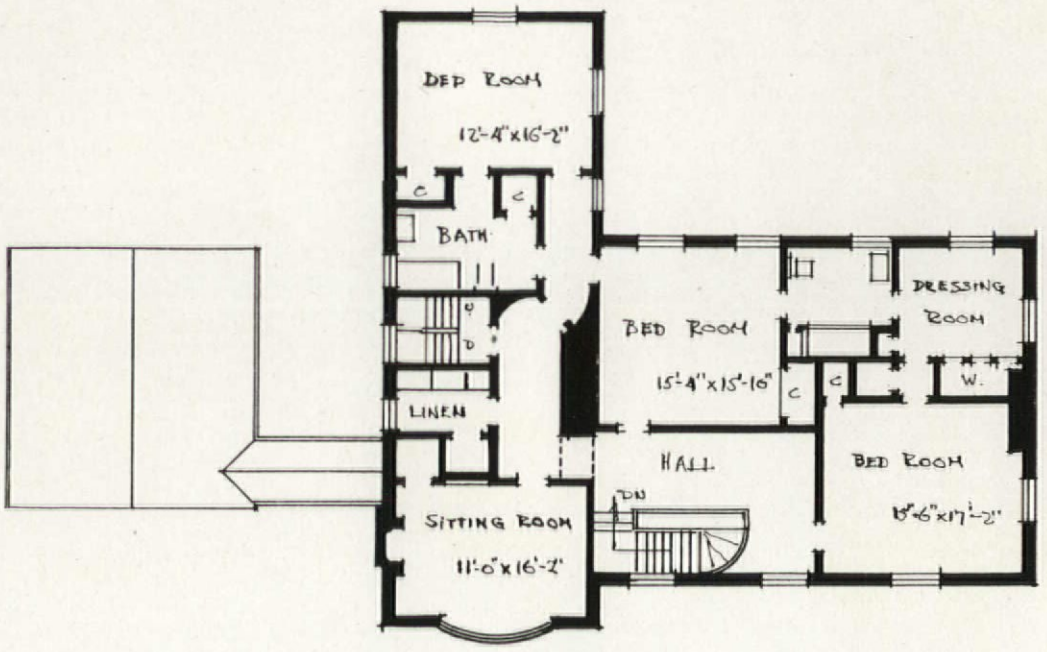
HOUSE OF BEN R. MEYER
SANTA BARBARA, CALIFORNIA
GORDON B. KAUFMANN, ARCHITECT

W. M. Clarke

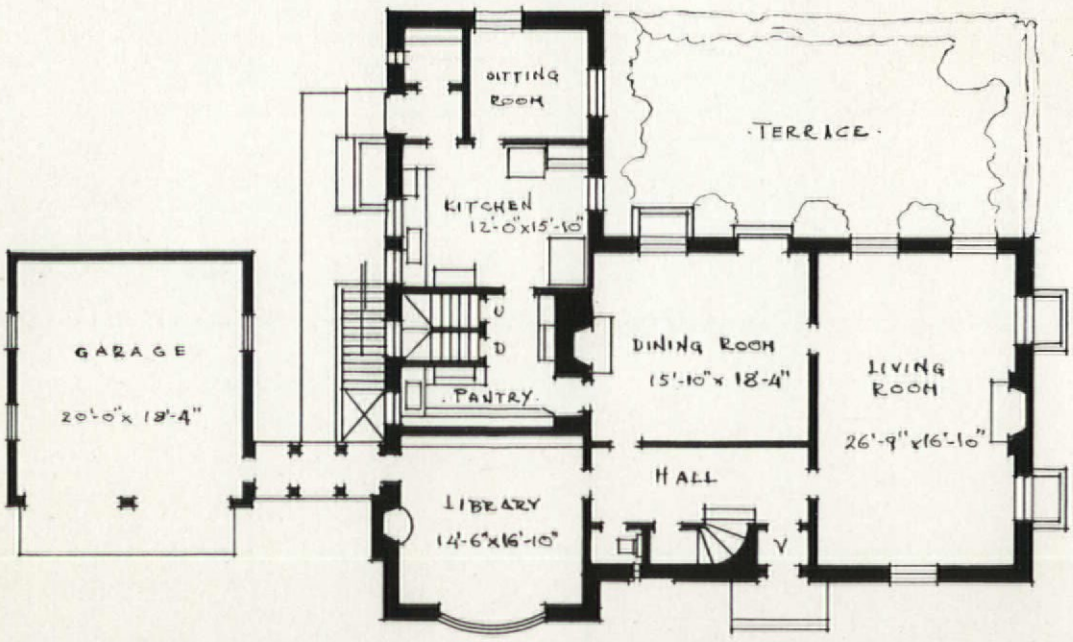
HOUSE OF BEN R. MEYER
SANTA BARBARA, CALIFORNIA
GORDON B. KAUFMANN, ARCHITECT

Simonds

HOUSE OF MISS OLIVE AND MR. PAUL DANN
NEW HAVEN, CONNECTICUT
DOUGLAS ORR, ARCHITECT

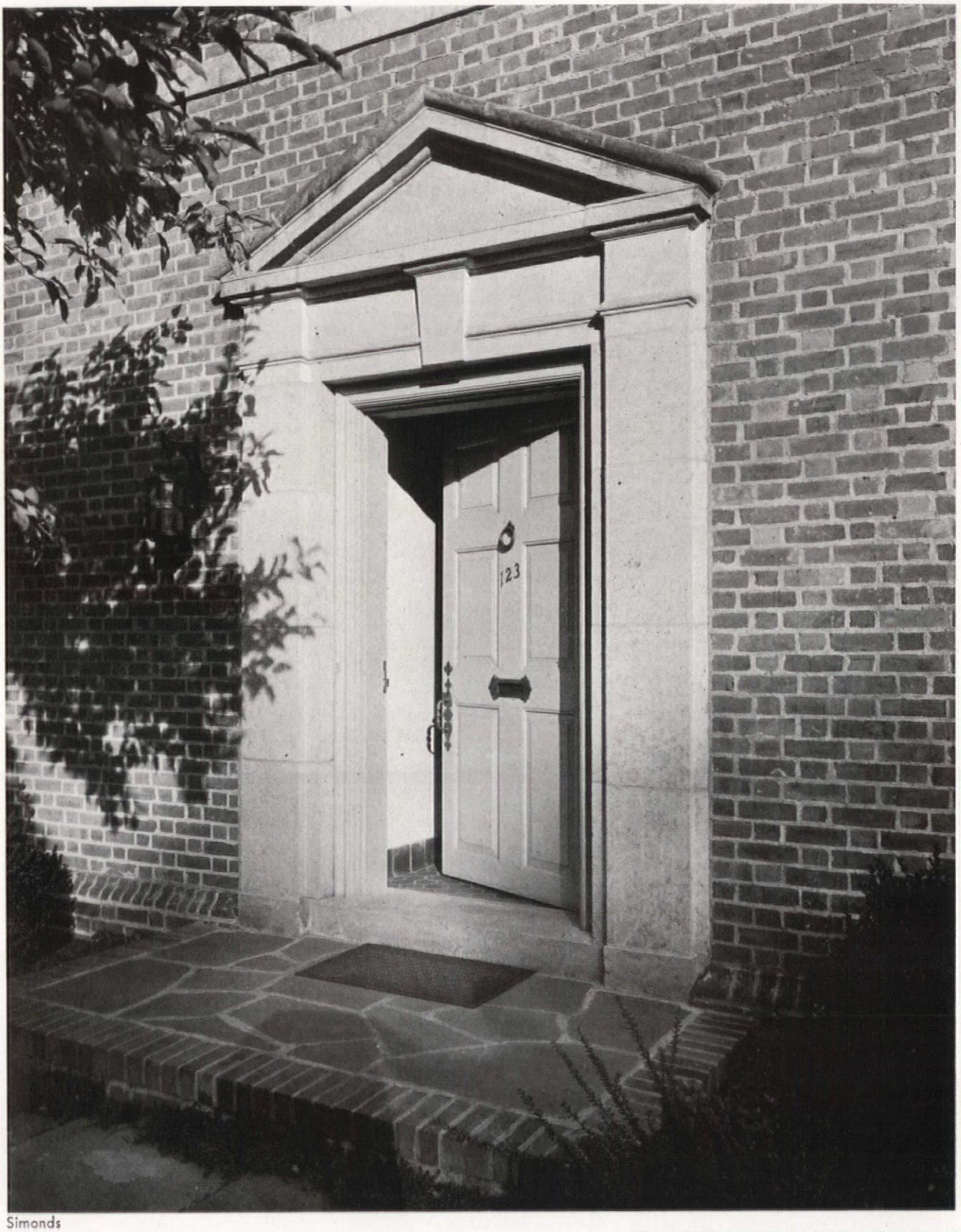


Second Floor Plan



First Floor Plan

HOUSE OF MISS OLIVE AND MR. PAUL DANN
NEW HAVEN, CONNECTICUT
DOUGLAS ORR, ARCHITECT



Simonds

HOUSE OF MISS OLIVE AND MR. PAUL DANN
NEW HAVEN, CONNECTICUT
DOUGLAS ORR, ARCHITECT

View of house from southwest.

Kammerdiener

Front façade.

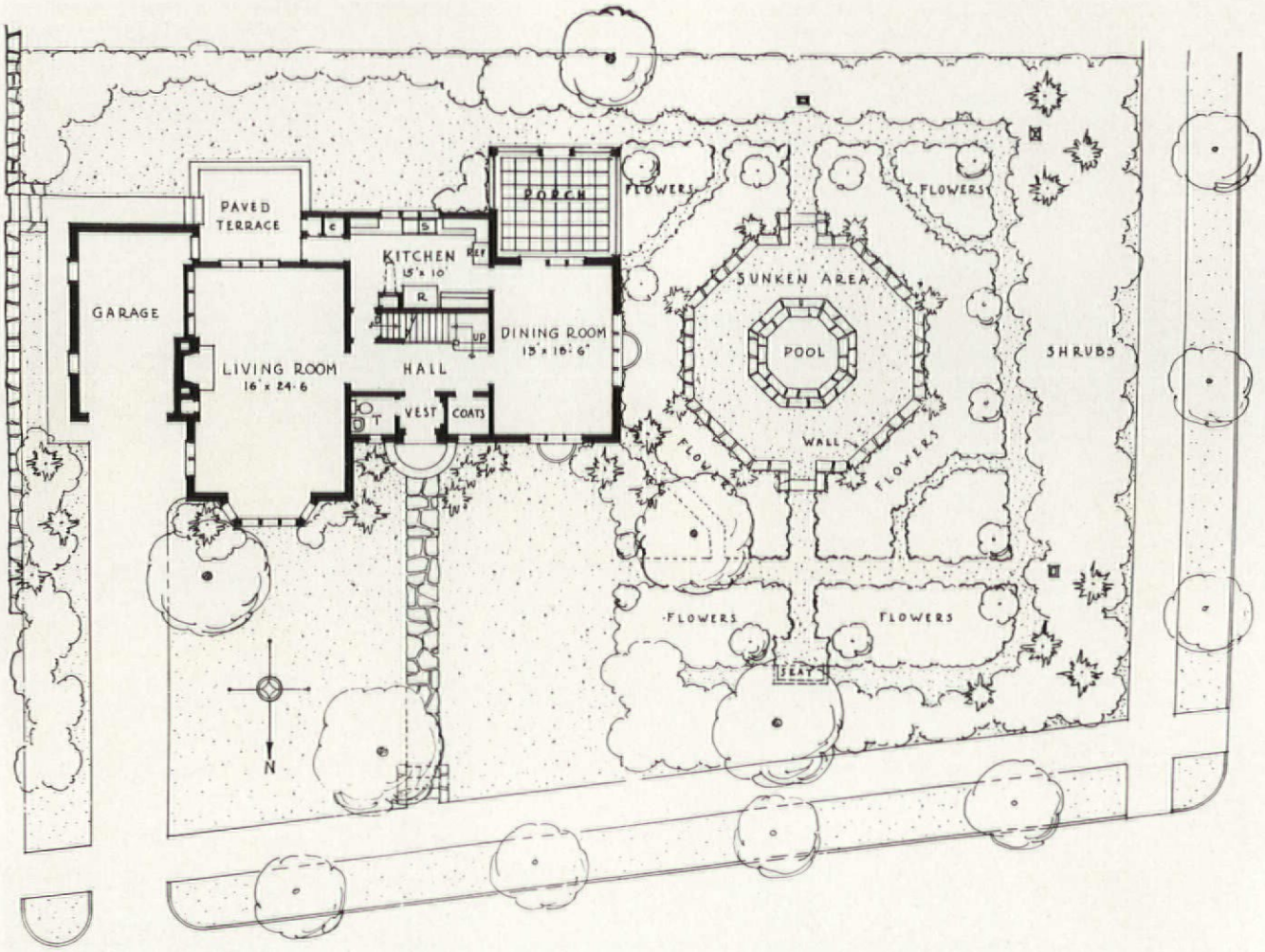
HOUSE OF HARVEY S. HOSHOUR
UNIVERSITY GROVE, MINNESOTA
ROLLIN C. CHAPIN, ARCHITECT

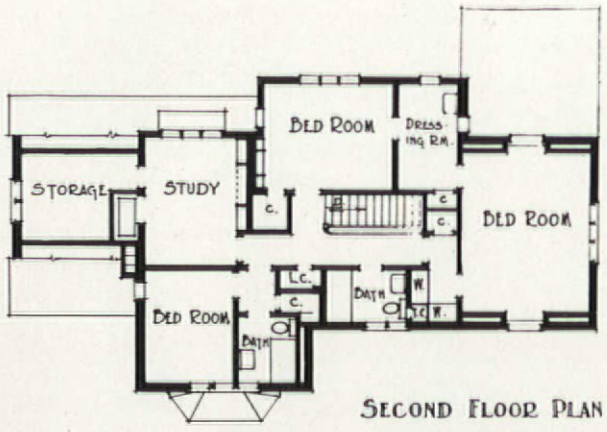
Sun room.

Kammerdiener

Living room.

HOUSE OF HARVEY S. HOSHOUR
UNIVERSITY GROVE, MINNESOTA
ROLLIN C. CHAPIN, ARCHITECT





SECOND FLOOR PLAN

SCALE IN FEET

The house is of frame construction with brick veneer, stained white. It is heated by a vapor system and has an automatic humidifier. Cost: approximately $14,000 or 34½ cents a cubic foot.

Landscaping by F. Elmer Hallberg

HOUSE OF HARVEY S. HOSHOUR
UNIVERSITY GROVE, MINNESOTA
ROLLIN C. CHAPIN, ARCHITECT

F. S. Lincoln

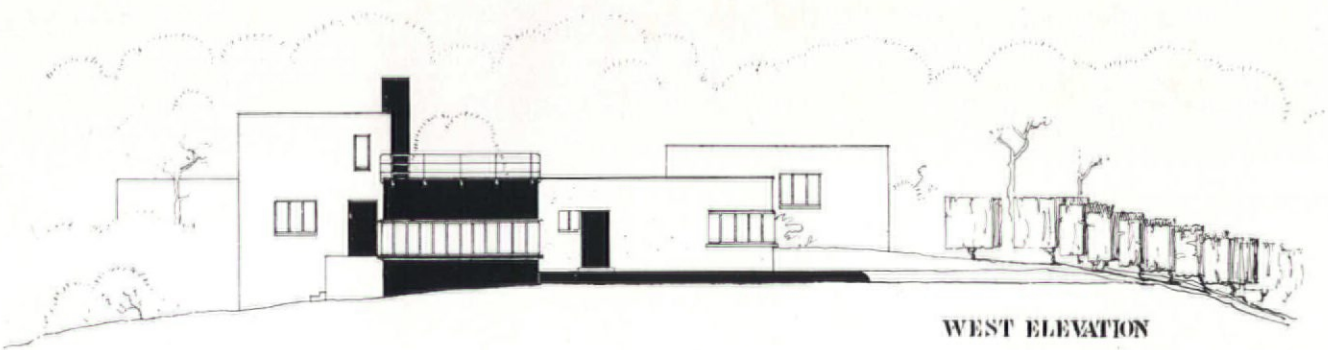
HOUSE OF REX STOUT, FAIRFIELD COUNTY, CONNECTICUT

BY A. LAWRENCE KOCHER AND GERHARD ZIEGLER

The rooms of the house for Rex Stout are grouped around a garden court and relate in floor levels to the hillside slope. The house, built in 1930, is one story in height, except that one wing for guest rooms, studio and service is two stories high. The living room faces toward a broad and rural Connecticut valley. The terrace at the northwest commands a view of this valley and of the swimming pool, fifty feet below the terrace. The court terrace is used for sitting and dining.

The exterior walls are of concrete cast in place with Van Guilder steel molds. There are, in fact, two walls each four inches thick with a continuous air space intervening. These two separate walls are tied together with light steel rods at intervals of two feet.

Color is used to emphasize the third dimension. Walls that serve as a background to terraces are in light gray. Terminating wall faces are painted black. All steel casement windows are painted an orange-red color. Window sills and projecting window heads are of aluminum. Doors facing the exterior are orange-red in color.



WEST ELEVATION

F. S. Lincoln

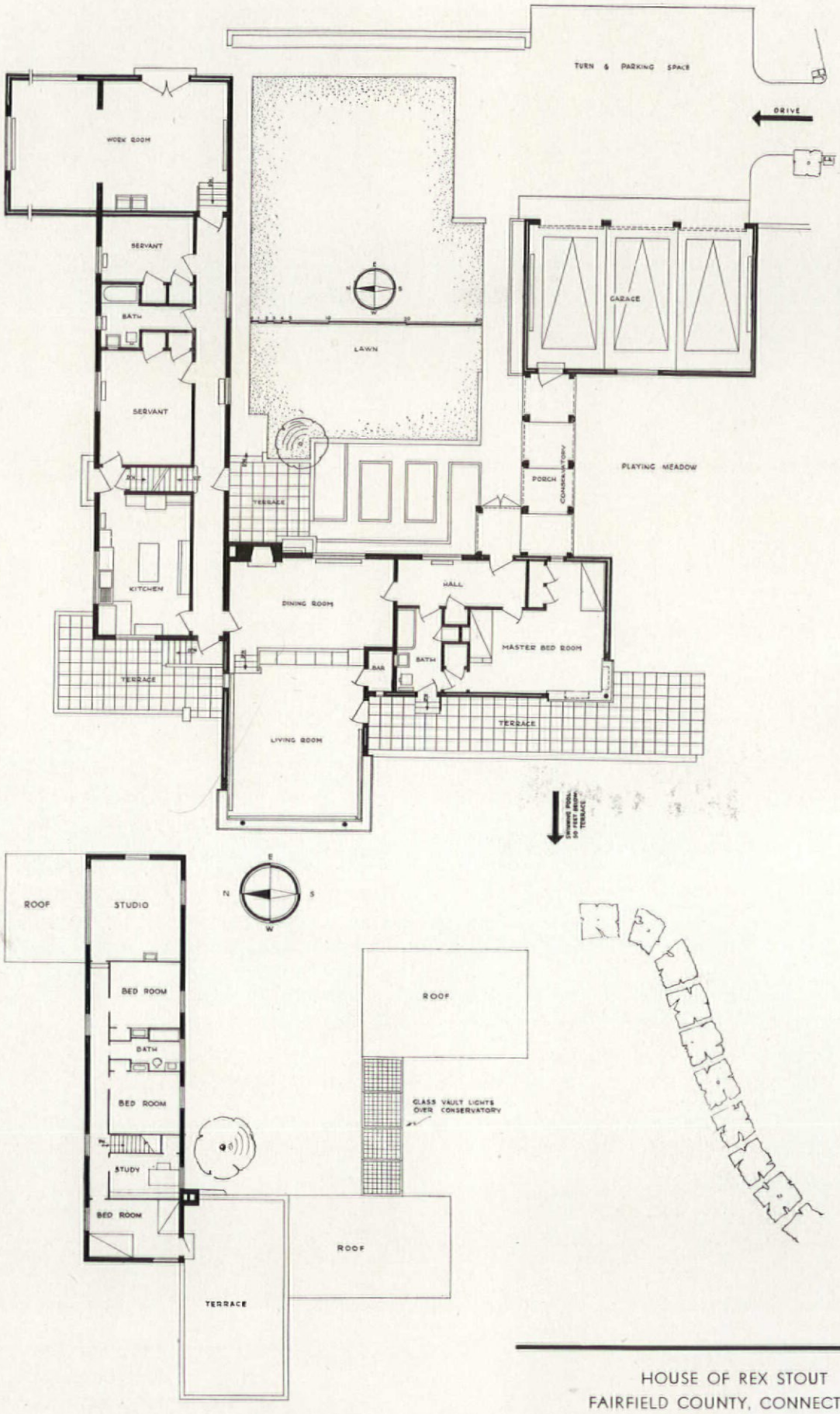
Windows of conservatory with south exposure.

HOUSE OF REX STOUT
FAIRFIELD COUNTY, CONNECTICUT
A. LAWRENCE KOCHER AND GERHARD ZIEGLER

F. S. Lincoln

Living room windows and terrace.

HOUSE OF REX STOUT
FAIRFIELD COUNTY, CONNECTICUT
A. LAWRENCE KOCHER AND GERHARD ZIEGLER



Floor Plans

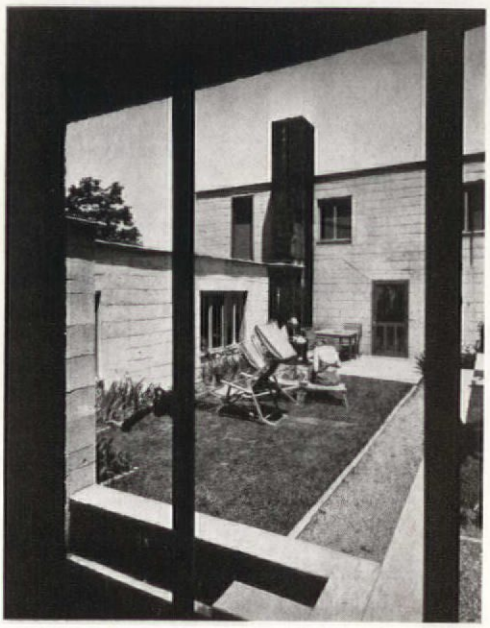
HOUSE OF REX STOUT
FAIRFIELD COUNTY, CONNECTICUT
A. LAWRENCE KOCHER AND GERHARD ZIEGLER

HOUSE OF REX STOUT
FAIRFIELD COUNTY, CONNECTICUT
A. LAWRENCE KOCHER AND
GERHARD ZIEGLER

(At Left) Interior of living room showing windows toward view. There is indirect lighting with glass for diffusion flush with ceiling. Floors are of Teakwood.

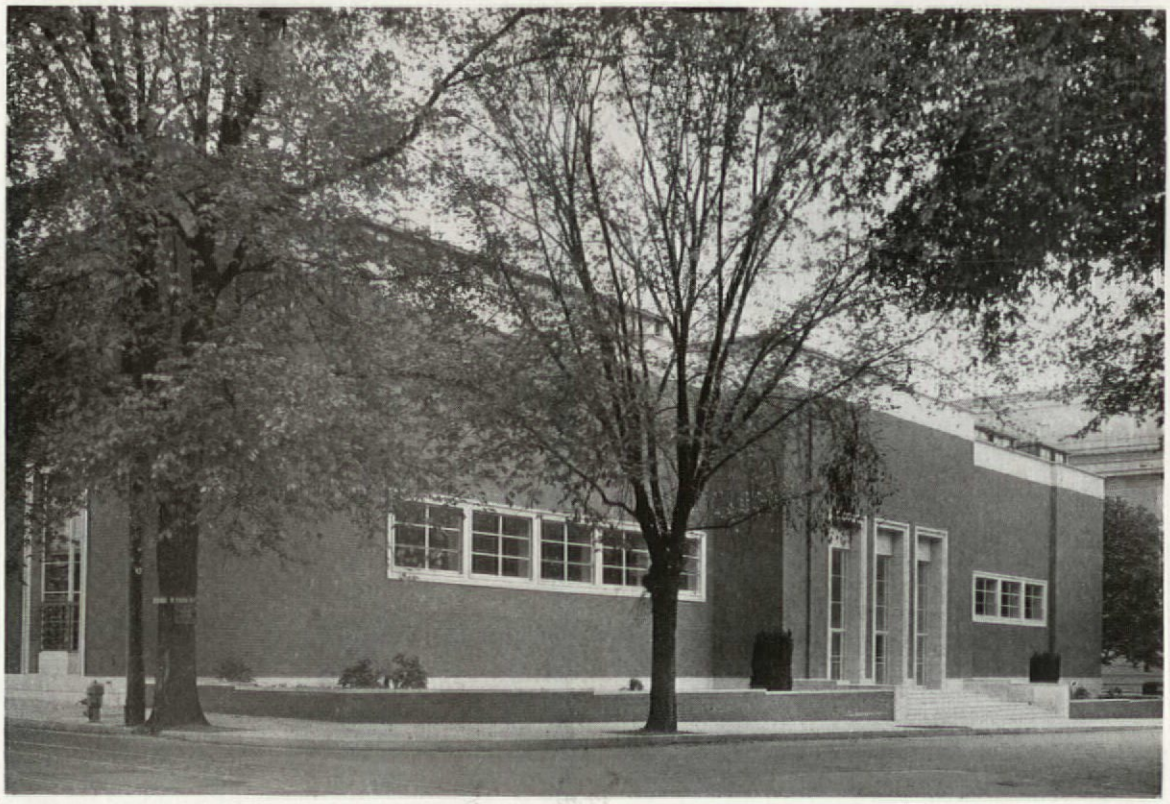
(Below) View of garden court from conservatory.

F. S. Lincoln

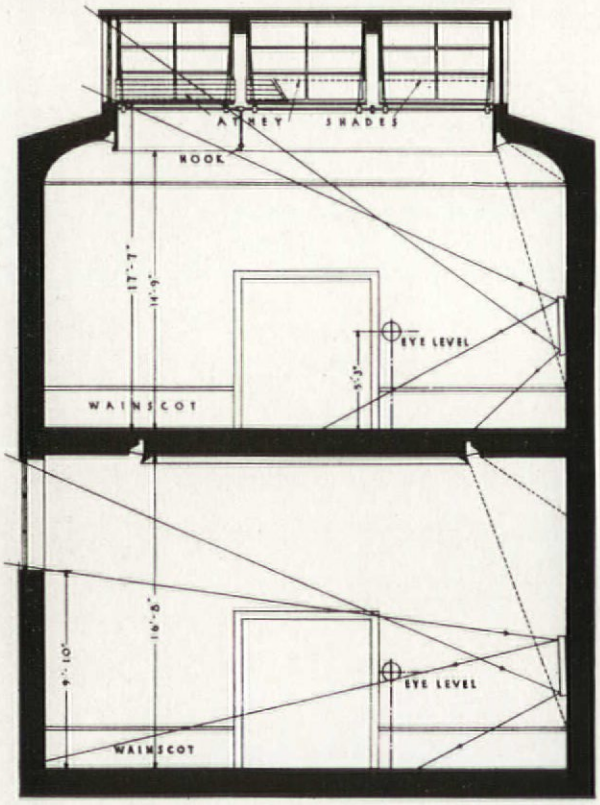


Kitchen, House of Rex Stout, Fairfield County, Connecticut. Cabinets designed and executed by Rex Stout. Walls are of canary yellow lacquer; cabinet doors are chestnut wood, waxed. Floors are black linoleum.

REMODELING AN ART MUSEUM



A. E. DOYLE & ASSOCIATE, ARCHITECTS



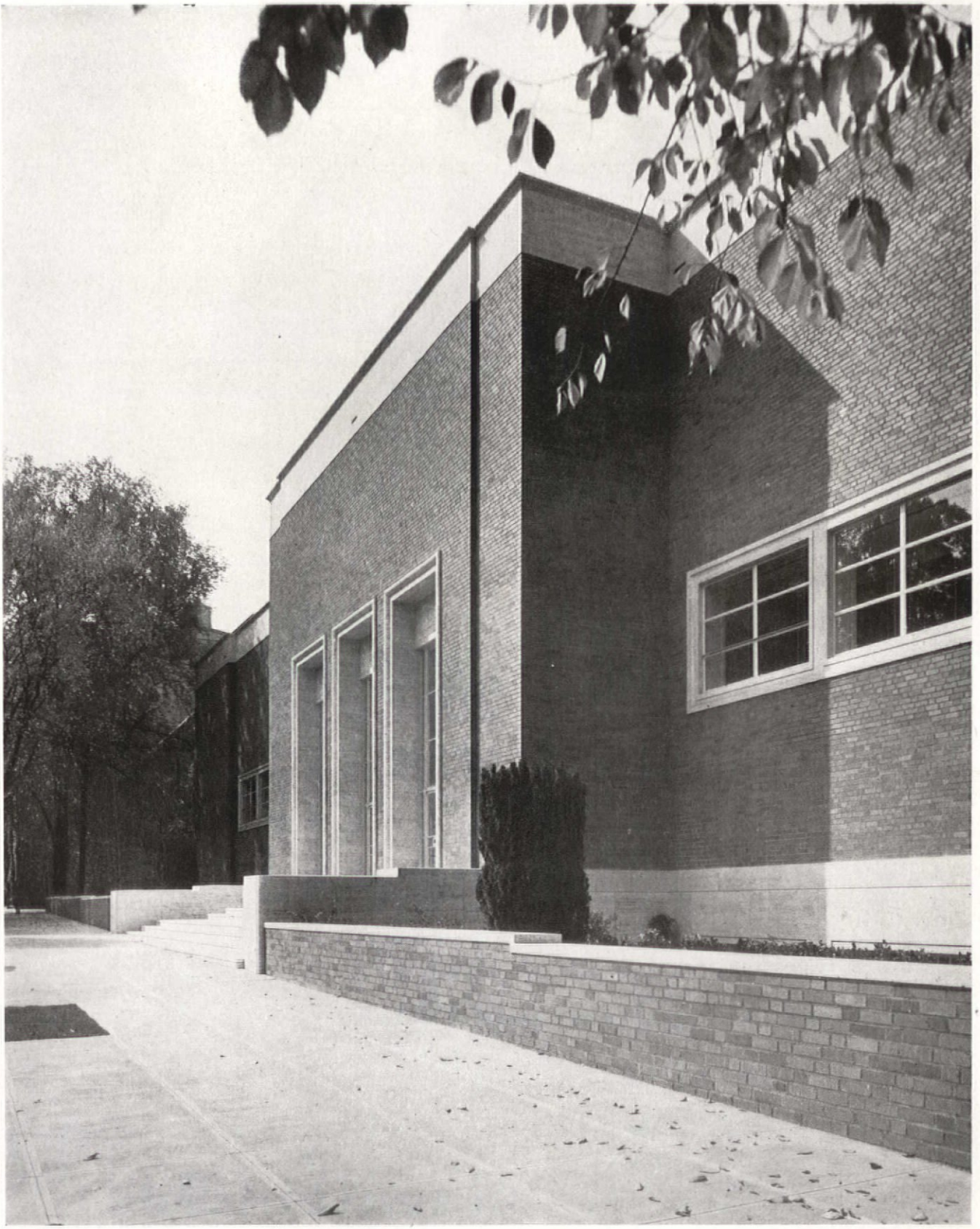
The Portland (Oregon) Art Museum, an addition to an old building, is the first unit of probable replacements in the future. The old building, which is a remodeled public school, now houses the Museum Art School, two small galleries, a lecture room, library, offices for the curator and assistants, a cast room and the various utilities. This section is not fireproof and will be replaced when funds are available.

The museum is constructed of reinforced concrete with brick and marble facing. The exterior design expresses the interior arrangement and lighting requirements. The upper galleries, as shown on accompanying diagram, are lighted by monitors.

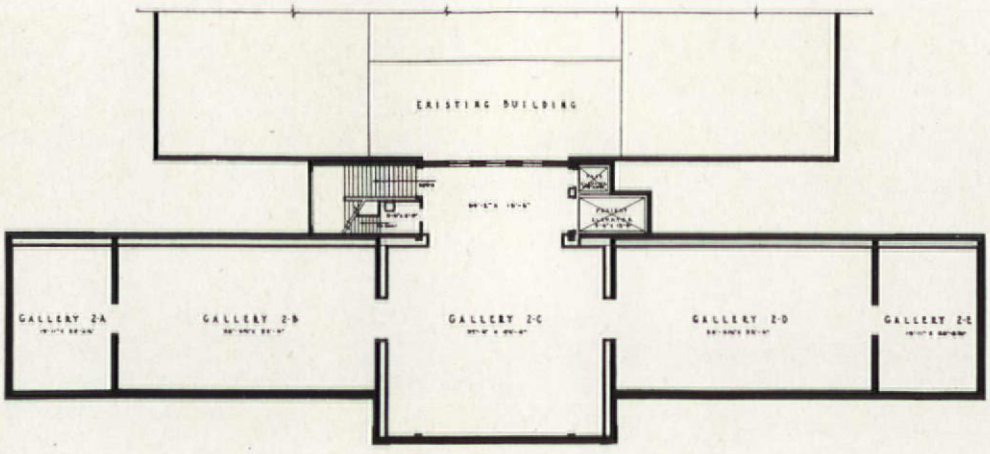
Gallery floors are oak; the walls are hung with burlap bleached and dyed to a neutral color. Clear plate glass is used in the windows of the lower galleries and slightly diffusing glass in the monitors. The quantity of light is controlled by Athey shades.

A system of supply and exhaust ducts and fans provides heat and ventilation. The air is washed, filtered, and the relative humidity controlled automatically.

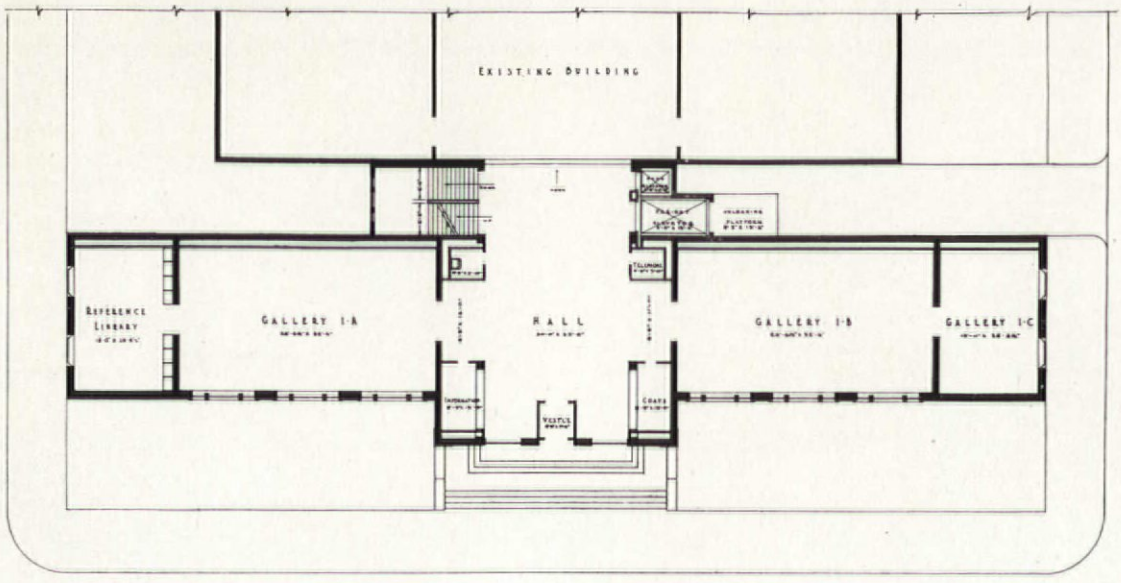
REMODELING IS FEATURED EACH MONTH IN THE ARCHITECTURAL RECORD



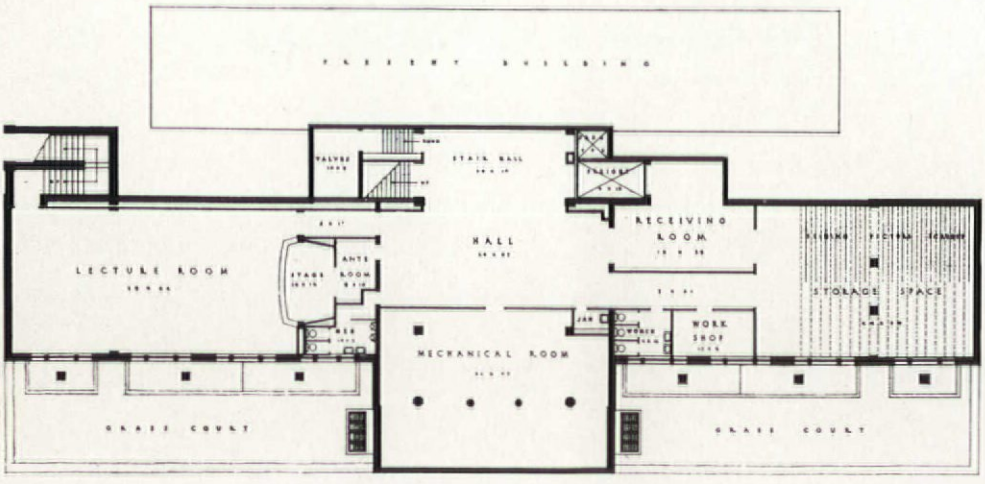
ART MUSEUM IN PORTLAND, OREGON
A. E. DOYLE AND ASSOCIATE, ARCHITECTS



SECOND FLOOR PLAN



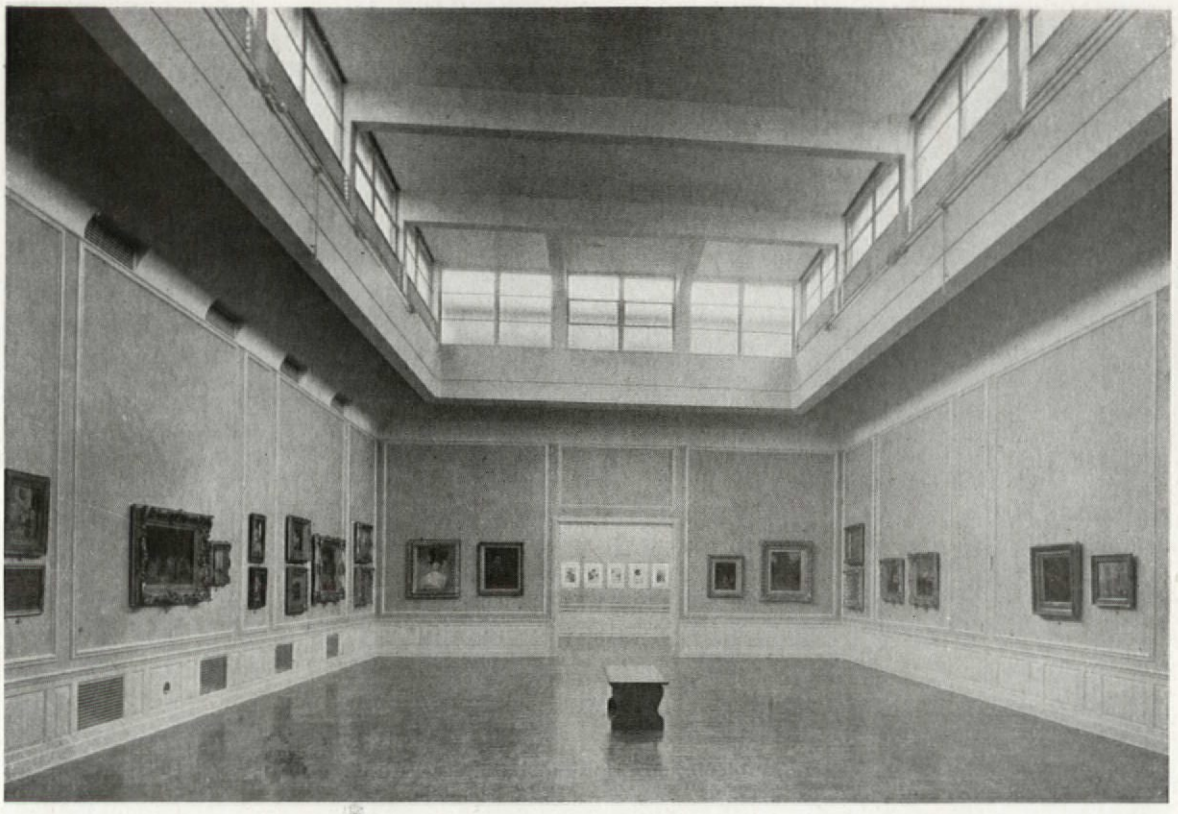
FIRST FLOOR PLAN



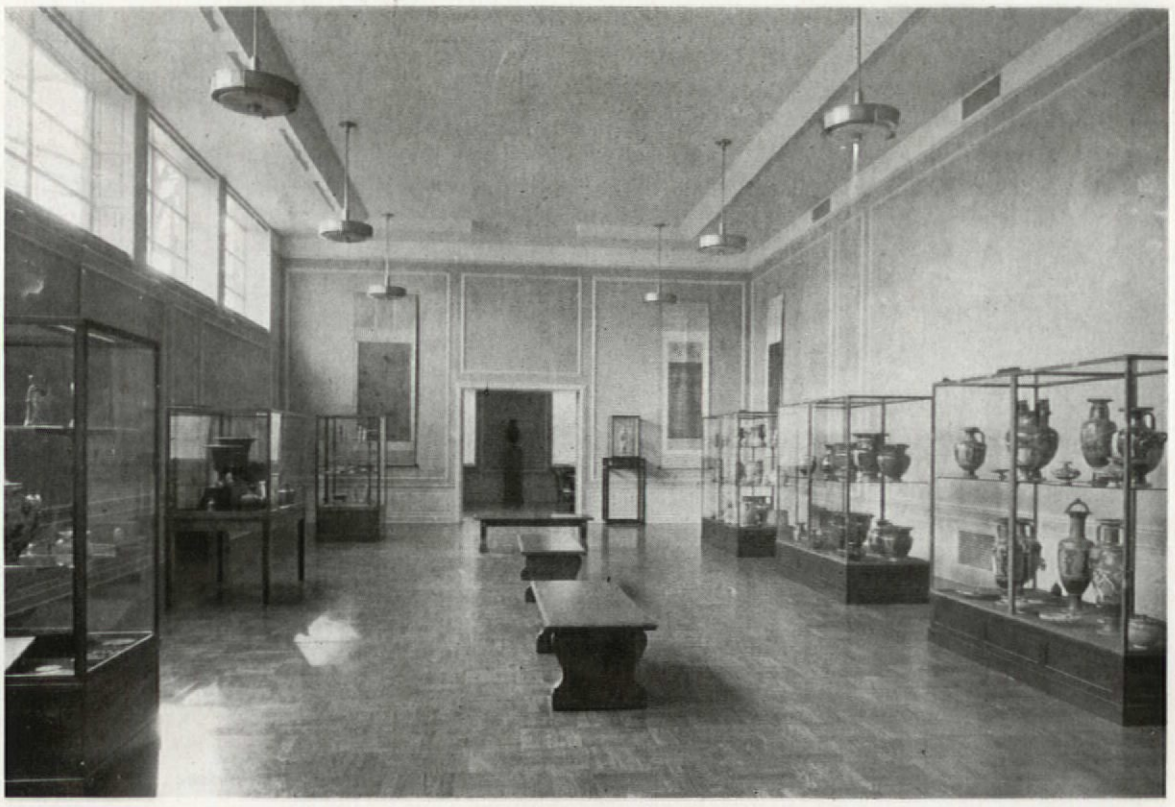
GROUND FLOOR PLAN

ART MUSEUM IN PORTLAND, OREGON
A. E. DOYLE AND ASSOCIATE, ARCHITECTS

ART MUSEUM IN PORTLAND, OREGON
A. E. DOYLE AND ASSOCIATE, ARCHITECTS



Second floor gallery.



First floor gallery.

ART MUSEUM IN PORTLAND, OREGON
A. E. DOYLE AND ASSOCIATE, ARCHITECTS

VIEW OF CANBERRA FROM MOUNT AINSLIE: (1) Provisional Parliament House; (2) Site of future Capitol; (3) Red Hill; (4) Houses at Forrest and Red Hill; (5 & 6) Commonwealth Office Blocks; (7) Molonglo River; (8) Anzac Park—central axis of city; (9) St. John's Church of England—1842-70; (10) Hotel Canberra; (11) Administrative (formerly Federal Capital Commission) Offices; (12) Forestry School; (13) Hotel Acton; (14) Beauchamp House; (15) Hospital; (16) Mount Stromlo—site of Solar Observatory; (17) City shopping and business center; (18) Gorman House — women's hostel; (19) Suburb of Braddon; (20) Hotel Ainslie; (21) Suburb of Reid; (22) City Hill — the Hexagon.

BUILDING THE CAPITAL CITY OF AUSTRALIA

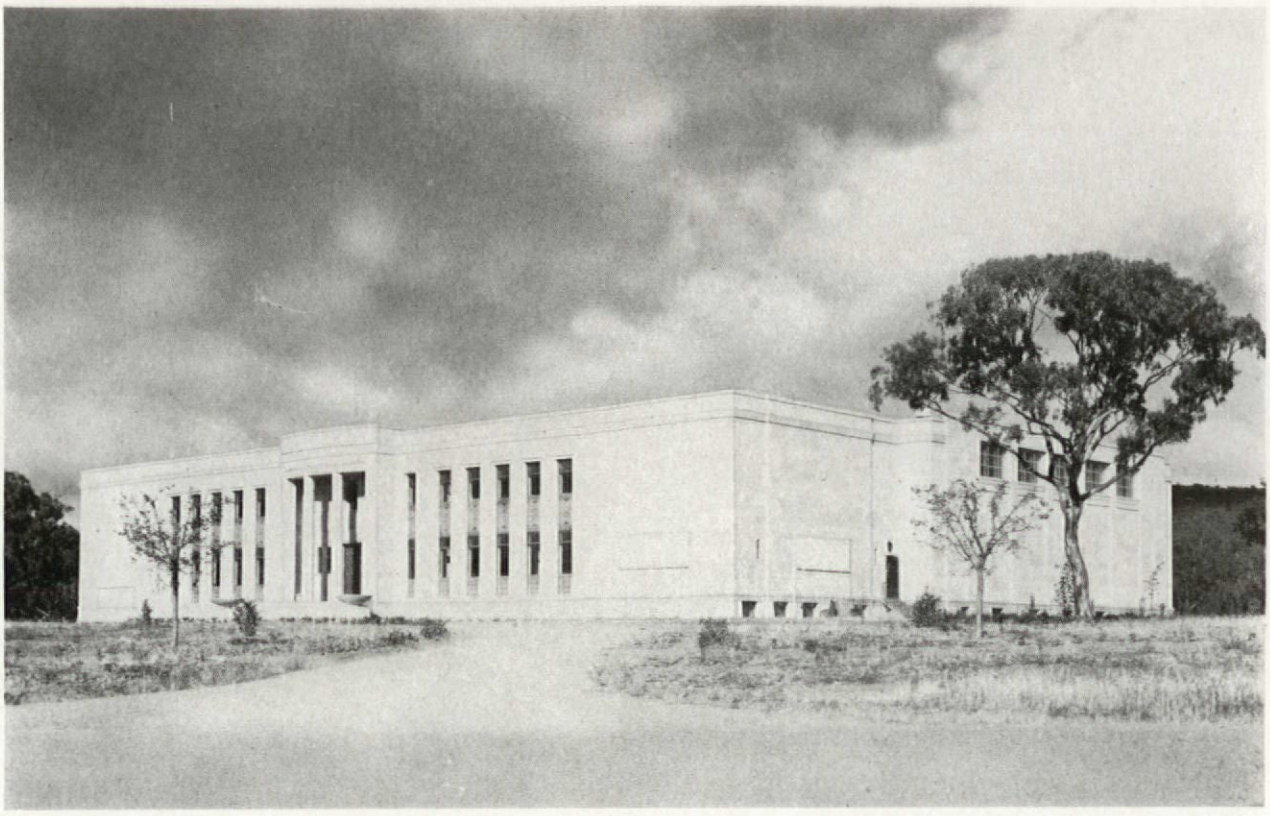
By MALCOLM J. MOIR, Architect

The Constitution of Australia provided that the Seat of Government should be established in its own territory, situated in the state of New South Wales and not less than 100 miles from Sydney. An area of some 12 square miles in the northeast corner of the territory was chosen for the city proper, which was afterwards named Canberra; a roughly rectangular plain with a mean elevation of 1,900 feet above sea level.

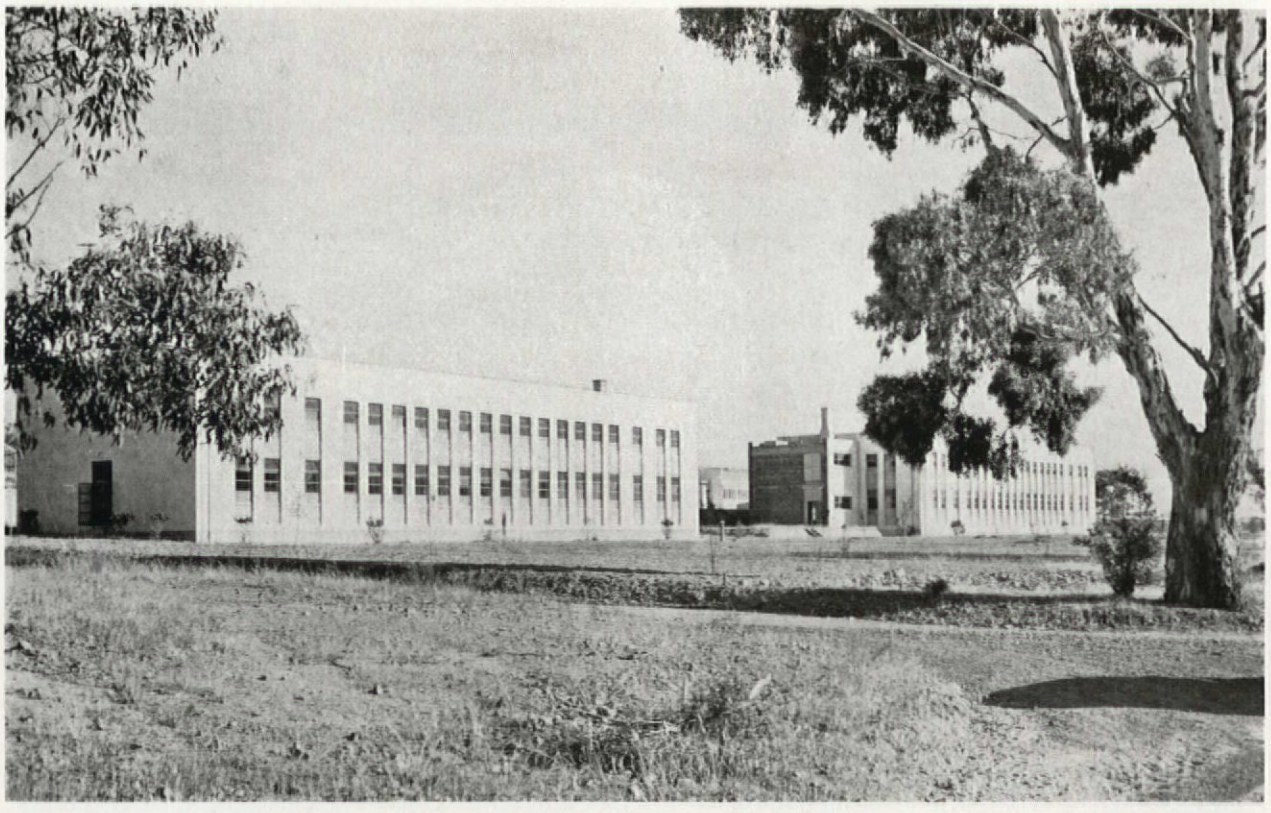
The jury of award for the competition for a city plan (1912) failed to agree so the Minister awarded the premiums in accordance with the majority recommendation; first, Walter Burley Griffen, Chicago; second, Eliel Saarinen, Helsingfors, Finland; third, D. Alf Agache, Paris. H. Van Buren Magonigle, New York, received special mention. The minority recommendation awarded A. C. Comey, Massachusetts, second premium.

A board of departmental officers, including those in charge of the territory, stubbornly opposed the adoption of any of the premiated plans and developed one of its own that had little to recommend it that was not culled from the purchased designs. Only a public outcry against the extravagant administrative methods in force, culminating in the presentation of a petition against the adoption of the departmental plan, signed by 150 Australian architects called a halt, and Griffen was invited to Australia. Subsequently, despite opposition, Griffen was appointed, in 1913, director of design and construction, and over a period of seven years he controlled much development. In 1920 he severed his connection with the city he had designed and entered private practice in Sydney. Government departments again took charge, and a foolish policy of erecting temporary buildings was entered into. A circumferential development has resulted in the growth of a scattered city.

In 1924 a Federal Capital Commission was appointed, responsible only to the Minister for all phases of the city's growth and administration. This body carried out the first permanent buildings of a monumental nature and was just proving itself the ideal form of government when a new government abolished it. Departmental control was reverted to, four departments being associated. This unsuitable and unsympathetic form of administration continues today; and it is only because of the great curtailment of the building program that it has not permanently ruined the city's beauty.



THE AUSTRALIAN INSTITUTE OF ANATOMY: A museum and laboratory block housing a collection of Australian anthropological and zoological specimens. Pale gray sandstone on pink granite plinth; spandrels of polychrome terra cotta; metalwork of bronze and aluminum; floors of marble, tile and hardwood. Designed by W. Hayward Morris and Malcolm J. Moir.



THE COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH LABORATORIES: Entomological and plant industry blocks. The first two blocks of a large group project. Reinforced concrete and brick, rendered in tinted white cement. W. H. Morris, architect.

HOW MANY ARCHITECTS ARE CARRYING ON?

By THOMAS S. HOLDEN, Vice-President
in Charge of Statistics and Research
F. W. Dodge Corporation

The number of active architectural offices decreased in 1932 by only half the percentage of building-volume decrease, thus showing a tendency toward relatively wide dispersion of projects. There was the usual turnover in the field, and the usual large number of new firms. Many firms not credited with projects that reached the contract stage in 1932 continued in business making plans to be carried out in better times.

In the all-time peak year 1928 there were in round numbers 60,000 architect-planned projects that went ahead to the contract stage in the 37 States east of the Rocky Mountains. These projects averaged $60,000 each, making a total of $3,600,000,000 of architect-planned work that went ahead. Approximately 9,000 firms participated in this total volume of work, with an average volume of $400,000 per office.

Architect-planned building projects have declined in just the same proportion as privately-planned building projects since 1928. The decline was continuous, but more drastic in 1932 than in any previous year. By 1931 the annual volume of work had declined 62 per cent from 1928, whereas the number of participating firms had declined only 11 per cent. By 1932 the total dollar volume of architect-planned work had declined 86 per cent and the total number of participating firms 42 per cent. As a result of the decline, 1932 had 20,000 architect-planned projects that went ahead, averaging $25,000 each; a total of $500,000,000 divided among 5,300 firms and individuals, an average volume of $95,000 worth of work per office.

A Tendency Toward Dispersion

While there was in 1932 a shrinkage in the number of active firms, this shrinkage has been nowhere nearly proportional to the volume decline in architect-planned work.

As might be naturally expected, there has been a tendency toward dispersion of the numerous small projects characterizing the program of 1932 rather than any concentration of work in a greatly reduced number of offices. In general it may be said that large offices in the past were large by reason of handling large-type city projects (conspicuously reduced in recent building activities) rather than by reason of handling large numbers of small projects. In 1928 there were 7,161 building projects of all kinds amounting to $100,000 or more each; in 1932 there were just 830 building projects of this class (figures for both years cover F. W. Dodge Corporation's territory).

There was in the critical year 1932 a considerable turnover among architectural firms, as in the past. Among the 5,291 who were credited with projects that reached the contract stage that year, 3,680 had been active in 1931; 447 had been active previous to 1931 but not in the year 1931; and 1,164 entirely new architects and firms were credited with contract projects.

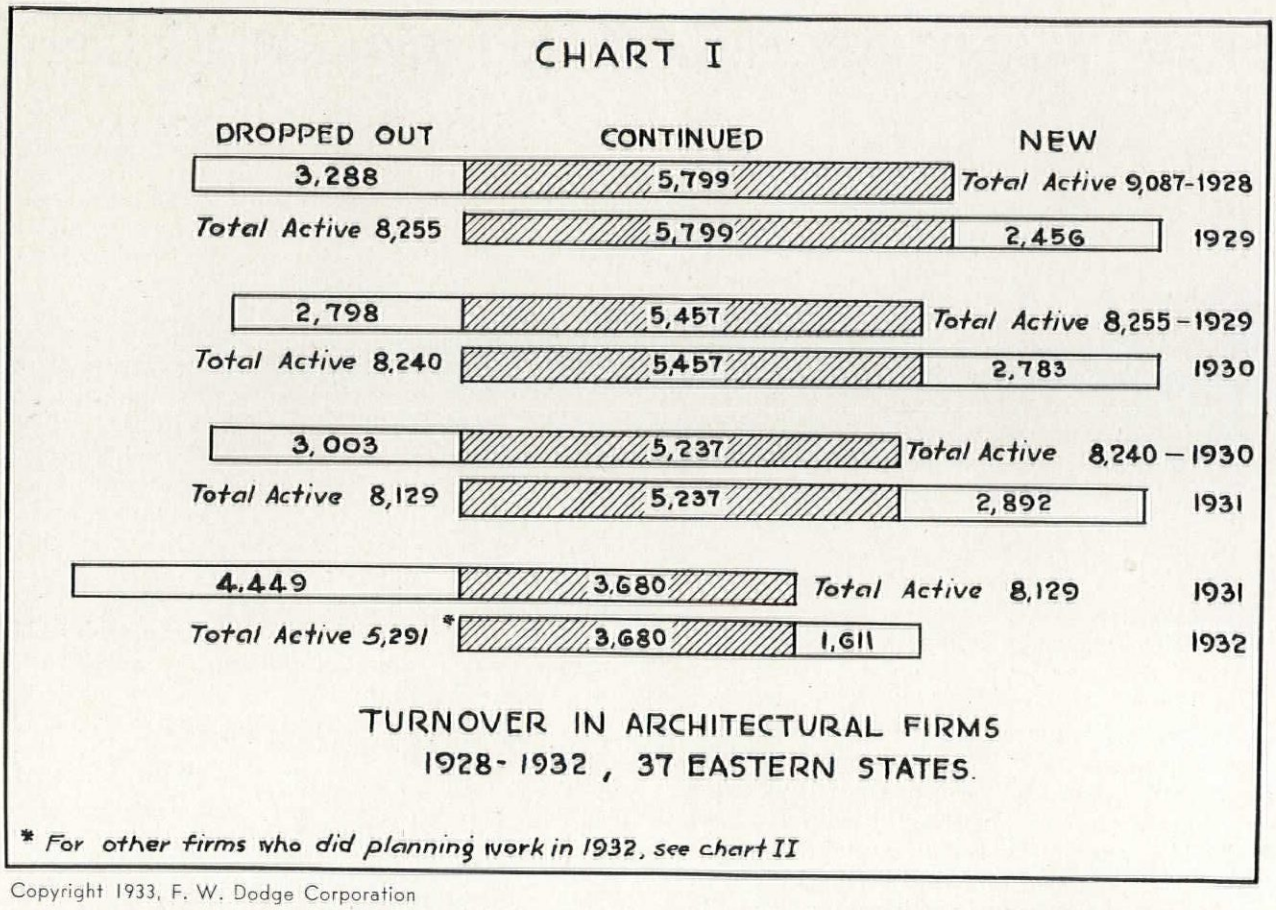
Some Inactive Offices Merely Dormant

Since 1932 was a year of extreme depression, just as 1928 was one of extreme speculative boom, it would be unfair to assume that the personnel of the professional is permanently reduced to anything like the number active in 1932. Increasing volume of building work hereafter will quite likely support a larger number of offices than those credited with contracts in 1932. In fact, F. W. Dodge Corporation recorded last year 3,611 firms credited with making plans though without any projects that went ahead to the contract stage in 1932. Of these firms, 1,386 had been credited with contracts in 1931, 410 had been active in years previous to 1931 but not in that year, and 1,815 were entirely new firms or individuals. So that in addition to the 5,291 credited with contract-

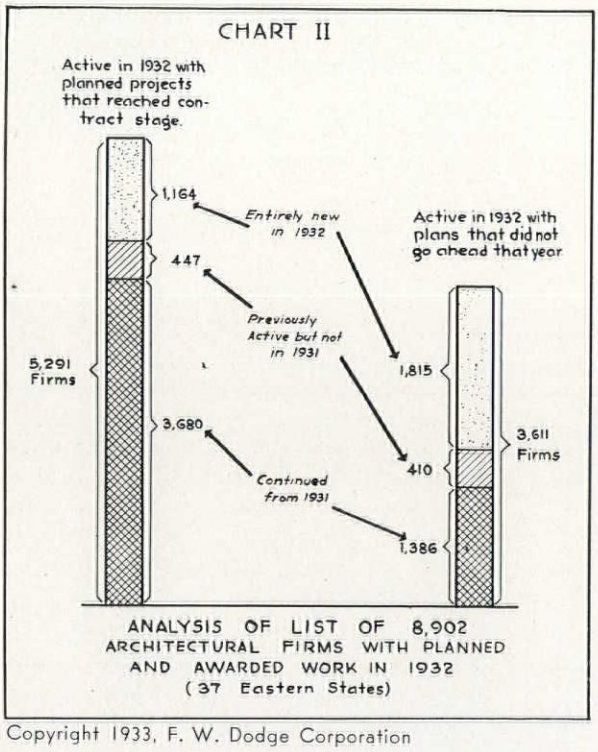
TABLE I: ARCHITECTS' PARTICIPATION IN BUILDING PROGRAMS
(Contract statistics for 37 Eastern States—F. W. Dodge Corporation)

Year	Total Building* Contracted For	Total Planned by Architects	Number of Participating Firms	Average Business Volume per Office
1928	$5,217,942,800	$3,639,018,800	9,087	$400,000
1929	4,336,025,100	2,917,148,700	8,255	353,000
1930	2,907,303,700	2,108,804,900	8,240	256,000
1931	1,986,837,000	1,391,356,000	8,129	170,000
1932	779,022,600	500,827,700	5,291	95,000

*Does not include public works and utilities, except the occasional jobs of this class which are planned by architects.



work in 1932, there were 1,796 continuing in business to the extent of making plans, and 1,815 new ones trying to get a start. Among those credited with plans only in 1932 there were 649 firms and individuals who had been actively and continuously in business from 1928, the year in which these records were started. It is reasonable to assume that a considerable number of the firms credited with plans only in 1932 will have contract-projects hereafter. Recent increases in private building operations and the prospect of numerous architectural projects under the Federal public works program point definitely in this direction.



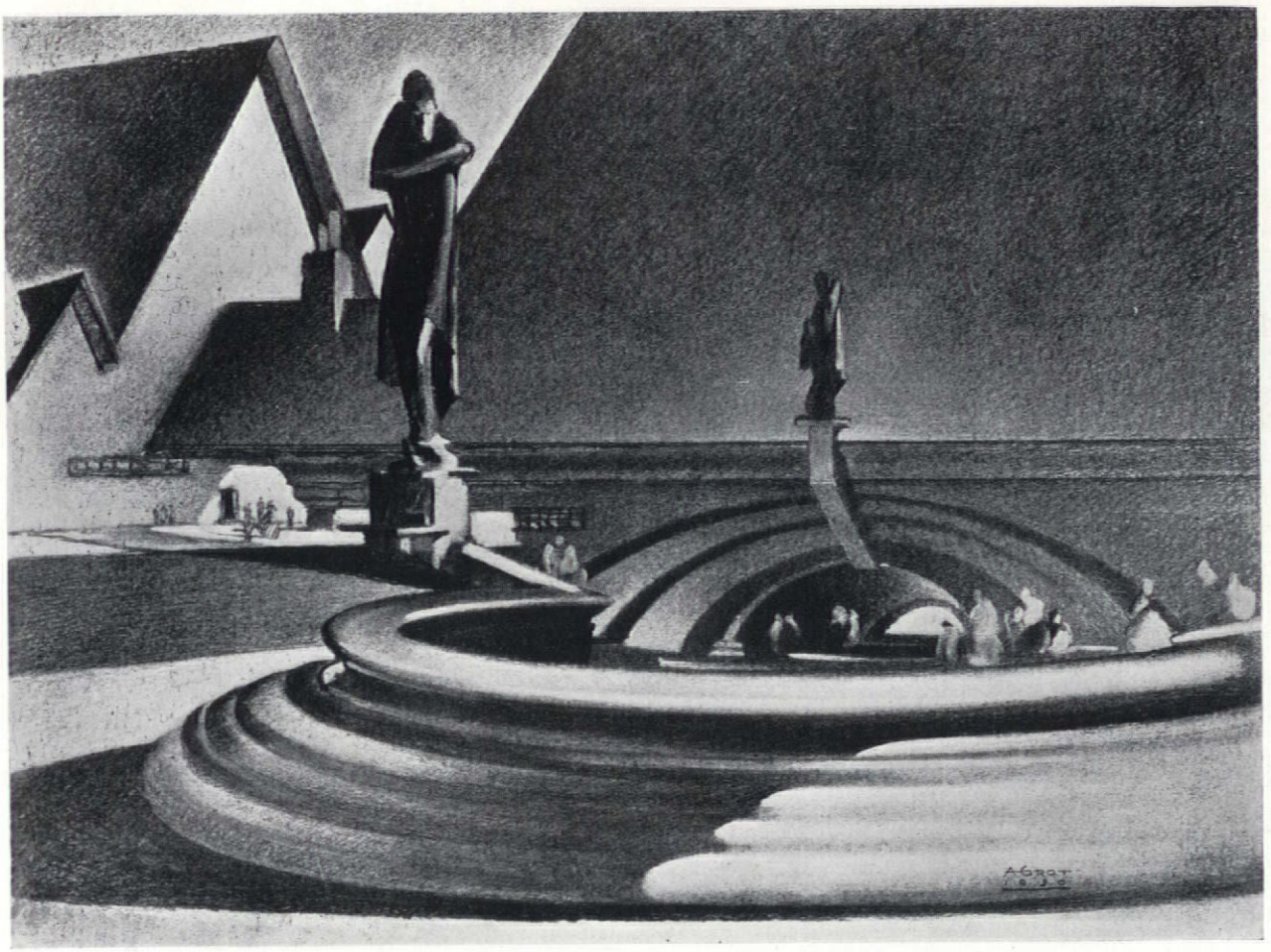
The number of architects active in 1931 who dropped completely from the 1932 records, having neither plans nor contracts to their credit in the latter year, was 3,063, which is just about the number that has dropped out in each of the preceding three years. In the strict definition of active firms as those with contract work to their credit, the firms active in 1931 who dropped out in 1932 number 4,449.

Many Newcomers

In spite of reduced volume, newcomers were conspicuous in the field. As stated above, there were 1,164 entirely new firms credited with contracts in 1932, and 1,815 new ones credited with plans only. The number of entirely new firms credited with contracts in 1930 was 2,238 and in 1931, 2,162. During the first quarter of 1933, been a little less drastic there than in F. W. Dodge Corporation's project records.

As stated above, all the quoted figures are taken from records covering the 37 States east of the Rocky Mountains. No such detailed records of architect-planned work are available for the 11 Rocky Mountain and Pacific Coast States. Building permit records for cities in that western area

(Continued on page 34, advertising section)



A set designed and sketched by Anton Grot.

DESIGNING MOTION PICTURE SETS

By A. B. LAING

Though financial rewards are still somewhat disproportionate, the professional lives of screen architects and screen stars are equally transitory. The pace is swift; seven years is said to be the average span. But while the doings of the stars are extolled, the architect must toil unsung. His modesty springs from fear—fear of destroying "audience illusion."

He prepares the plans and specifications and superintends the erection of "sets," those stage representations of modern palaces or medieval prisons, interiors of U-boats, tanneries, volcanoes and brothels, a stretch of the Gobi or a corner of the Champs Elysées—to name a few in current production. Each feature picture requires sixteen to a hundred sets. Most major studios have from five to ten pictures in simultaneous production; so, allowing nine weeks to a picture, the sum of drafting-room problems may be calculated.

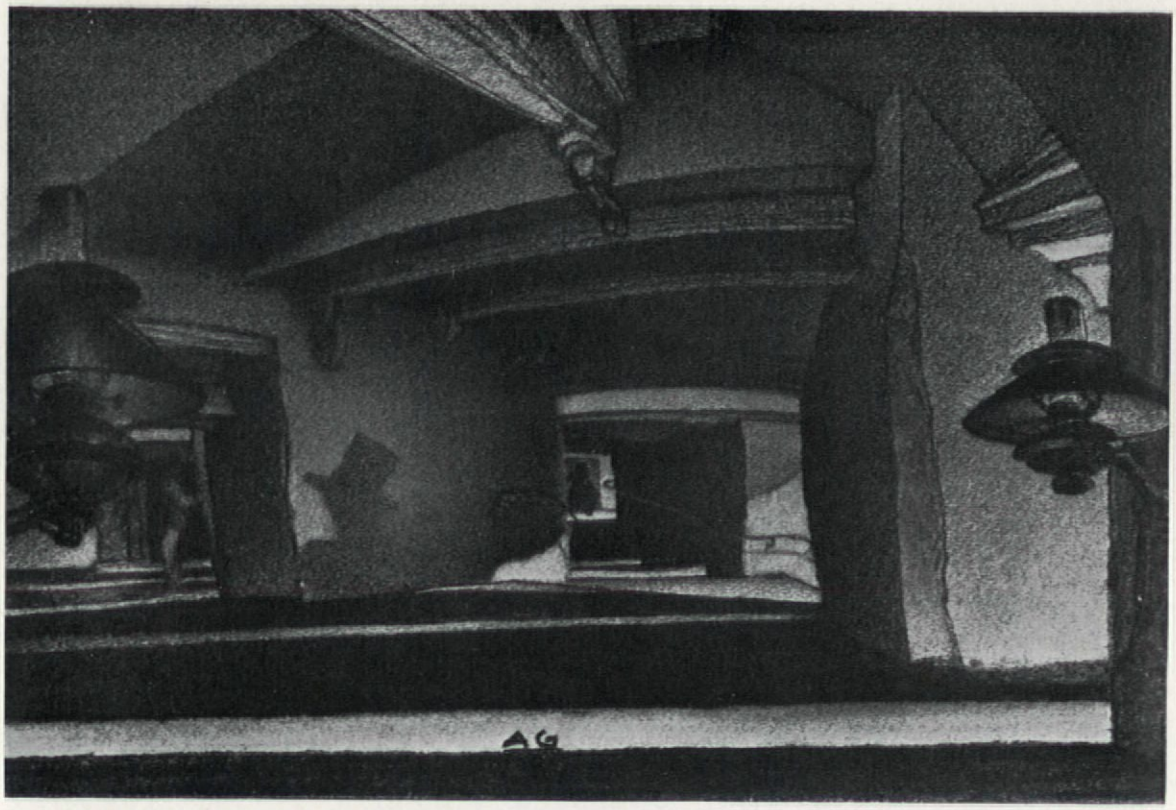
Governed by the physics of camera lenses, the chemistry of photography, the mechanics of lighting and sound and the limitations of budget, the architect must contrive sets sufficiently authentic to hold carping "fan-mail" at a minimum at least.

It is the art director to whom the picture, in amoeba, is brought—be it a $15,000 "quickie," or a "Cavalcade" or "Sign of the Cross" extravaganza for each of which a million is appropriated. But please examine a typical and comparatively simple commission extracted randomwise from "The Eighth Wonder." *Owner*: RKO Studios. *Architect*: Mr. Van Nest Polglase.

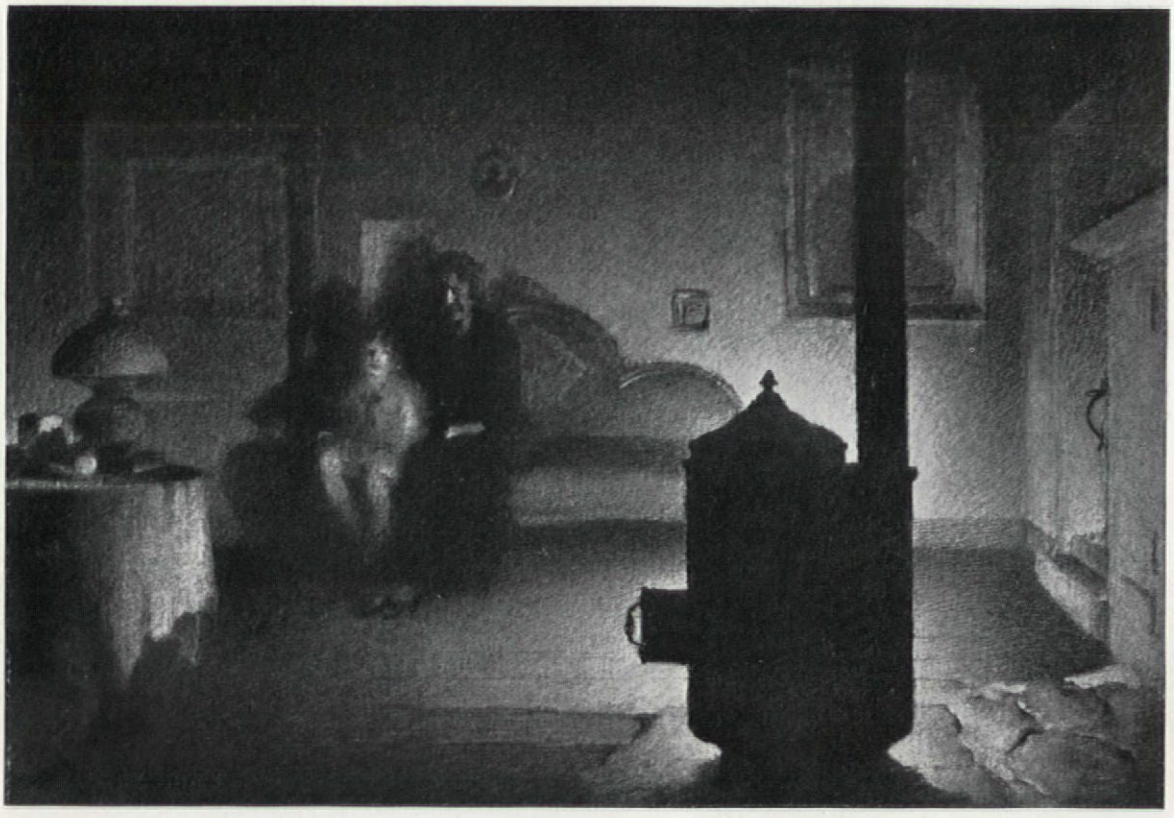
"INTERIOR SHIP'S SALOON — FULL SHOT — NIGHT.

"——It is a comfortable room, furnished after the manner of tramp steamers. A companionway leads down into the interior of the ship. (We do not necessarily have to see stairs. If desired companionway can be around a turn, with stairs suggested by rail, etc.) It is lighted by a lamp hanging over a table around which sit the characters. They are smoking as they study invoices. A ship's parrot perches in a cage, hidden behind a wastebasket on the floor."

From this description—unusually detailed for a movie script—complete plans and specifications must be drafted. First, a colored perspective is

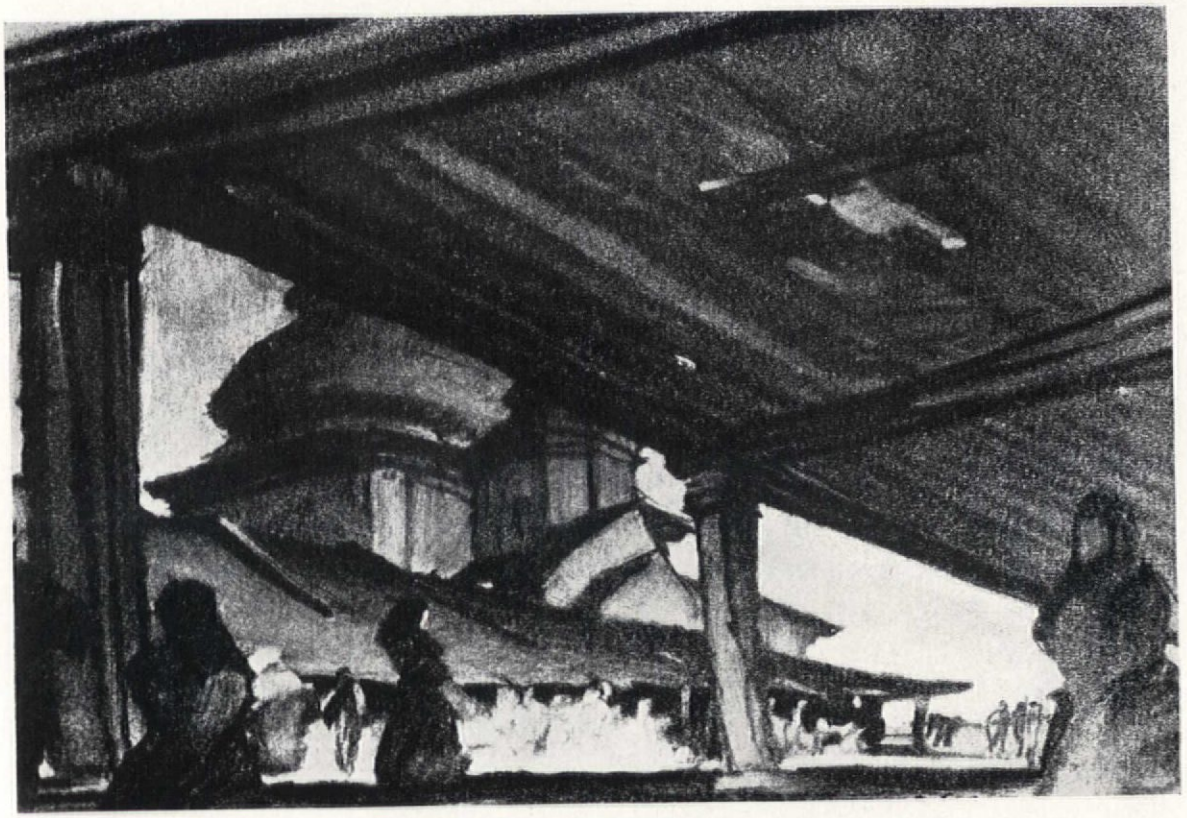


"Svengali"

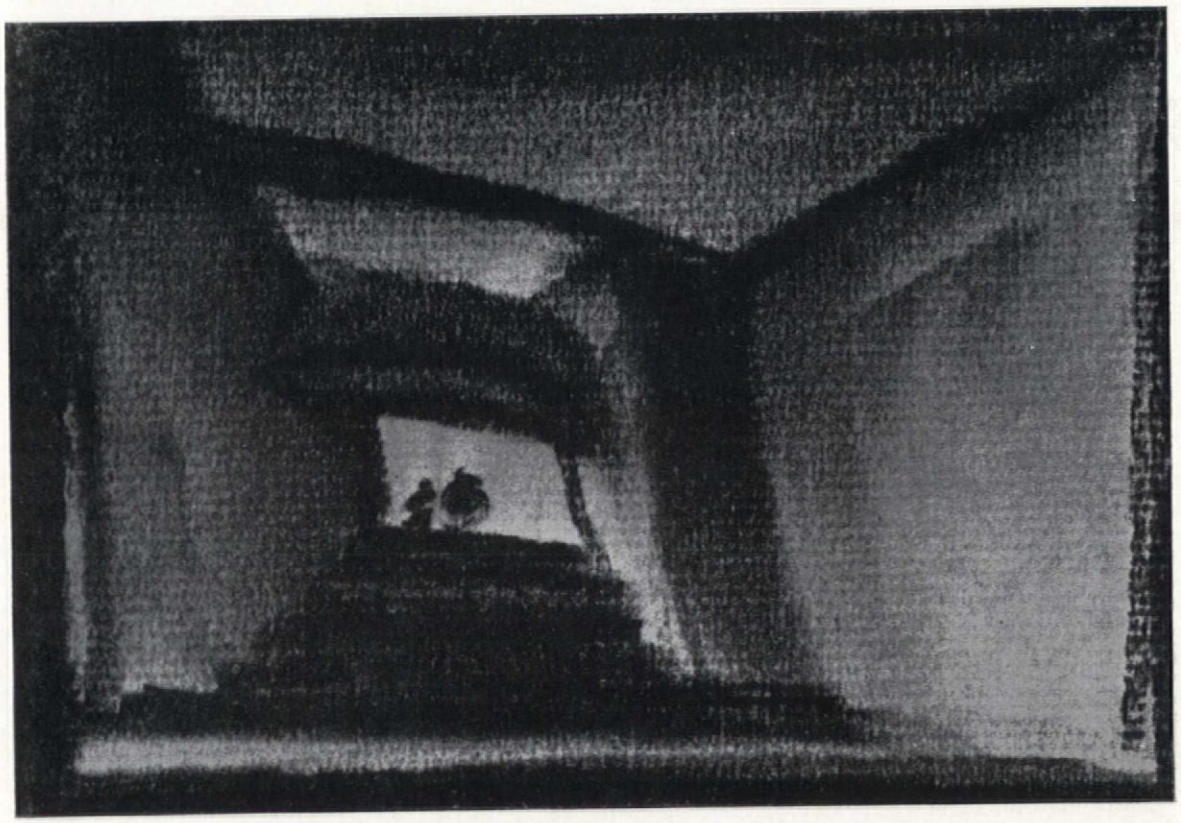


"The Country Doctor"

DESIGNS AND SKETCHES OF MOTION PICTURE SETS BY ANTON GROT

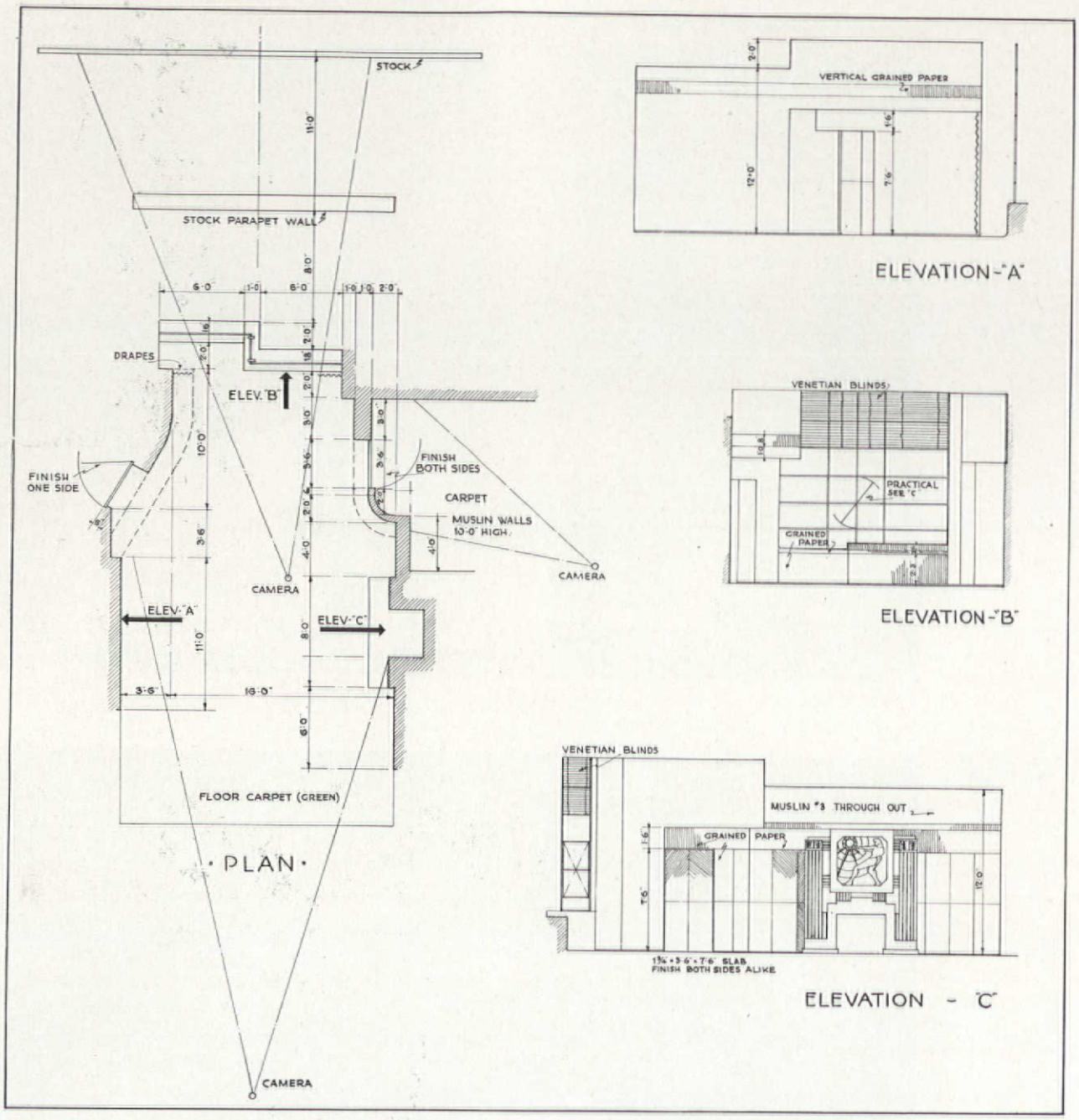


"The Song of the Flame"



"The Wax Museum"

DESIGNS AND SKETCHES OF MOTION PICTURE SETS BY ANTON GROT



Working drawings of an office interior set for "Phantom Fame" (RKO Studios).

required. Why? "Because," as Mr. Polglase explains, "directors cannot visualize from an elevation the most effective grouping of characters and props."

From the research library are drawn all filed references to "tramp steamer interiors," ranging from advertising sheets torn from magazines illustrating chronometers and the like to museum volumes. Reading down through stage "business" one finds that a character rises and opens a porthole. One port, then, must be hinged and a brass casting has to be designed. We find, let us say (for the story cannot be revealed here), that a character in a fit of rage hurls parrot and cage through a porthole, so that port must be enlarged; better make all windows. To catch a whispered word, the microphone boom will swing across the table between the characters' heads, hence the lamp cord must be shortened, perhaps omitted, despite the records which show no tramp steamers designed with windows or flush-type ceiling lighting fixtures.

By the use of straight lines and extreme angles the violence and melodrama of the episode in the cabin will be intensified. With sharp highlights and a 25-millimeter lens (which violates perspective), depth and vividness will be imparted; withal simplicity, for the audience must grasp the whole scene and its meaning at a glance.

Paint colors are selected from a chart of about fifty panels. Against each panel is mounted its photograph. Gold, for instance, produces a phosphorescent white. Royal blue: dove gray.

Left: A behind-the-scenes photograph of a set used in "Cavalcade" (Fox Films).

Below: Drafting room at Warner Brothers First National Studio in Hollywood, California.

Orange: almost a white. So on through the infinite assortment of grays and silvers on the screen architect's palette.

Likewise the "camera angle" is a useful tool. With it, given the point at which the director will mount his camera, set dimensions are determined. These must of course be in "screen proportions," principles of marine architecture notwithstanding. Bulkheads may have to be shifted, lest an unsightly black margin appear when the picture is projected on a theater screen. Conversely, the "camera angle" prevents waste of building materials by indicating the exact area in focus.

In 1932 the major producing companies used approximately one million square feet of wall board —composition, various types of insulating board and 3-ply veneered panels. The latter, by the way, is framed 12 inches on centers to overcome reverberation. Wall joints are commonly filled with "Swedish" putty and covered with cloth before trim or overlays are planted.

When all the perspectives in a picture are ready they are submitted to the director for approval, while the estimates are passed to the owner. Seldom does he tamper with them, and he "fades out" when final figures are approved, and working drawings and specifications are put in hand. Shop drawings are prepared by the foundry, "miniature," staff, and mill. The working schedules of these departments govern "shooting" sequences, since each bit of film can be spliced later into a finished reel. Products of the various artisans are picked up by carrier system and assembled on the sound stage. Scenes are "shot," and the set is razed. But what if a "retake" is ordered? Or censors order a change?

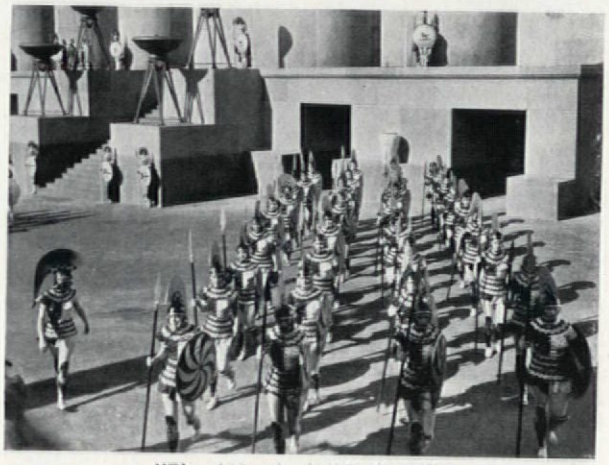
Then the set must be rebuilt with exactitude, and the unsatisfactory portion of the scene "reshot" and spliced in. Errors occasionally creep into these "retakes," and the spliced film may show, for example, an actor entering a room through a door hung on three hinges, then leaving an instant later by the same door which now hangs on two. Such incidents evoke a flood of accusatory mail from the lynx-eyed "fans." Indeed one film journal offers a standing cash prize for every discrepancy of this kind its readers can turn up. This partly explains why Hollywood's plans, specifications and shop drawings are unusually complete.

A dainty boudoir must be so designed that its walls can be economically rigged with 50 to 100 arc lights weighing from 100 to 680 pounds each. One would design a comedy scene almost in the mood of caricature; pageantry in commensurate scale and pattern with rich trappings, seen through a huge arc. We have observed why a squatty Vermont farmhouse must have its face lifted (or else a beam ceiling introduced), why the high windows of a Gothic cathedral are widened. "But why did you cut up that otherwise gorgeous Georgian drawing room with those terrible windows?" was a question asked a screen architect recently.

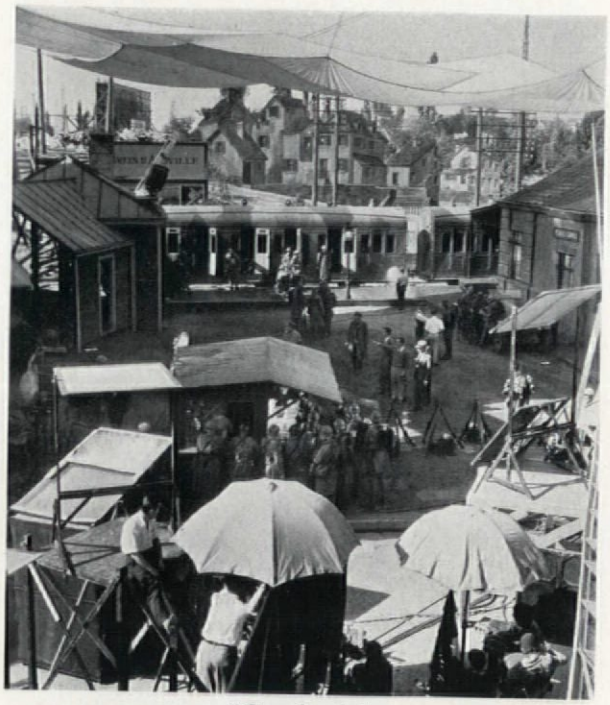
"Because Elissa Landi, who plays the lead in that picture, is a blonde."

The windows were actually light pockets, permitting Miss Landi's hair to be "backlighted" as she stood by the fireplace. Otherwise, her head

"The Sign of the Cross"



"The Warrior's Husband"



"Cavalcade"

MOTION PICTURE SETS IN USE

would have merged indistinguishably with the creamy white walls behind.

Here Mr. Polglase mentions some new uses for building materials: Granulated cork is preferable to granite in a garden path. A concrete wall can fall on a man without inflicting serious injury, if cork is mixed with the aggregate. Realistic flagstones are made from bits of insulating board, with snubbed or beveled edges. Three-ply veneer, laid on the floor of a sound stage and scribed and stained to pattern, functions as parquet. In a conflagration scene, an expensive residence can be so protected with asbestos that it will live to "burn" another day. Massive pipe fittings, elbows, gate-valves, and so forth, may be quickly and cheaply turned from solid blocks of laminated wood for a power-house scene. Contrariwise the skirting of a circular "wooden" staircase may be done in sheet metal, with electrically-welded joints.

In one picture a motorist was to drive through a plate-glass shop window. In this "breakaway" scene a large sheet of candy was specified for the glass, but just as the director gave his "twist 'em" signal a swarm of bees descended on the huge pane, completely obscuring it. While the cast and technical corps waited, with studio overhead metering along at about $3,000 an hour, the art director was sent for. He substituted a sheet of cellophane.

The fog scene in "Air Mail" was produced by throwing one of the sound stage's air conditioning systems into "reverse." An aromatic oil (which would not cloud the camera lens) was led into the casing ahead of the washers.

How should we sound-deaden a quarter mile of outdoor pavement? How should we design an electrically actuated battering-ram, diving bell, airplane catapult? When should a Praetorian Guard's chariot be stamped from 10-gauge; when molded in plaster? Will the gladiator's greaves, *épaulières* and trident be more effective if electro-plated, or merely burnished? Upon the correct answers to such incessant questions obviously hinge production speed, box-office appeal, profit, loss, artistry.

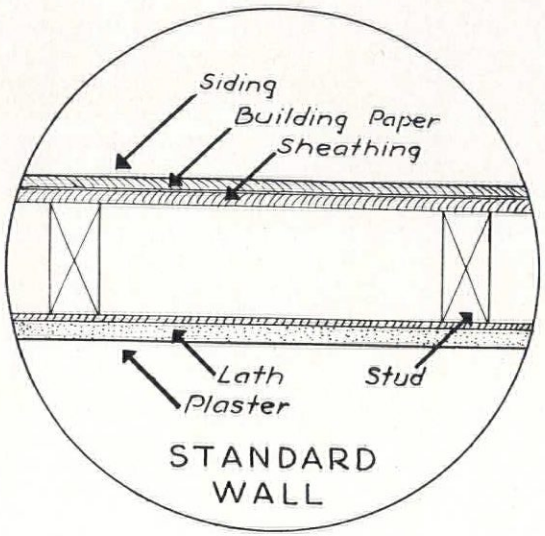
As W. C. Menzies, another art director, expresses it: "The motion picture technician must have great ingenuity. He must have a knowledge of architecture of all periods and nationalities. He must be able to picturize and make interesting a tenement or a prison. He must be a cartoonist, a costumer, a marine painter, a designer of ships, an interior decorator, a landscape painter, a dramatist, an inventor, an historical, and now, an acoustical expert—in fact, a Jack of all trades."

The actors and actresses play a relatively minor rôle in the movies, gauged by costs, employment ratios and similar measuring rods. Actually, the quest for realism is an unconscious trade propagandist, stimulating interest in many American products. The Commercial Attaché of the Department of Commerce at Rio states that the use of the California type bungalow and outdoor swimming pool in Brazil was really brought about through the showing of these on the screen.

TECHNICAL NEWS AND RESEARCH

THE SELECTION OF BUILDING INSULATION

By THEO. F. ROCKWELL, Instructor in Heating and Ventilating,
Carnegie Institute of Technology



The object of this paper is to present some suggestions for the design of walls and ceilings in order that the space which they inclose may be more economically heated without unduly increasing the first cost of the structure. Any discussion of other favorable properties which individual insulating materials may have in addition to their resistance to the flow of heat is not considered to be within this scope. This, however, is not to be interpreted to mean such properties as structural weakness or increased fire hazard.

The examples discussed are limited to the average small frame houses. The methods of analysis may be applied to any type of building.

PART ONE: THE ECONOMY OF REDUCING HEAT LOSSES

Dimensions from approximately forty small-house plans, designed by competent architects, were averaged to determine the size of an average two-story, six-room house and an average five-room bungalow. The results indicated by these plans:

	Two-story Six-room	*Five-room Bungalow*
Gross wall area—sq. ft.	1950	1250
Glass area —" "	410	275
Net wall area —" "	1540	975
Total floor area —" "	1400	1100
First floor " —" "	700	1100
Ceiling " —" "	700	1100
Volume (living space) cu. ft.	12200	9800

Minimum Specifications

To permit comparisons between various types of constructions, a standard wall is considered to be one which meets the following minimum requirements: the wall shall be constructed of 2" x 4" studs, 7/8" pine or fir sheathing, windproof building paper, pine or fir lap siding, and wood lath and plaster. The sheathing shall be applied in such a manner as to close all openings between the outside air and the air space between sheathing and plaster. Headers shall be placed inbetween the studs at each floor or ceiling level to prevent passage of air from basement or attic to air space in wall, and to reduce convection currents within the space itself. The function of the building paper is to prevent leakage through the cracks in the sheathing, and it shall be applied in such a manner as to produce this result, special care being taken at corners and door and window frames. All cracks between window and door frames and the structure shall be calked with a satisfactory calking material.

The standard top-floor ceiling construction shall be wood lath and plaster on joists. The roof shall be tightly sheathed and covered with roofing paper before applying slate or other roofing material. The same precautions for preventing air leakage in walls shall apply to roofs.

These specifications may appear to be somewhat rigid for minimum requirements, but it is believed that it is impossible to maintain a comfortable effective temperature in severe weather with a reasonably sized heating plant or with a reasonable fuel cost in a building which does not meet these requirements.

Heat Losses

Tests conducted at the University of Minnesota (1) have definitely shown that the commonly ac-

(1) *Heat Transmission Through Building Materials.* Rowley and Algren.

TABLE I: AVERAGE SIX-ROOM TWO-STORY HOUSE

REDUCTION IN HEAT LOSSES DUE TO CHANGES IN CONSTRUCTION

Item	Description	Wall		Glass		Ceil. & Roof		Floor		Infiltration			Heat Losses													
		U	at	U	at	U	at	U	at	Air Ch.	at	Leakage C.F.H.	Wall		Glass		Ceil. & Roof		Floor		Infiltration		Total		Reduction	
													Btu/hr	%	Btu/hr	%	Btu/hr	%	Btu/hr	%	Btu/hr	%	Btu/hr	%	Btu/hr	%
1	Std. Frame Wall No Insu No W.S.	.262	70	1.13	70	.278	75	.34	5	2	70	24400	28200	26	32400	29	17500	16	1200	1	31000	28	110300	—	—	—
2	No 1 + Weatherstripping	.262	70	1.13	70	.278	75	.34	5	½	70	6100	28200	32	32400	38	17500	20	1200	1	7750	9	87050	23250	21	
3	No 1+⅛" R.I. in Ceil. for lath	.262	70	1.13	70	.198	75	.34	5	2	70	24400	28200	27	32400	31	12500	12	1200	1	31000	29	105300	5000	4	
4	No 1+½" B.I. in Ceil. 1 A.S.	.262	70	1.13	70	.145	75	.34	5	2	70	24400	28200	27	32400	32	9150	9	1200	1	31000	31	101950	8350	8	
5	No 1 + 3" F.I. in Ceiling	.262	70	1.13	70	.069	75	.34	5	2	70	24400	28200	29	32400	33	4350	5	1200	1	31000	32	97150	13150	12	
6	No 3 + Weatherstripping	.262	70	1.13	70	.198	75	.34	5	½	70	6100	28200	34	32400	40	12500	15	1200	2	7750	9	82050	28250	26	
7	No 4 + "	.262	70	1.13	70	.145	75	.34	5	½	70	6100	28200	36	32400	41	9150	12	1200	1	7750	10	78700	31600	29	
8	No 5 + "	.262	70	1.13	70	.069	75	.34	5	½	70	6100	28200	39	32400	44	4350	6	1200	1	7750	10	73900	36400	33	
9	No 3+½" R.I. in Wall for Lath	.198	70	1.13	70	.198	75	.34	5	2	70	24400	21400	22	32400	33	12500	13	1200	1	31000	31	98500	11800	11	
10	No 9 but ½" R.I. for Sheathing	.174	70	1.13	70	.198	75	.34	5	2	70	24400	18800	20	32400	34	12500	13	1200	1	31000	32	95900	14400	13	
11	No 3+½ R.I. nailed to Sheathing	.187	70	1.13	70	.198	75	.34	5	2	70	24400	20200	21	32400	33	12500	13	1200	1	31000	32	97300	13000	12	
12	No 9 + Weatherstripping	.198	70	1.13	70	.198	75	.34	5	½	70	6100	21400	29	32400	43	12500	17	1200	1	7750	10	75250	35050	32	
13	No 10 + "	.174	70	1.13	70	.198	75	.34	5	½	70	6100	18800	26	32400	45	12500	17	1200	1	7750	11	72650	37650	34	
14	No. 11 + "	.187	70	1.13	70	.198	75	.34	5	½	70	6100	20200	27	32400	44	12500	17	1200	2	7750	10	74050	36250	33	
15	Use ½" PB for lath in Wall & Ceil.	.256	70	1.13	70	.270	75	.34	5	2	70	24400	27600	25	32400	30	17000	16	1200	1	31000	28	109200	1100	1	
16	No 15+1" PB. for Sheath in Wall & Roof	.262	70	1.13	70	.280	75	.34	5	2	70	24400	28200	26	32400	29	17600	16	1200	1	31000	28	110400	−100	−1	
17	No 15 + Weatherstripping	.256	70	1.13	70	.270	75	.34	5	½	70	6100	27600	32	32400	38	17000	20	1200	1	7750	9	85950	24350	22	
18	No 16 + "	.262	70	1.13	70	.280	75	.34	5	½	70	6100	28200	32	32400	38	17600	20	1200	1	7750	9	87150	23150	21	
19	No 4+½" B.I. in Wall 2 A.S.	.151	70	1.13	70	.145	75	.34	5	2	70	24400	16300	18	32400	36	9150	10	1200	1	31000	35	90050	20250	18	
20	No. 19+ Weatherstripping	.151	70	1.13	70	.145	75	.34	5	½	70	6100	16300	28	32400	49	9150	14	1200	1	7750	12	66800	43500	39	
21	No. 4+1" B.I. nailed to Sheath 1 A.S.	.133	70	1.13	70	.145	75	.34	5	2	70	24400	14300	19	32400	37	9150	10	1200	1	31000	36	88050	22250	20	
22	No 21 + Weatherstripping	.133	70	1.13	70	.145	75	.34	5	½	70	6100	14300	22	32400	50	9150	14	1200	2	7750	12	64900	45500	41	
23	No 5+ F.I. in Walls	.072	70	1.13	70	.069	75	.34	5	2	70	24400	7750	10	32400	42	4350	6	1200	2	31000	40	76700	33600	30	
24	No 23 + Weatherstripping	.072	70	1.13	70	.069	75	.34	5	½	70	6100	7750	15	32400	61	4350	8	1200	2	7750	14	53450	56850	51	
25	No 10 + FI in Wall & Ceiling	.063	70	1.13	70	.062	75	.34	5	2	70	24400	6800	9	32400	43	3900	5	1200	2	31000	41	75300	35000	39	
26	No. 25 + Weatherstripping	.063	70	1.13	70	.062	75	.34	5	½	70	6100	6800	13	32400	62	3900	8	1200	2	7750	15	52050	58350	53	
27	No. 1 + Double Glass	.262	70	.45	70	.278	75	.34	5	2	70	24400	28200	31	12900	14	17500	19	1200	1	31000	35	90800	19500	18	
28	No. 2 + " "	.262	70	.45	70	.278	75	.34	5	½	70	6100	28200	42	12900	19	17500	26	1200	2	7750	11	67550	42750	39	
29	No. 20 + " "	.151	70	.45	70	.145	75	.34	5	½	70	6100	16300	35	12900	27	9150	19	1200	3	7750	16	47300	63000	57	
30	No. 24 + " "	.072	70	.45	70	.069	75	.34	5	½	70	6100	7750	33	12900	38	4350	13	1200	3	7750	23	33950	76350	68	

R. I.—Rigid Insulation; B. I.—Blanket Insulation; F. I.—Fill Insulation; A. S.—Air Space. Net wall area, 1,950 sq. ft.; glass area, 410 sq. ft.; first floor area, 700 sq. ft.; ceiling area, 700 sq. ft.; volume, 12,200 cu. ft.

cepted over-all heat transmission coefficients may not be safely applied to walls with air space construction unless the leakage of outside air is prevented. The loss of heat through the wall may be increased fifty per cent or more depending on the volume and temperature of the air passing through the space. It is easily seen that the introduction of cold outside air into this air space in appreciable quantities will soon wipe out the resistance of the air space itself. The presence of this cold air also increases the temperature drop across the lath and plaster, which means the loss of more heat through this part of the structure. A lower inside wall surface temperature results, which has a decided effect on the comfort of the occupants, as will be pointed out later. The fact that the pressure causing leakage varies inversely as the outside temperature also makes it important that this leakage be eliminated.

Table I shows the distribution of the major heat losses from the average two-story house for a seventy degree temperature drop for the standard construction and for insulation added by the methods in common use. Table II shows this distribution for the average bungalow (2).

The minimum requirements for construction may be improved by any one or more of the following methods in order to reduce the losses shown in Item 1 of Tables I and II.

1. Apply weatherstripping to windows and doors.
2. Install storm sash or double glass windows.
3. Apply some form of heat insulating material to ceilings and walls.

Item 1 in Tables I and II shows that infiltration accounts for the second largest heat loss from the structure. It is exceeded by a small margin by the glass loss from the two-story house and by the ceiling loss from the bungalow. According to tests made by the American Society of Heating and Ventilating Engineers' Laboratory in cooperation with the University of Wisconsin (3), the addition of a good grade of weatherstripping to windows and doors may be expected to reduce infiltration to at least one-fourth of the original amount.

The resulting distribution of heat losses is shown by Item 2 in Tables I and II, which indicates a reduction of one-fifth of the total loss if weatherstripping be used. Because the possible saving in fuel is so high and because weatherstripping is not expensive (approximately $3 per window installed) it might reasonably be added to our list of minimum requirements, especially for those houses which are built where temperatures much below freezing may be expected.

(2) The transmission coefficients were calculated from values given in A. S. H. V. E. *Guide*, 1932.
(3) A. S. H. V. E. *Guide*, 1932.

TABLE II: AVERAGE FIVE-ROOM BUNGALOW

REDUCTION IN HEAT LOSSES DUE TO CHANGES IN CONSTRUCTION

Item	Description	Wall U	Wall at	Glass U	Glass at	Ceil&Roof U	Ceil&Roof at	Floor U	Floor at	Infiltration AC/H	Infiltration at	Leakage CFH	Heat Loss: Wall Btu/hr	Wall %	Glass Btu/hr	Glass %	Ceil&Roof Btu/hr	Ceil&Roof %	Floor Btu/hr	Floor %	Infiltration Btu/hr	Infiltration %	Total Btu/hr	Reduction Btu/hr	Reduction %
1	Std Frame Wall No Insu No WS	.262	70	1.13	70	.278	75	.34	5	2	70	19600	17900	19	21700	23	27600	30	1900	2	24900	26	94000	—	—
2	No 1 + Weatherstripping	.262	70	1.13	70	.278	75	.34	5	½	70	4900	17900	24	21700	29	27600	37	1900	2	6200	8	75300	18700	20
3	No 1+⅜" RI in Ceil for lath	.262	70	1.13	70	.198	75	.34	5	2	70	19600	17900	21	21700	25	19600	23	1900	2	24900	29	86000	8000	9
4	No 1+½" BI in Ceil 1 A S	.262	70	1.13	70	.145	75	.34	5	2	70	19600	17900	22	21700	27	14400	18	1900	2	24900	31	80800	13200	14
5	No. 1 + 3" FI in Ceiling	.262	70	1.13	70	.069	75	.34	5	2	70	19600	17900	24	21700	30	6800	9	1900	3	24900	34	73200	23800	22
6	No 3 + Weatherstripping	.262	70	1.13	70	.198	75	.34	5	½	70	4900	17900	27	21700	32	19600	29	1900	3	6200	9	67300	26700	28
7	No 4 + "	.262	70	1.13	70	.145	75	.34	5	⅛	70	4900	17900	29	21700	35	14400	23	1900	3	6200	10	62100	21900	22
8	No 5 + "	.262	70	1.13	70	.069	75	.34	5	⅛	70	4900	17900	33	21700	40	6800	13	1900	3	6200	11	54500	39500	42
9	No 3 + ½" RI in Wall for lath	.198	70	1.13	70	.198	75	.34	5	2	70	19600	13500	17	21700	27	19600	24	1900	2	24900	30	81600	12400	13
10	No 9 but ½" RI for Sheathing	.174	70	1.13	70	.198	75	.34	5	2	70	19600	11900	15	21700	27	19600	25	1900	2	24900	31	80000	14000	15
11	No 3 + ½" RI nailed to Sheathing	.187	70	1.13	70	.198	75	.34	5	2	70	19600	12800	16	21700	27	19600	24	1900	2	24900	31	80900	13100	14
12	No. 9 + Weatherstripping	.198	70	1.13	70	.198	75	.34	5	½	70	4900	13500	22	21700	35	19600	31	1900	3	6200	9	62900	31100	33
13	No. 10 + "	.174	70	1.13	70	.198	75	.34	5	½	70	4900	11900	19	21700	36	19600	32	1900	3	6200	10	61300	32700	35
14	No. 11 + "	.187	70	1.13	70	.198	75	.34	5	½	70	4900	12800	21	21700	35	19600	31	1900	3	6200	10	62200	31800	34
15	Use ½" PB for lath in Wall & Ceil.	.250	70	1.13	70	.270	75	.34	5	2	70	19600	17300	19	21700	23	26700	29	1900	2	24900	27	92700	1300	1
16	No 15 but 1" PB for Sheath instead of ½"	.262	70	1.13	70	.280	75	.34	5	2	70	19600	17900	19	21700	23	27800	30	1900	2	24900	26	94200	- 200	.2
17	No. 15 + Weatherstripping	.250	70	1.13	70	.270	75	.34	5	½	70	4900	17300	24	21700	30	26700	36	1900	2	6200	8	74000	20000	21
18	No 16 + "	.262	70	1.13	70	.280	75	.34	5	½	70	4900	17900	24	21700	29	27800	37	1900	2	6200	8	73500	18500	20
19	No 4 + ½" BI in Wall 2 A S.	.151	70	1.13	70	.145	75	.34	5	2	70	19600	10300	14	21700	30	14400	20	1900	2	24900	34	73200	20800	22
20	No 19 + Weatherstripping	.151	70	1.13	70	.145	75	.34	5	½	70	4900	10300	19	21700	40	14400	26	1900	4	6200	11	54500	39500	42
21	No 4 + 1" BI nailed to Sheath 1 A S	.133	70	1.13	70	.145	75	.34	5	2	70	19600	9100	13	21700	30	14400	20	1900	2	24900	35	72000	22000	23
22	No 21 + Weatherstripping	.133	70	1.13	70	.145	75	.34	5	½	70	4900	9100	17	21700	41	14400	27	1900	3	6200	12	53300	40700	43
23	No 5 + FI in Walls	.072	70	1.13	70	.069	75	.34	5	2	70	19600	4900	8	21700	36	6800	11	1900	4	24900	41	60200	33800	36
24	No 23 + Weatherstripping	.072	70	1.13	70	.069	75	.34	5	⅛	70	4900	4900	12	21700	52	6800	16	1900	5	6200	15	41500	52500	56
25	No 10 + FI in Wall & Ceiling	.063	70	1.13	70	.062	75	.34	5	2	70	19600	4300	7	21700	37	6200	11	1900	3	24900	42	59000	45500	48
26	No 25 + Weatherstripping	.063	70	1.13	70	.062	75	.34	5	⅛	70	4900	4300	11	21700	54	6200	15	1900	5	6200	15	40300	53700	57
27	No 1 + Double Glass	.262	70	.45	70	.278	75	.34	5	2	70	19600	17900	22	8600	11	27600	34	1900	2	24900	31	80900	13100	14
28	No 2 + " "	.262	70	.45	70	.278	75	.34	5	⅛	70	4900	17900	29	8600	14	27600	44	1900	3	6200	10	62200	31800	34
29	No. 20 + " "	.151	70	.45	70	.145	75	.34	5	⅛	70	4900	10300	25	8600	21	14400	35	1900	4	6200	15	41400	52600	56
30	No. 24 + " "	.072	70	.45	70	.069	75	.34	5	⅛	70	4900	4900	17	8600	30	6800	24	1900	7	6200	22	28400	65600	70

R. I.—Rigid Insulation; B. I.—Blanket Insulation; F. I.—Fill Insulation; A. S.—Air Space. Net wall area, 975 sq. ft.; glass area, 275 sq. ft.; floor area, 1,100 sq. ft.; ceiling area, 1,100 sq. ft.; volume, 9,800 cu. ft.

The loss of heat by transmission through doors and single glass windows is always relatively a large one. It is the largest loss in the case of the two-story house and the third largest in the case of the bungalow, but in both the glass loss is greater than the wall loss.

The use of double glass windows would reduce this loss to about one-half, but to my knowledge there are no double glass windows, which would overcome the major objections of the home owner, available at a low first cost. In the colder climates, several types of storm sash are used during the heating season, but generally only where the severity of the weather makes it necessary in order to maintain a comfortable room temperature. The effect of using double glass on the distribution of heat losses is shown in items 27 to 30 in both tables.

The remaining heat losses, namely transmission through walls, floors and ceilings, are the ones which can be reduced by the addition of heat insulating materials to the standard construction. A study of the tables shows that the total of these losses would run from two-fifths to one-half of the total loss from a house constructed in accordance with the minimum requirements. Adding weatherstripping to the list of minimum requirements increases the relative importance of the transmission losses. This suggests that while a worthwhile reduction of heat-loss can be accomplished by the use of insulation, a saving of more than one-third in fuel consumption cannot be expected unless an excessive amount of insulating is used. (See items 19, 23 and 25 in Tables I and II.)

Types of Insulation

Where insulation should be placed, which material should be used, and how thick it should be are questions which may be properly introduced into the discussion at this point.

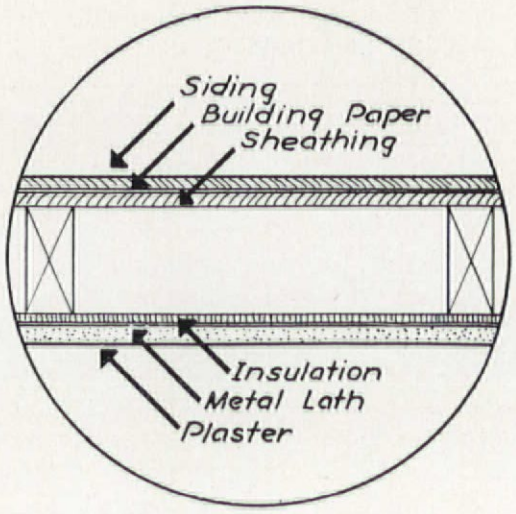
At present there are available three distinct types of insulating materials for ordinary building construction. They are:

1. Rigid board form insulation.
2. Flexible or blanket insulation.
3. Fill insulation.

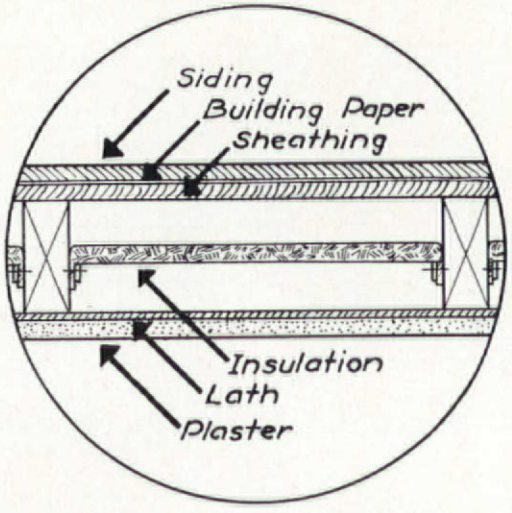
The raw material for the first two groups is almost always a vegetable fiber, although in a few cases asbestos and cattle hair are used. The vegetable fibers include sugar cane, cornstalks, wheat straw, licorice roots, flax straw, jute, cork, seagrass, and wood in several forms. Fill insulation is usually a gypsum or limestone product.

Criteria for Good Insulation

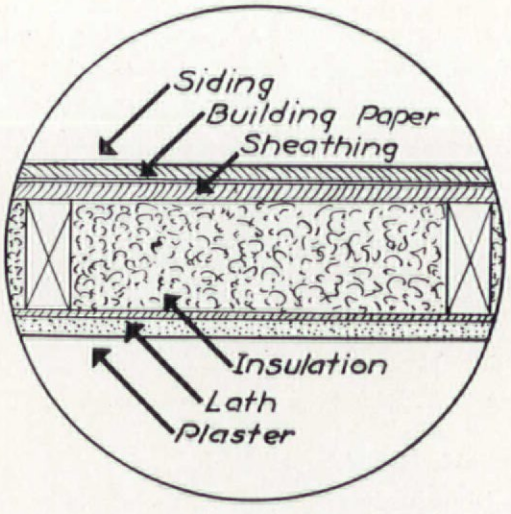
The following have been set up as the requirements of a good material for building insulation (4):



RIGID BOARD INSULATION



FLEXIBLE OR BLANKET INSULATION



FILL INSULATION

1. Low conductivity.
2. Low cost.
3. Low density.
4. Low thermal capacities.
5. Ease of application.
6. Mechanical strength.
7. Durability (slow aging).
8. Vermin-proof.
9. Nonrusting.
10. Fire resisting.
11. Nonhygroscopic (moisture-proof).
12. Nonodorous.

Rowley and Algren (1) in their study of insulating materials found that, roughly, the conductivity increases as the density. The curve is not a straight line, which suggests that the rate of air diffusion through the material has some bearing on the material's heat transfer properties. And as thermal capacity is the product of the specific heat of a substance and its weight, we may infer that a material which meets the first requirement of low conductivity would also meet the third and fourth.

The second requirement of low cost cannot very well be considered separately from the fifth, which is ease of application, because it is the cost of the material in place that is of importance to the home owner. It may be reasonably assumed that manufacturing costs for the same types of material will be about the same for all producers. An exception may occur in the case of those concerns which use a raw material which might otherwise be wasted, such as bagasse, wheat straw or cornstalks. The producers of materials of the same class appear willing, however, to meet a common price in any given locality. Transportation charges will then be the governing factor which will determine whether a manufacturer can successfully compete in all markets. Because there is this tendency to meet a common price for the material, the cost of applying the material must be carefully considered in order to determine the true cost of the resistance in place. This is discussed in more detail later.

Structural strength is a property possessed only by the board form of insulation, but the better grades of blanket and fill insulation have sufficient strength to withstand the stresses of handling during construction. There is a slight tendency for fill materials to settle after installation, but this can be overcome by correct construction methods. It is not good practice to use materials which will not stand the abuse of the construction period. Board form insulation may be used either as lath or sheathing, and there is considerable evidence to show that walls constructed from the large sheets possess greater structural strength than the standard frame wall.

The vegetable fiber materials all tend to decompose, tend to attract vermin and rodents, are combustible, absorb hygroscopic moisture, and possess

(4) *Basic Laws of Heat Transmission.* W. J. King, Mechanical Engineering, April, 1932.

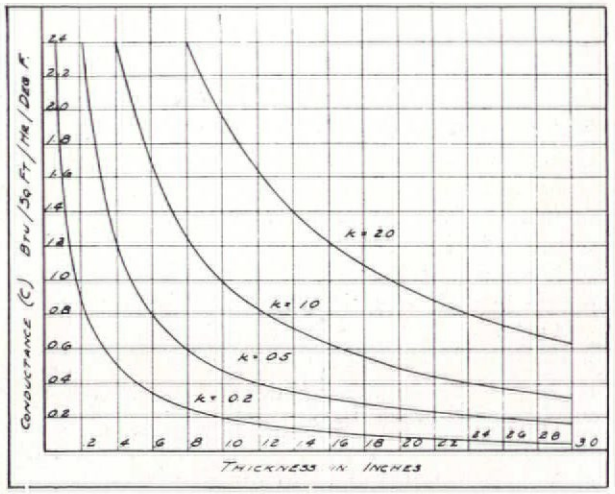


FIGURE I: EFFECT OF INCREASE IN THICKNESS ON THERMAL CONDUCTANCE

more or less perceptible odor. The first two of these affect the useful life of the material and the third bears directly on the fire hazard. It would be poor policy to use a material which would not last for the useful life of the structure or one which would increase the fire hazard. The better manufacturers sterilize their material to overcome the first two difficulties and treat it chemically to make it slow burning to overcome the third. In one case the fiber is saturated with a neat portland cement mortar, which is then allowed to set. The fourth property is important because an increase in moisture content is followed by an increased conductivity. The fibers are treated during the manufacturing process to reduce their moisture-absorbing capacity.

The materials made from minerals do not possess these unfavorable properties, but they are generally handicapped by higher conductivities, which means that a greater thickness must be used to provide the same resistance.

Relationship of Conductance and Thickness

The relation between conductance and thickness for a constant conductivity is shown by equation (1):

$$C = \frac{k}{x} \qquad (1)$$

where C = conductance in B.t.u./hr/sq. ft./°F.
k = conductivity for a thickness of 1 inch in B.t.u./hr/sq. ft./°F.
x = thickness in inches.

Equation (1) is a form of a hyperbola, which tells us that the conductance of a given material will not decrease at a uniform increase in thickness.

This is shown graphically in Fig. I, on which are plotted curves for several values of k. It is evident from these curves that considerable reduction results from increasing the thickness until a thickness of 1½ inches is reached. Beyond this thickness the reduction in conductance is small for equal increments of thickness, especially for those materials with low conductivities.

The commercial thicknesses for rigid or flexible house insulating material range from ¼ to 1 inch. The most widely used thicknesses are ½ inch (actual thickness = 7/16 inch), ¾ inch and 1 inch. It is seldom that the resistance offered by a material less than ½ inch thick would justify the expense of installing it.

Fill insulation is usually used to the full width of the air space in walls. In ceilings, it may be screeded out to any desired thickness. One material, which falls in this class, provides an exception. A flaky substance is mixed with an adhesive, and the mixture sprayed on the wall or ceiling. The application can be stopped when any desired thickness is built up.

Application of Insulation

Turning again to Tables I and II for an answer to the first question, as to where insulation should be applied, we find that *the ceiling loss is of major importance*. It is the largest loss from the bungalow, and if the money available for insulation is limited, the ceiling should be the first place in which insulation is applied. Even in the case of the two-story house, insulating the ceiling offers a greater return than insulating the walls as the following examples indicate. An expenditure of $17.50* for ceiling insulation will result in a reduction in heat losses of 5000 B.t.u/hr., while an expenditure of $38.50 on the walls will result in a reduction of only 6800 B.t.u./hr. (Items 3 and 9, Table I). Likewise an expenditure of $52.50 for ceilings results in a reduction of 8400 B.t.u/hr., while an expenditure of $115 for walls results in a reduction of only 11700 B.t.u./hr. (Items 4 and 19, Table I). This is accounted for by the great difference in area between wall and ceiling, the lower initial resistance of the ceiling, and higher air temperature at the ceiling level.

In the preparation of these tables it was assumed that the basement was fully excavated and that none of the first floor extended over an unexcavated or unheated portion. The loss of heat from boiler or furnace and from piping is almost always sufficient to maintain a basement breathing line temperature of at least 60°F. The tables show that for a temperature difference of 5°F. (65°F.—air temperature at floor line), (5) the transfer of heat through to standard double floor of ⅞" pine subfloor and 13/16" hardwood finish floor on joists without a basement ceiling is so small as to be almost negligible. Only in the case of the very well insulated house does this floor loss exceed more than 3 per cent of the total loss. This indicates that the addition of insulating material to a floor under these conditions cannot be justified on the basis of heat or fuel saved.

*See Tables III and IV and Appendix.

Choice of Materials

Tables I and II do not present sufficient information to answer the second question conclusively because they do not consider the element of cost. The final selection from a group of materials, which satisfactorily meet all other requirements previously mentioned, should always be the one which is most economical.

The true scale of measurement for this requirement is the cost in place of the extra resistance to heat transfer resulting from the change in construction.

For a given locality, two factors greatly affect the cost of the material in place: first, the transportation cost from the point of manufacture, and second, the prevailing local wage rates.

Tables III and IV have been prepared to show the comparison existing at the present time in the Pittsburgh area. The cost of each of the several constructions was determined by adding the unit costs of each material that went into the wall or ceiling.*

Every architect or engineer who is confronted with the problem of selecting house insulation should make a similar analysis for his community. It is reasonable to expect that results will differ in various parts of the country. It must also be clearly understood that a change in prices for some of the materials without a corresponding change for others will materially alter the results.

Column 1 in Tables III and IV gives a description of the construction. Column 2 gives the value of U and Column 3 the resistance. These constants were calculated from the conductivities and conductances given in Table 7, page 28, 1933 *Guide*. Column 4 gives the cost of a square foot of the wall or ceiling in place. Column 5 gives the increase in resistance due to change in construction and column 6 the increased cost. These values were determined by subtracting the resistance and the cost of the standard construction respectively from the resistance and the cost of the improved construction. Column 7 expresses the cost of the added resistance per 100 units in dollars:

$$\frac{\text{Column 6} \times 100}{\text{Column 5}} = \text{Column 7}$$

Column 8 expresses the added resistance per dollar invested for insulation:

$$\frac{\text{Column 5}}{\text{Column 6}} = \text{Column 8}$$

COST OF INSULATION IN PLACE (1932-33)

TABLE III: WALLS

No	Description	2	3	4	5	6	7	8
		U	Resistance	Cost of 1 sq. ft. of Wall in Place	$R-R_1$	Increase in Cost over Standard	Cost of Added Resistance per 100 Units	Units of Res. Add'd per $ for Insulation
			1/U	Dollars		Dollars	Dollars	
1	Standard Frame Wall	.246	4.08	.335				
2	Use ½" R.I. for Lath	.187	5.35	.360	1.27	.025	1.97	50.8
3	" " " " " & Sheathing	.177	5.65	.369	1.57	.034	2.16	47.8
4	" " " " Sheathing	.228	4.38	.344	.30	.009	3.00	33.3
5	" ¾" " " "	.195	5.13	.359	1.05	.024	2.28	43.8
6	No. 1 + ½" R.I. Nailed to Sheath. 1 A.S.	.178	5.60	.420	1.52	.085	5.60	17.9
7	No. 1 + ½" B.I. 2 A.S.	.146	6.84	.410	2.76	.075	2.72	36.8
8	No. 1 + 1" " " "	.130	7.70	.440	3.62	.105	2.90	34.5
9	Use ⅜" Gyp. P.B. for Lath	.244	4.09	.345	.01	.010	100.0	1
10	No. 9 with 1" P.B. for Sheathing	.295	3.39	.359	-.69	.024	—	—
11	No. 1 + Flaked Gypsum Fill	.093	10.72	.428	6.64	.093	1.40	70.5
12	No. 1 + Cellular " "	.087	11.42	.434	7.34	.099	1.35	74
13	No. 1 + Rock Wool "	.066	15.27	.485	11.19	.150	1.34	74.6
14	No. 3 + Flaked Gypsum "	.081	12.29	.462	8.21	.127	1.55	64.5

TABLE IV: CEILINGS

1	Standard Ceiling	.62	1.61	.231				
2	No. 1 + Attic Floor	.284	3.52	.291	1.91	.06	3.14	31.8
3	Use ½" R.I. for Lath	.347	2.88	.256	1.27	.025	1.97	50.8
4	No. 1 + ½" B.I. 1 A.S.	.224	4.47	.306	2.86	.075	2.62	38.2
5	No. 1 + 3" Flaked Gypsum Fill	.127	7.86	.309	6.25	.078	1.25	80
6	No. 1 + 3" Cellular " "	.119	8.43	.314	6.82	.083	1.28	82
7	No. 1 + 1" Rock Wool Fill	.203	4.93	.281	3.32	.05	1.51	66.2
8	No. 1 + 2" " " "	.122	8.27	.311	6.65	.08	1.20	83.2
9	No. 1 + 3" " " "	.086	11.60	.351	9.99	.12	1.20	83.2
10	No. 3 + 3" " " "	.078	12.87	.376	11.26	.145	1.29	77.5
11	Use ⅜" P.B. for Lath	.613	1.63	.241	.02	.01	50.00	2
12	No. 3 + Attic Floor	.209	4.79	.316	3.18	.085	2.67	37.4
13	No. 4 + " "	.155	6.38	.366	4.77	.135	2.83	35.3
14	No. 5 + " "	.103	9.77	.369	8.16	.138	1.69	59.1
15	No. 9 + " "	.074	13.51	.411	11.90	.18	1.51	66.2

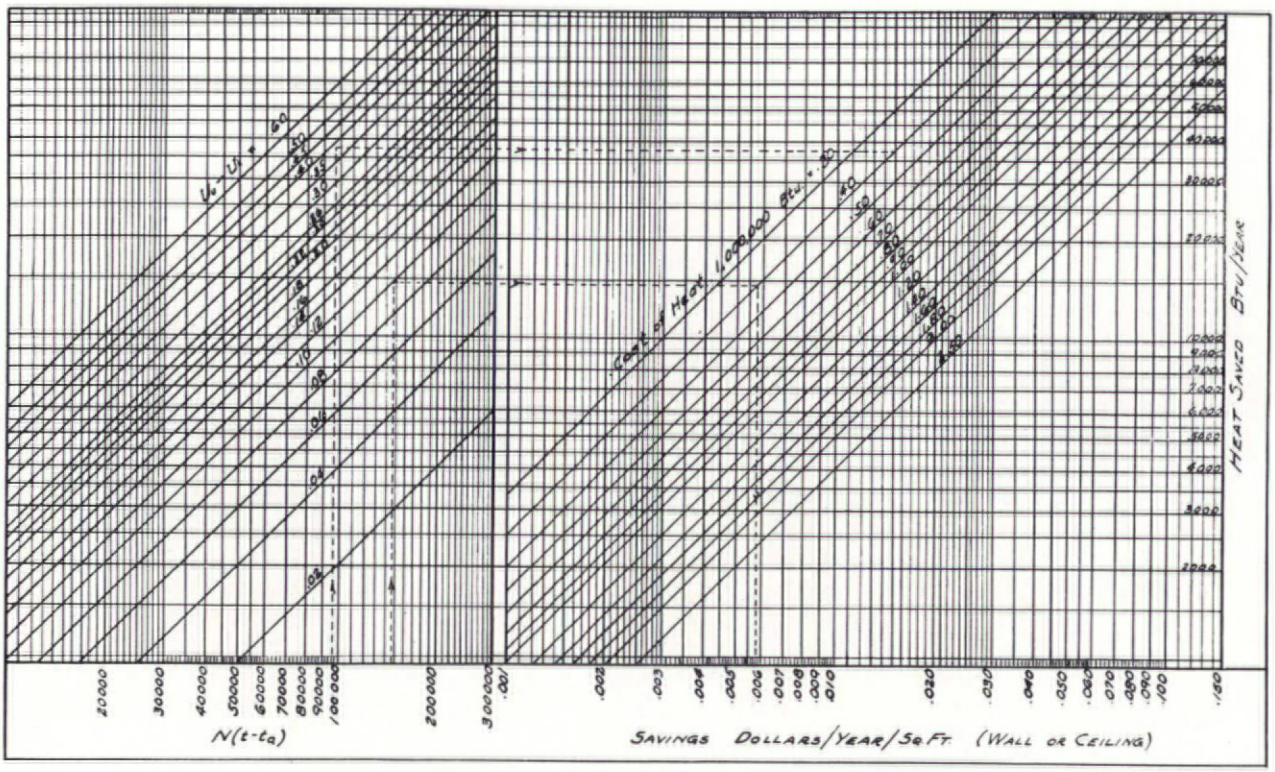


FIGURE II: CHART FOR THE DETERMINATION OF ANNUAL SAVINGS RESULTING FROM THE USE OF BUILDING INSULATION

Considerable care must be exercised in drawing conclusions from these tables. A careful study of Table III indicates that using rigid insulation as a plaster base or in place of sheathing (the ¾" thickness for sheathing)† offers a good return on a small investment. It is true that columns 7 and 8 indicate a greater amount of resistance per dollar invested for fill insulation, but column 6 shows that the initial investment would be from four to six times as large.

These statements shall not be interpreted to mean that fill insulation should not be used. The law of diminishing returns governs the increase in thickness of insulating materials, but the right combination of longer heating season and high fuel costs may easily justify the more expensive construction.

The analysis for the ceilings indicates that the substitution of ½ inch rigid insulation as the plaster base offers a good return on a small investment. The thinner layers of fill insulation show the next best results.

The determination of whether any insulation is necessary or whether extra thickness should be used requires a careful analysis of local fuel costs and weather conditions. High fuel prices or a large number of degree days may, either one, make the addition of extra material economically sound.

The amount of additional money‡ which may be justifiably spent for insulation increases as the severity of the heating season (number of degree days) and as the cost of fuel. The desirability of using a particular insulating material decreases as the cost of the material in place increases and as its conductivity increases.

The balancing of the first cost against operating costs and carrying charges in order to determine the optimum wall construction requires a tedious amount of calculation. Figure II is offered as a means of reducing the time required to make these calculations.

(5) *Heating Effect of Cast Iron Radiators at University of Illinois.* Willard and Kratz.

*Prices used and a few sample calculations appear in the Appendix.

†A thickness greater than this might cause expensive changes in standard parts such as window and door frames.

‡The money spent in excess of that required to satisfy the minimum requirements. See page 65.

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Part Two of this article will appear in the August issue.

A CENTURY OF PROGRESS EXPOSITION . . . CHICAGO, 1933

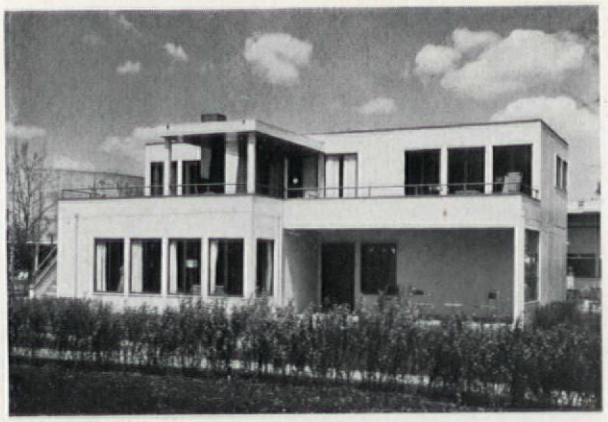
An extensive article on the Exposition buildings appeared in the May issue.

"A DESIGN FOR LIVING"—By John C. B. Moore, Clements Horsley and Richard Wood, associated architects. G. Rohde, designer of interior and furniture.

A house designed for occupancy by an average family. It is adapted for construction as an individual unit or in group housing.

Design is governed by principles of indoor and outdoor living rooms for extensive exposure to sun. Ample porches on two levels provide large outdoor spaces. Cellar, attic and waste spaces are eliminated. Maximum utilizable space and efficiency are combined with construction requiring the minimum amount of materials. The house is framed with wood and faced on outside and inside with insulation board.

The main entrance and garage face the street; living room, bedrooms, porch and terrace overlook the garden. The main entrance is protected from the weather. The front door opens on the hall, not directly on the living room. Stairs go up from the hall, not from the living room. Coat closet and toilet are accessible from the hall.



Hedrich-Blessing

"A DESIGN FOR LIVING"
JOHN C. B. MOORE & ASSOCIATES, ARCHITECTS

The living room consists of a main portion with alcoves serving as dining room and library respectively. The porch opens on the garden from the living room. The kitchen adjoins the dining alcove; it has a side entrance from the exterior and communicates with the front hall through the laundry; not through the living room.

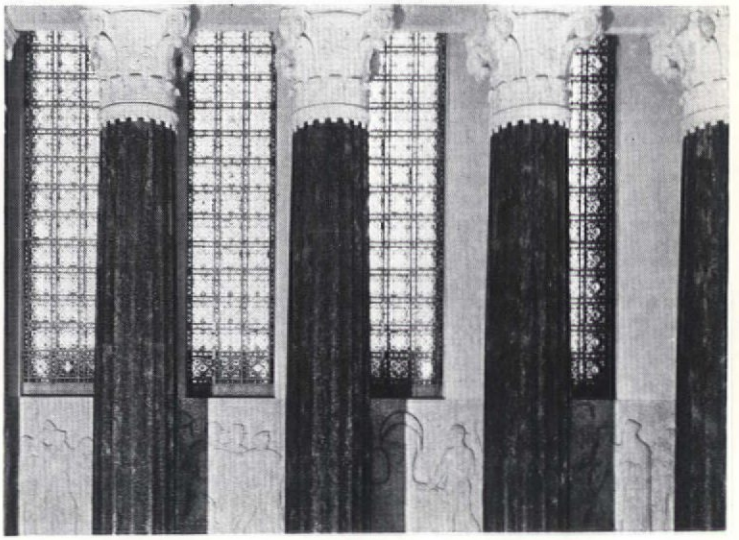
There is no cellar. Laundry tubs, hot air heater, hot water heater and housemaid's closet are placed in the laundry accessible from the front hall and the kitchen.

(Continued on page 24, advertising section)

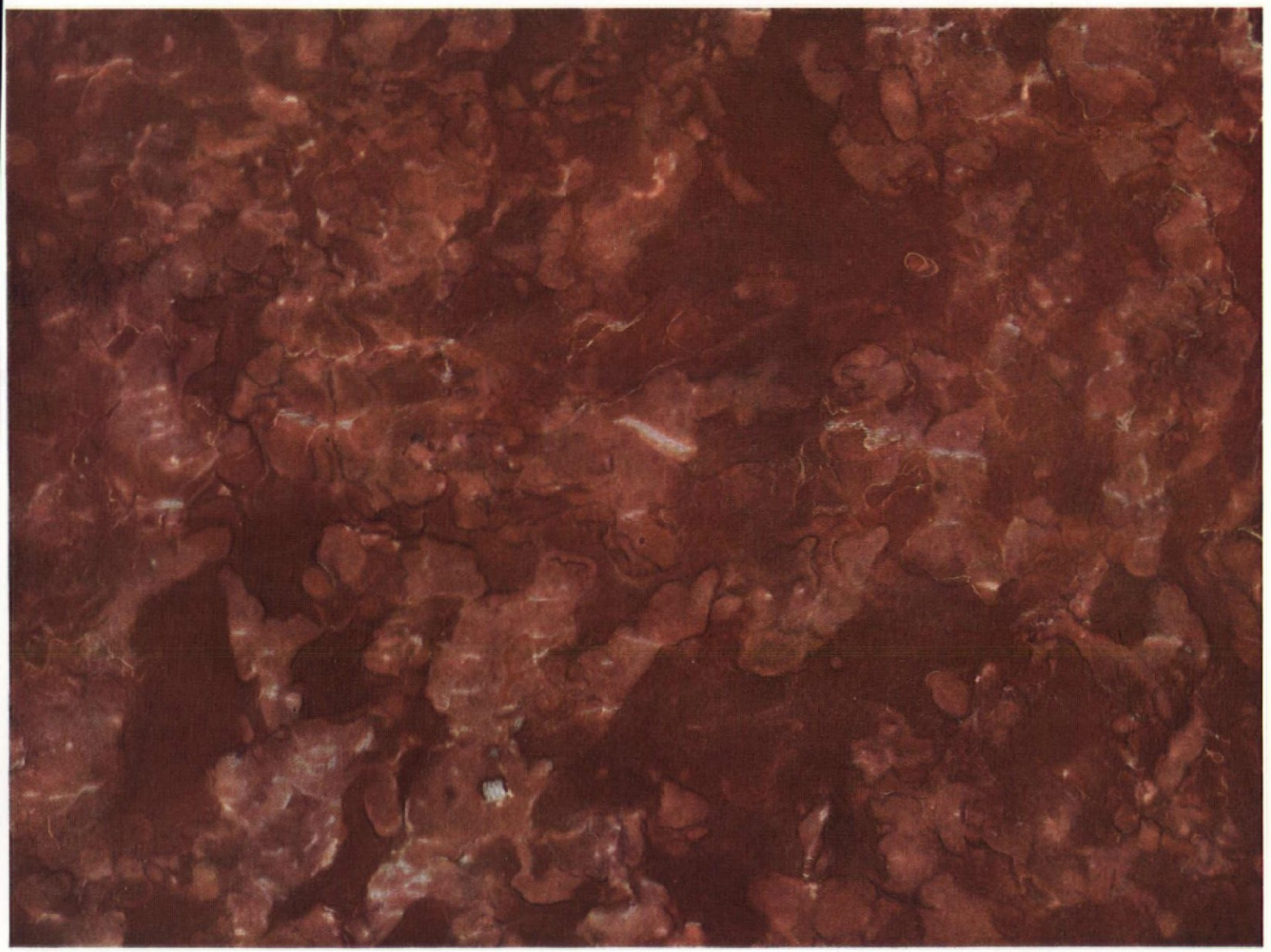
STRAN-STEEL GOOD HOUSEKEEPING HOUSE
INTERIOR FINISH: CELOTEX BOARD

Hedrich-Blessing
"A DESIGN FOR LIVING"—INTERIOR
GILBERT ROHDE, DECORATOR

St. Albans Red



AN INTERIOR marble of liquid design, and warm color, St. Albans Red has been used with startling effectiveness in the Memorial Hall of the Indiana War Memorial. (Photograph shows upper sections of columns.) Walker and Weeks were the architects. St. Albans Red is quarried at Swanton, Vermont. Architects are cordially invited to write for a copy of *Vermont Marble Color Plates*, showing St. Albans Red and twenty-two other varieties. Address: Vermont Marble Company, Proctor, Vermont.



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Another feature of the Speakman Si-Flo is the low cost of maintenance. For instance, the piston unit, the entire working part of the valve, can be renewed in a few minutes at a cost of not more than $1.50.

Si-Flo Flush Valves rough in on standard measurements and can be used to replace practically all types of noisy flush valves.

We have a bulletin on the Si-Flo, prepared especially for architects' use. It will be sent promptly on request.

•

Refer to Sweet's Architectural Catalogs pages D-2338-39-40

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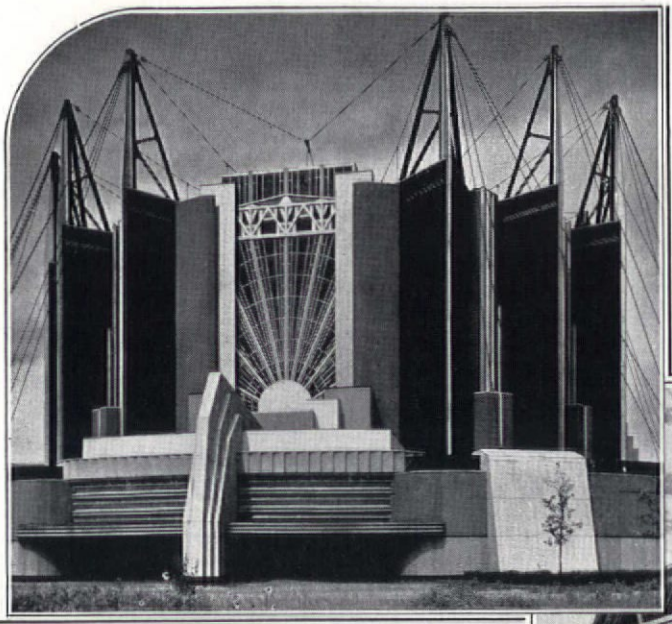

American Steel & Wire Company Wire Rope supports the "Sky-Hung" Dome of the Travel & Transport Building.

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A CENTURY OF PROGRESS EXPOSITION—CHICAGO, 1933

(Continued from page 72, editorial section)

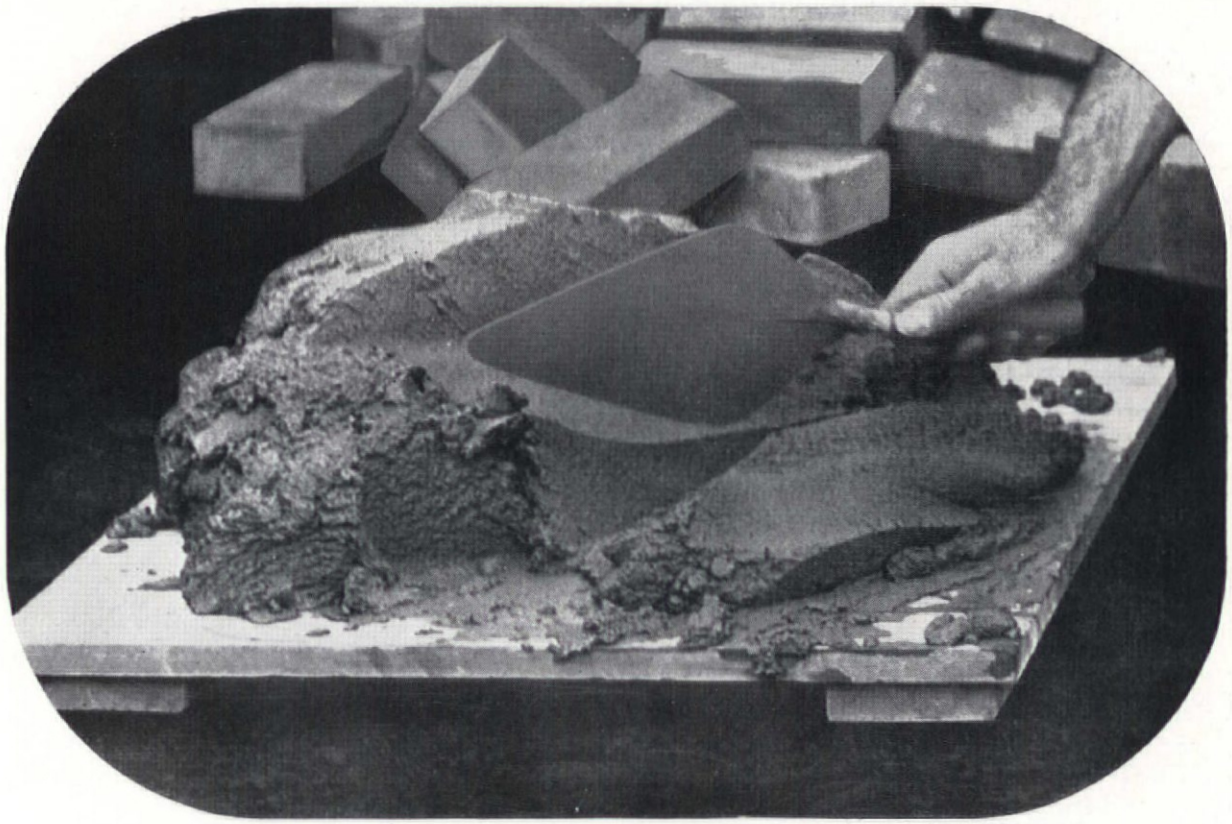
GLASS BLOCK BUILDING

This building was erected by the Owens-Illinois Glass Company in the Home and Industrial Arts group as a vehicle for the display of glass blocks for wall construction. While one cannot see through the glass block wall, light penetrates with a soft illumination.

The glass block is primarily a hollow, plain-surfaced, six-sided rectangular unit of a size and shape that masons are accustomed to handle. It is made by pressing a five-sided unit and by adding a separately pressed sixth side, the two members being hermetically sealed together to complete the block, leaving an airtight cavity within.

To assure a good bond between the mortar and the glass block, to prevent the mortar from dropping off the block, to give the block some suction while being laid, to prevent water from penetrating the wall between the block and the mortar, and to eliminate the unsightliness of air pockets in the mortar, the surfaces which would normally be in contact with the mortar are painted in the factory with a cement paint. Proper mortars and methods of laying glass block have been fully developed and present no special problems.

"STREETS OF PARIS"—DURING CONSTRUCTION
BUILDINGS OF GYPSUM WALLBOARD



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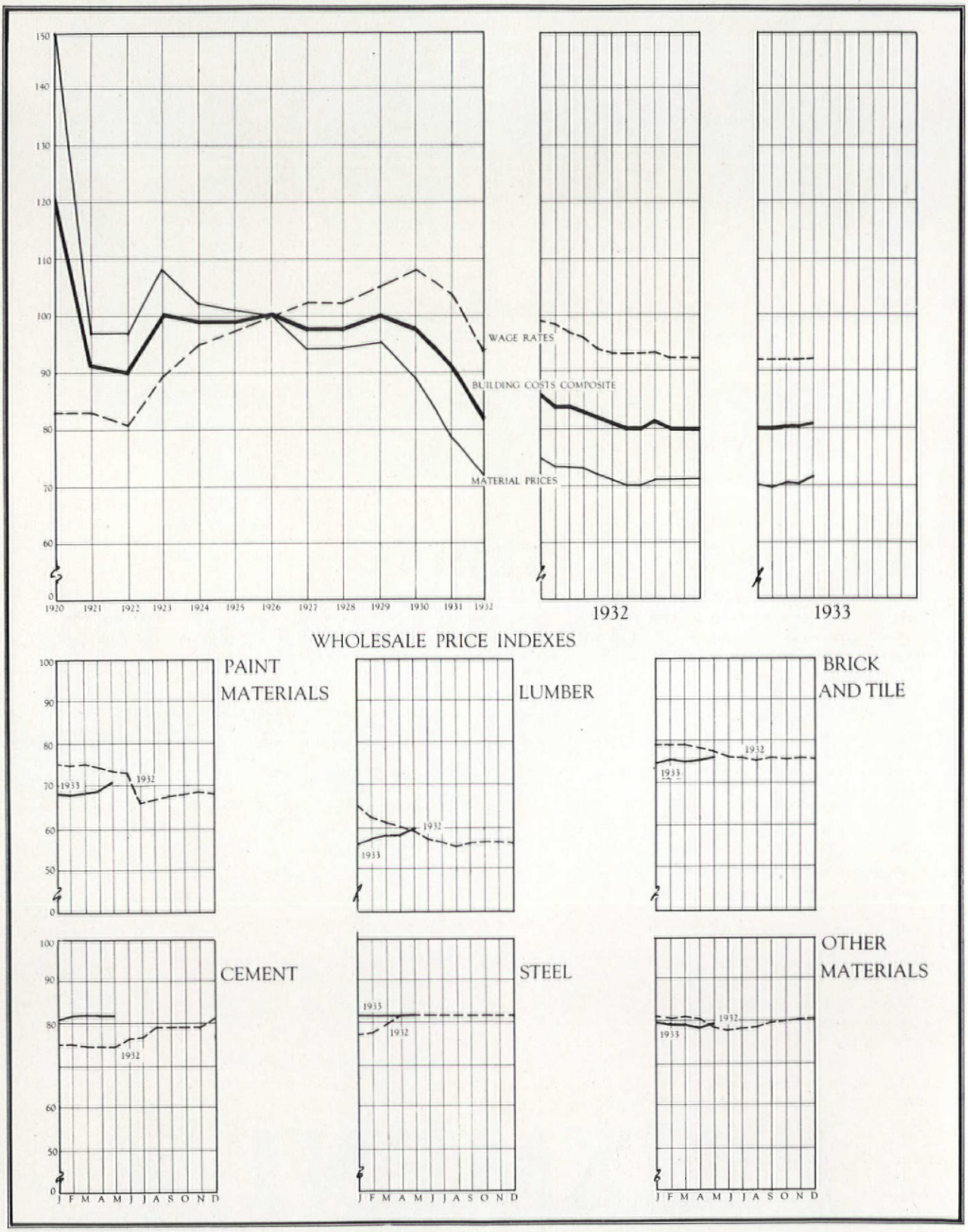

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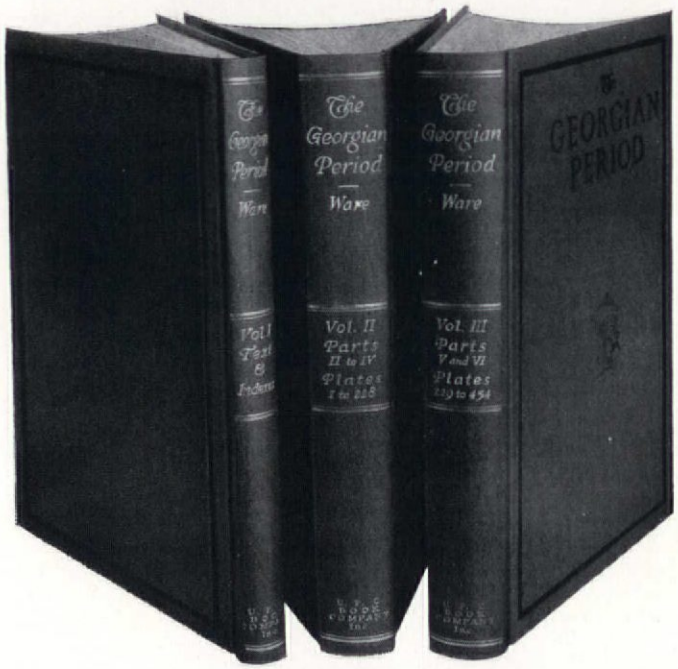

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WAGE SCALES IN THE BUILDING TRADES

Information Furnished by National Association of Builders Exchanges and Compiled by Division of Statistics and Research, F. W. Dodge Corporation, as of June 15, 1933

	Asbestos Workers	Bricklayers	Bricklayers' Tenders	Carpenters	Cement Finishers	Electricians	Hoisting Engineers	Iron Workers—Ornamental	Iron Workers—Structural	Laborers	Lathers	Painters	Plasterers	Plasterers' Tenders	Plumbers	Roofers—Composition	Roofers—Slate & Tile	Sheet Metal Workers	Steamfitters	Stone Masons	Tile Setters	Tile Setters Helpers
Akron	$1.00	$1 25	$0.45	$0 70	$0 70	$0 75	$0 70	$0 60	$0 60	$0 40	*$0 87½	$0 65	*$1 00	$0 62½	$0 85	$0 80	$0 80	$0 80	$0 85	*$1 25	*$1 25	*$0.50
Atlanta	1 00	1 25 1 40	‡ 30 45	70	1 25	90 1 10	60 1 00	35 1 85	1 25	25 35	1 00 1 25	75	1 25	30 45	1 25	80	80	90 1 00	1 25	1 00 1 25	1 25	40
Baltimore	1 00	*1 00	1 00	65	*1 00	*1 00	*1.25	*1.37½	*1 37½	.20 30	*1 25	.80 *90	*1 25	1 00	*1 00	75	.75	*1 12½	*1 00	1 00	1 25	72
Boston	1 25	*1 30	70	*1 17½	1 17½	*1 25	1 17½	*1 20	*1 20	70	*1 25	*1 12½	*1 37½	*95	*1 25	*1 17½	*1 05	1 17½	*1 25	*1.30	*1 30	*95
Buffalo	1 12½	*1 12½		*1 00	.90	*1.00	1.00	1 12½	1 12½	30 40	1 00	*1.00	1 00		1 00	40 50	60 1 00	60 1 00	*1 00	*1 12½	*1 18¾	
Chicago	1 37½	*1 37½		*1 31¼	1.31¼		1 31¼			.82½	*1 37½		*1.37½		1 37½	1 37½	1 40	1 37½	1 37½	1 37¼	1 37½	1 00
Cincinnati*	1 15	1 25	70	1 20	1 02½	1 25	.80 1 25	1 25	1 25	.45	1 31¼	1 15	1 37½	.70	1 25	92½	1 07½	1 07½	1.25	1 25	1 00	
Cleveland*	80 1 17½	1 25		.90 1 12½	.90 1 12½	1.00 1.37½	1.12½	1 00 1.25	1 00 1 25	.57½ .72	85 1.37½	80 1.12½	.99¾ 1 37½		1.25	66 1.15	1 00 1 37½	90 1 12½	90 1 25		80 1 25	
Columbus	1 00	1 30	62½	80	80	1.00	1.15	1 25	1 25	.40	1.00	.80	1 00	62½	1 00	80	1 00	.80	1 00	75	1 25	50
Dallas††	10 50	10 00	.50	8 00	10 00	*11.00	10 00	10 00	10 00	.35	10.00	*9 00	*10 00	*50	12.00	8 00	9.00	*10.00	12.00	10.00	*12.00	†*75
Dayton*	1 25	1 30	.80	1.00	1 15	1 55	1 25	1 35	1 35	.35	1.10	1.00	1 25	80	1 15½	.85	1.00	1 00	1.15½	1.30	1.50	60
Denver††	9 00	12 00 *13 00	6 50 7 00	10 00	10 00 11 00	10 00 11 00	10.00	10.00 11.00	10.00 11.00	4.00 5.00	11 00	*10.00	12.00	7.00	11.00	7 00 8.00	7.00 8 00	9.00	9 50	12.00 13.00	10 50	† 62½
Des Moines	1 00	1 25	65	1 00	1 00	1 00	1 00	1 00	1 00	55	1 00	1 00	1 25	75	1 25	1.12½	1.12½	1.12½	1.25	1.50	1.25	80
Detroit	1 37½	1 25 max.	.55 60	.80 1 00	70 .90	1.25 1.40	.60 1.00	1.00 1 20	1 00 1 25	.50 .55	1.37½	.80 1.00	1.00 1 25	70 .80	1 00 1 50	.70 90	80 1 00	.80 1 00	1 25 1.50	1.25 1 50	1 00 1 25	.80
Duluth	.85	1.00	35 45	75	.75 .85	90	80	.80	90	.35 .45	.85	.75	1 10	1.00	1.00	70	.70	75	.95	1 00	1.25	.80
Erie		1 00	.45 50	.80	80	.90 *1 00	.90	.60 .80	.90	.35	90	.60 70	1.00	40 50	1.00	50 60	80 90	‡.80 .90	*1.00	1 00	.80	40 50
Grand Rapids	65 .80	1 25	.40	.60	.65	.90	75	80	1 00	.35	80	60	80	40	.90	.50	.70	70	90	1 25	1 25	.50
Houston	1 00	1 00		1.00	1 00	.95	1.00			50	1.00	.62½	1.00		.75	60	1.00	1.00	1.00	1.00	1.00	
Indianapolis	1 32½	1 62½	90	1.22½	1.17½	1 50	1.37½	1.45	1.45	.40 .45	1.37½	1.25	1 57½	1 00	1 00	60 90	1.27½	1 22½	1 50	1.62½	1 50	60
Kansas City	90	1.32½	.80	1.00	1.00	1.00	1.00	1.00	1.00	.60	1.00	1.00	1.06¼	80	1.00	.92½	.92½	1.00	1.00	1.12½	1 25	62½
Los Angeles††	10 00	8.00	6.00	7 00	8 00	7.00	8.00	9.00	10.00	4.00	10 00	7.00	9.00	6 00	9 00	7 00	7.00	8 00	10 00	8.00	6 00	† 75
Louisville	1 12½	1.00	50	.80	1.00	1 00	1.00	1.00	1.00	.25 .35	1.12½	.90	1.00	50	1.12½	.30 50	.85	85	1 12½	1.25	1 00	50
Memphis	1.00	1 37½	50	50	.50	1 00	.75	.75	.75	20	1.00	75	1 25	.50	1 25	.25 .40	1.12½	1 12½	*1 25	1 37½	1 25	.50
Milwaukee	1 00	1.00	75	.92½	1.00	1.25	1.00	1.05	1.05	.60	1.00	1.00	1.00	75	1 00	1 00	1 00	92½	1.00	1 00	1 00	75
Minneapolis	1 06¼	1 10	.55 .65	.75 .85	.75 .85	.90	.80	.90	.90	.45	.75 .85	.80	1.10	.70	95	70	.70	.80	.95	1.10	1 25	.65
Nashville	1.00	1 00		.65		1.00				.30	1.00	80	1 00	30	1 00	.65	.65	.65	1.00	.90	1.25	
New Haven*		1 20	.50 .60	.80 1.06¼	1.20	.80 1.00	1.16¾ 1.27½	1 37½	1.37½	.45 60	1.27½	80 1.00	1.20	.50 .60	1.06¼	65	1.50	1 06¼	1 06¼	1 20	1 20	
New Orleans	.65 80	1 25	85	.55 .75	1 00	1.25	1.25	1.25	1.25	.35 .50	1.25	75 90	1 25	.75	1 00 1 25	40	.90 1.15	90	1.05 1 25	1.50	1 25	.35
New York City††	11.20	13.20	8 00	11.20	e11.20	11.20	13.20	11.20	13.20	6.60	11.20	11.20	12.00	8.50	e12 00	10.28	12 62	11 20	11 20	13.20	11 50	8.50
Oakland††	6 40	9 00	5 60	7.20	7.20	8 00	9 00	7.20	9 60	5.00	8.00	7.00	8.80	6 00	8 00	6.40	6.40	7.50	9 00	9 00	8 00	5 00
Oklahoma City††	8.00	8 00	4 00	6.00 8 00	8.00	6.00 8 00	8.00	8 00	8 00	3.50	.80	7.00 8.00	80	4.00	80	6 00	6 00	8 00			11 00	†.62½
Omaha	1 32	1 00	.45	80	90	1.00	1 00	.90	90	.35	1.00	.80	1.00	.45	1 00	.72½	87½	87½	1.00	90	1 00	.50 60
Philadelphia	1 00	1 50		1.00	1 05	1 25	1 18½	1 25 1.37½	1.00 1 37½	35 .40	1.37½	.62½	*1.37½		1.04	1 00	1.2›	1.25	1.04	1.25	1 25	
Pittsburgh	*1 50	*1 50		*1.25		*1.56¼	1.37½ 1.43¾	*1.37½	1 37½	70	*1.50	*1.18¾	*1 50		1 50	*1.25	*1.50	*1.31¼	*1 50	*1 40	1 33¾	88
Portland, Ore ††	8.00	*9 60	7 20	7 20	*7.20	*8 00	6.40 9.60	8.80	8 80	7.20	*8.80	7.04	*9.60	*7 20	*8 80	7 20	7 20	*8.00	*8 80	*9.60	8.00	6.40
Reading	.70 80	90	75	.75	85	.75				.35	.75	.70	.85	.75	.90		.80	80	.90	.75	90	50
Richmond	60 .65	1.25		.40 .60	.35 .50	.80		.20 .70	70	.15 20	1.00	60	60		1 00	c.25 .60	.25 60	1.00	1.00		1 25	
Rochester	.91	1 12½	55	*90	*1.12½	*1 15½	.90	.70-*1.00	.70-1.00	.55	.90	*.90	*1.12½	.55	*1.06¾	*.80	*80	.90	*1.06¾	*1.12½	1 12½	.47½
Salt Lake††	6.50 7.20	3 00	62½	.90	1.00	1.00	1 00	1.00	1 00	4 00	8 00	7.00	1 25	.80¼	1.00	.90	1 00	1 00	1.00	1.12½	8.00	4 00
San Antonio††	6 00 10 00	6.00 10 00	2 00 3.00	2.00 7.00	3.00 8 00	3.00 7.00	4.00 7.00	1 75 4 50	5 00 10.00	1.50 2.50	4 00 7.00	3.00 7 00	4.00 8.00	2.00 3.00	5.00 8.00	5.00 6.00	4.00 6.00	3 00 7 00	5.00 8.00	3.50 8.00	4.00 10 00	2 00 3.00
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Seattle††	8 00	9 60	5.28	7.20	7 20	*8 80	8.00	8.00	8 80	4.75	*8.80	*4 50	*9.60	*6.40	*8 80	7.20	7.20	8 00	*8.80	9 60	8 00	
Sioux City	90	1 00		.75	.75	1.00		1 00	1.00	.35	.90	.60 .90	1.00		1.00	.60 1.00	.60 1.00	.90		1 25	.60 1 00	
St. Louis	1 25	1.50	1.00	1.25	1.31¼	1.67½	1.35- 1.47	1 47	1.47	.87½	1.25	1.25	1.50	1.06¼	1.43¾	1.17½	1.25	1 25	1.43¾	1.25	1.25	.76½
St Paul	1 18	1 10		.75 85	.75 85	90	.80	.90	.90	.45	.75 .85	.80	1.10	.70	.95	70	.70	.80	.95	1.10	1 25	
Washington, D C	*1 50	1 75	.50 .75	*1 37½	1 25	*1.65	*1.37½	*1.65	*1.65	.75	*1.62½	*1.37	*1.75	*.75	*1.50	*1.37½	*1.37½	*1 50	*1 50	*1 25	*1.50	75
Wichita	60	75 1 25	.25 40	.40 .75	.40 1.00	.50 87½	.30 .75	.40 1.00	.40 1.00	.20 40	.50 1.25	.50 .87½	.60 1 25	.25 .50	1 00	.50 1.00	.50 1 00	.50 1.00	.75 1.12½	.75 1 25	.50 1.00	.25 .40
Youngstown††	*1 37½	12 00	6 80	10 00	9.00	11.00	10.00	12.00	12.00		12.00	10.00	12.00	6.80	11.00	10.20		10.00			10.00	70

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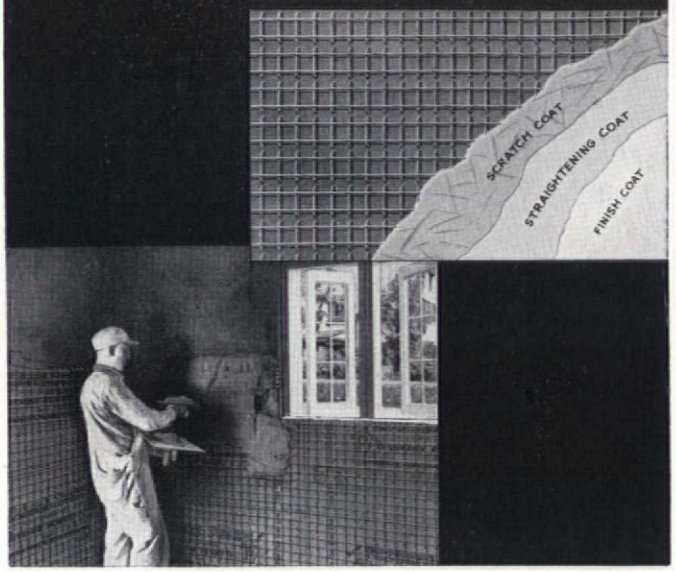

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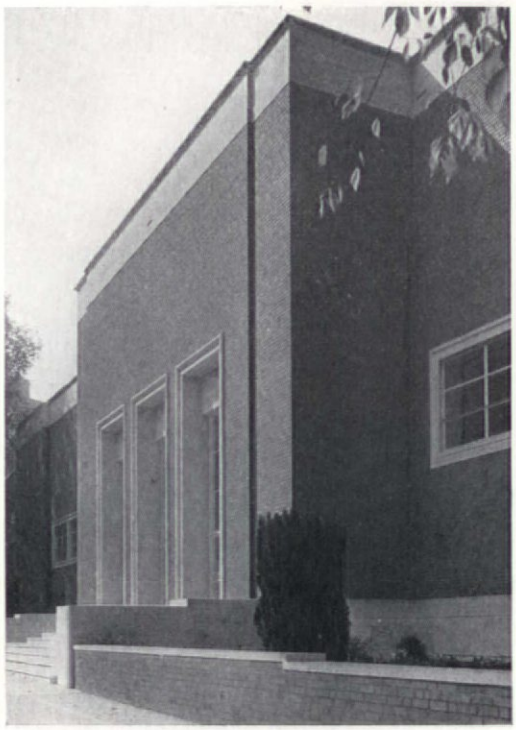

Portland Art Museum, Portland, Oregon. Architects, A. E. Doyle & Associates. Waterproofed with Cabot's Clear Brick Waterproofing

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THE walls of the Portland Art Museum were thoroughly waterproofed with Cabot's Clear Brick Waterproofing, applied after the walls were finished. All moisture was thus shut out from the brick and the joints. Cabot's Clear Brick Waterproofing will not succumb to the fatal weaknesses of common waterproofings—oxidation, friability and solubility in water. Thirty to forty years of test in all parts of the world, under all climatic conditions, have proved its worth and permanence.

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701

RUSS BARS

Bars for hotels, restaurants and clubs are designed in the modern manner by the Russ Soda Fountain Company. This complete line of tap room equipment includes service bars, novelty boxes, coil boxes and all other accessory beer-dispensing apparatus. Each unit is made of heavy sheets of copper-bearing steel, shaped and welded together (not riveted) to form a durable structure that is not subject to rotting or warping. The manufacturer states that the all-steel construction of these units prevents odors and removes the danger of vermin. All units are designed for use with either ice or mechanical refrigeration, having all necessary fittings for connecting with beer kegs, the only equipment not supplied being the compressors and carbonic gas drums. In all models the bar is finished with an 18 inch mahogany top. The exterior is attached directly to the service bar and the whole unit shipped complete. A dozen or more bars of various designs and serving capacity are illustrated in the Russ catalogue now available.

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702

THE COPPUS-ANNIS AIR FILTER SCORES HIGH IN EFFICIENCY TESTS

Annis Air Filters are of the dry type. Principal components are a base, a rigid supporting wire frame, a filter "glove" removably fitted over the wire frame, and a spreader grid which, placed over the filter "glove" and wire frame, is bolted to the base, thus drawing the filter "glove" tautly over the supporting frame and sealing the filter tightly against leakage of unclean air.

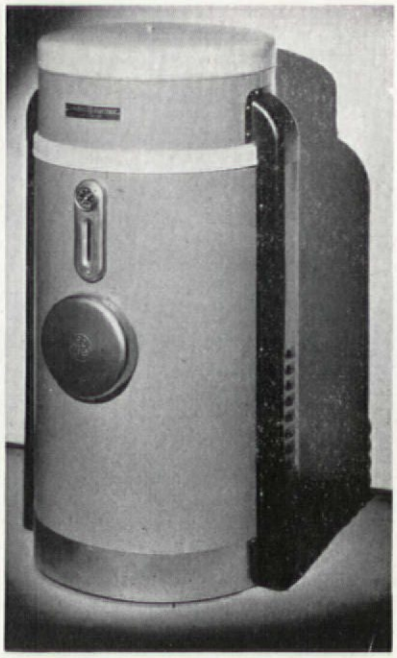
This air filter was judged to be 100% efficient in tests made by the University of California, according to the manufacturer's quotation of U. of C. Bulletin 449. The faultlessness of this filter is largely owing to (1) the use of a special wool felt filter element which slips "like a glove" onto the spacer frame, (2) efficiency in arrangement of the filter pockets, recognizing the proven principle that an increase of the filter surface within the filter cell beyond a certain limit increases the resistance to the flow of air.

Due to the structure of the wool used in this filter there is no danger of absorbed dirt passing into the air duct. The cleaning efficiency is not diminished by excessively increased or decreased rate of air flow. Operation is not impaired by atmospheric conditions. Without requiring the use of spare filter cells, washing and charging tank, or other auxiliary equipment the Coppus-Annis Unit Filter is reported to function effectively for as long as three or four years without replacement of filter material. This advantage minimizes upkeep cost. Replacement, when necessary, is simple and quickly accomplished.

703

NEW, SMALLER OIL FURNACE ANNOUNCED BY GENERAL ELECTRIC COMPANY

An oil furnace, 60 inches high and 29 inches in diameter, is announced by the General Electric Company. This furnace is rated at a maximum output of 133,000 b. t. u. per hour, equivalent to 555 square feet of steam radiation or 885 square feet of hot water radiation, and can be used with steam, vapor or hot water systems. With addition of the G-E warm air conditioner it can also be used with air duct heating systems. An advantage of the new furnace is that the oil rate is independent of the viscosity of the oil. It has a maximum oil rate of 1¼ gallons per hour, and a minimum rate of 0.70 gallon per hour. A hot water coil of the built-in type, of sufficient capacity to supply the requirements of the average family throughout the year is provided and there is also



provision for the connection of an external heater when additional capacity is required. It has a coordinated boiler, burner and control, manufactured as one unit, automatically maintaining an even temperature in winter and providing heated water for domestic use. The burner is of compact design having all rotating parts mounted on one shaft constantly lubricated by oil under pressure and requiring no manual attention to oiling. All working parts are totally enclosed within the lacquered, chromium-trimmed shell. The motor has no brushes to require maintenance. The fine atomization made possible by the impact-expansion principle permits the use of economical heavy domestic fuel oil. Traces of oil vapor cannot escape into the basement. By incorporating the correct acoustical principles into the design of the cover and air duct the furnace is effectively silenced when in operation. The all-electric control is fully automatic.

704

TREMCO OVERCOMES BLEEDING OF CAULKING COMPOUNDS

A Caulking Compound, if it is to adhere properly to the surface upon which it is applied, must contain oils which will penetrate sufficiently into the pores of the stone, marble, concrete, wood or metal and have sufficient adhesive qualities so that it cannot be pulled away easily. The compound should, however, provide against the oils leaving the body of the material to such an extent as to cause a spreading of the oil beyond the periphery of the material. It is this unsightly spreading of the oils, accelerated by the capillary attraction in masonry surfaces, that is referred to as "bleeding" and which is objectionable. Excessive loss of oil also results in premature drying of the material, shortening of its life, hardening and loss of elasticity and pliability, so that it will not be able to withstand shocks, strains and stresses and will either fall by cracking, or be pulled away from the edges of the surface to which it is applied. The Tremco Manufacturing Company claims discovery of a method of treating pigments enabling them to produce a caulking of exceptional oil content. Retention of this oil in the caulking, achieved by a treatment which prevents bleeding and too rapid oxidation, insures maximum duration of plasticity.

705

GLASS WOOL CLEANS AIR FOR RADIO CITY BUILDINGS

"Dustop" glass-wool filters, manufactured by the Owens-Illinois Glass Company and installed in Radio City buildings, handle 1,020,000 cubic feet of air per minute. The "Dustop" standard unit is composed of a closely packed mass of fine, twisted viscous-coated glass wool in a fiber container, this container having open grilled faces permitting free passage of air through the glass wool. The weight of the unit is only two pounds.

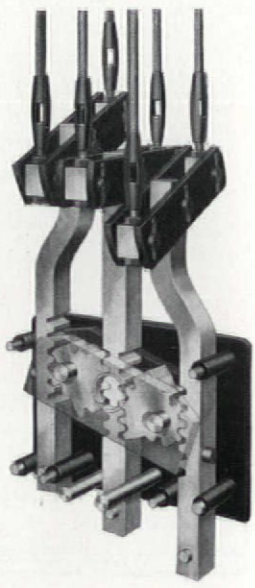
According to its manufacturers the "Dustop" filters are so much lower in price than any other filters used for the same purpose that they can be pulled out of their frames and disposed of, as they reach saturation, and can be replaced with new units much more cheaply than other types can be removed, cleaned, re-oiled and re-installed.

706

KIESLING BLUEPRINTS FOR ELEVATOR, DUMBWAITER AND CABLE EQUALIZER INSTALLATIONS

A group of 12 blueprints showing standard layouts for installations of the above Kiesling equipment is offered as an aid to simplified specification. These sheets produced in A.I.A. File size, give standard required dimensions and capacities on Kiesling cable dumbwaiters, vertical sliding dumbwaiter doors, undercounter dumbwaiters, passenger and other types of elevators.

The cable equalizer illustrated here is all-steel, requiring no adjustment or servicing of any kind during the life of the cables. Its primary function is that of equalizing cable tension; its indirect benefits include (1) increasing the life of cables, (2) reducing power costs and (3) lowering elevator maintenance. The manufacturer reports that in the Whitehall Building in New York, a recent installation of the all-steel model overcame severe operating handicaps (including a badly worn drum), providing absolutely uniform cable tension.



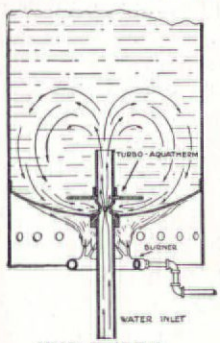
Super Aquatherm Gas Underfire

KEEP ABREAST
OF
THE TIMES

YOUR TRADE WILL NOT STAND
For Discolored and Dirty HOT WATER

THE NEW
DAHLQUIST TURBO

Copper automatic hot water storage systems and range boilers use 50% less gas and deliver an abundance of clean, fresh, rust- and sediment-free hot water day and night.



Copper is nature's own material for storing hot water; never rusts or deteriorates. But regardless of the metal used, sediment in the water will form a coating of mud on the bottom unless it is equipped with Theodore W. Dahlquist's latest invention—**THE TURBO.**

The patented **TURBO** placed in all Dahlquist boilers prevents mud from forming—keeps hot water clean—prevents costly burnout—reduces cost of gas.

Write for full particulars

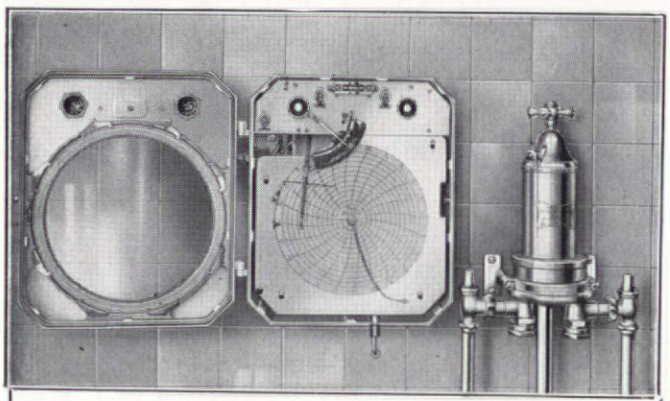
THE TURBO
A new Dahlquist patent which prevents mud from accumulating in the boiler and does away with costly burnouts.

SAVES GAS

Architects and heating engineers may rely entirely on Dahlquist workmanship and experience, whether for range boilers, automatic storage boilers or heavy pressure boilers.

DAHLQUIST MFG. COMPANY
50 WEST 3RD STREET SO. BOSTON, MASS.

Continuous Flow Baths



Leonard HYDRIATRIC Suite
Reg. U. S. Pat. Off.

When you specify a
Leonard Hydriatric Suite
you have a choice of
six designs in cases
and
twelve different combinations.
Write for catalogue F which is
Standard A. I. A. File size.
In Sweet's Catalogues

Manufactured by
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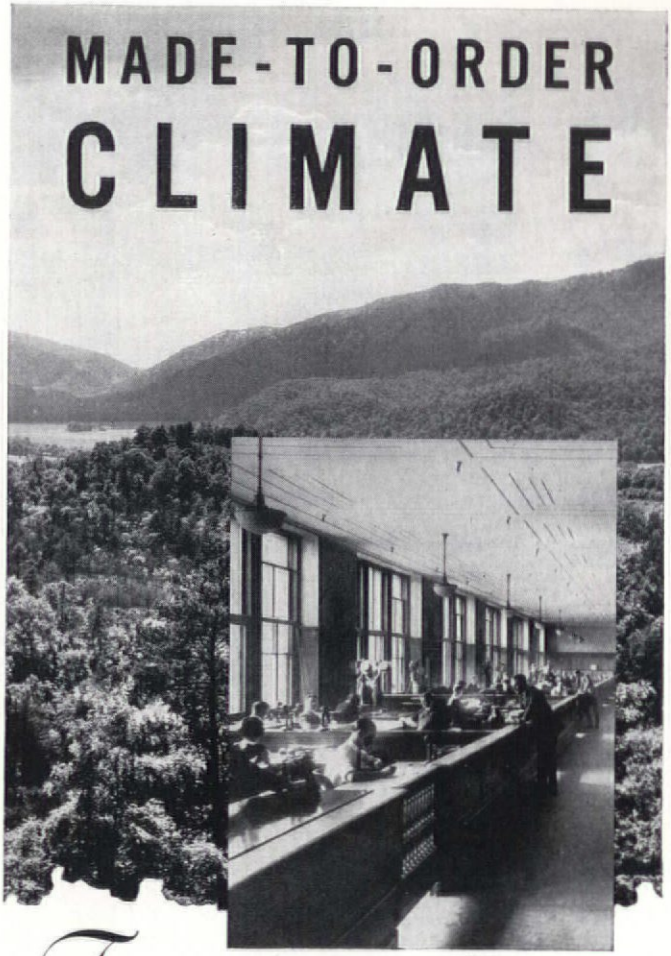
INCORPORATED
Providence, Rhode Island

MADE-TO-ORDER CLIMATE



EWING GALLOWAY

For single room or entire building

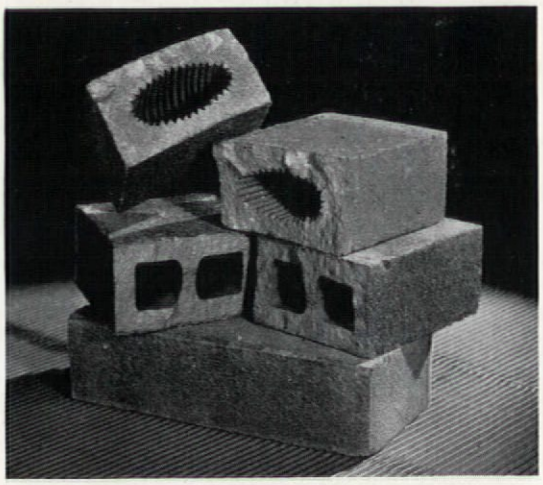
Skyscraper or barbershop . . . railroad train or restaurant . . . office or department store . . . factory or home. For every kind and size of place there is Sturtevant Air Conditioning Equipment . . . exactly suited for the purpose.

In the comprehensive Sturtevant Line there are units for individual rooms and applications as well as apparatus for complete central systems . . . all up-to-the-minute in design and construction, and incorporating the fine engineering for which Sturtevant long has been famed in the field of air conditioning.

Let us put our 20 years of air conditioning experience at your disposal. At your request a Sturtevant Engineer will gladly visit your office . . . to supply full information and to cooperate in any way possible.

Sturtevant Cooling and Air Conditioning Corp., a division of B. F. Sturtevant Co., is organized for engineering and installing complete systems in both the Comfort and Industrial fields.

B. F. STURTEVANT CO.
HYDE PARK · BOSTON, MASSACHUSETTS
Specialists in complete air conditioning with refrigeration since 1912



707

NEW AIR-CORE FACE BRICK WITH CLOSED ENDS

A new face brick, hollow in the center but solid in all six of its surfaces, is offered by the Face Brick and Granule Company as a solution to the problem of creating a lighter brick without opening at the end. Unlike cored brick, the new product, according to its originators, offers no complications in handling and requires no increased amount of mortar in laying. The weight is at least 20% less than ordinary solid brick. Freight costs—and hence costs at the job are correspondingly reduced. In laying, the lighter weight is an advantage, reducing fatigue of brick layers and producing more accurate and rapid work. Tests at Massachusetts Institute of Technology show that the compressive strength is maintained within limits which fully meet with the requirements of building codes.

Further information on this product and a list of licensed manufacturers may be obtained from the Face Brick and Granule Company, 18 Newbury Street, Boston, or by writing to THE RECORD.

708

ALUNDUM RUBBER BONDED SAFETY TREADS

A new type of safety tread, especially suitable for use in school buildings, department and chain stores, office buildings, industrial plants, hospitals, hotels and similar structures has just been placed on the market by Norton Company of Worcester, Massachusetts. This new tread, known as Alundum Rubber Bonded Safety Tread, is composed of Alundum Aggregate securely bonded in a reinforced base of hard, tough rubber. Alundum Aggregate consists of chips or granules of ceramically bonded Alundum abrasive (aluminum oxide) and is not only extremely tough but also irregular, angular and slightly porous so that it bonds securely with the rubber giving a tread surface that is highly non-slip. The tread's non-slip effectiveness is permanent; it will not wear smooth. It has a flat, level surface eliminating tripping hazard. Tests conducted by a prominent university have demonstrated that the wear resisting ability of the Alundum safety tread is even greater than that of granite. This new tread is suitable for use in exposed locations out of doors as well as indoors. It is supplied in units of various lengths and widths and can be placed directly over old wood, steel, concrete or stone steps. The entire depth of the tread may be covered with the Alundum unit or it may be applied as a nosing for 6″ or so on the outer edge.

MANGANESE STEEL FORGE CO.

The business and assets of the Audubon Wire Cloth Company, Inc., wire cloth and wire products manufacturers of Audubon, N. J., were acquired by the Manganese Steel Forge Co., of Philadelphia, Pa., on May 1, 1933. Operation will be continued under the name of the Audubon Wire Cloth Corporation, wholly owned subsidiary of the Manganese Steel Forge Co.

HOW MANY ARCHITECTS ARE CARRYING ON?

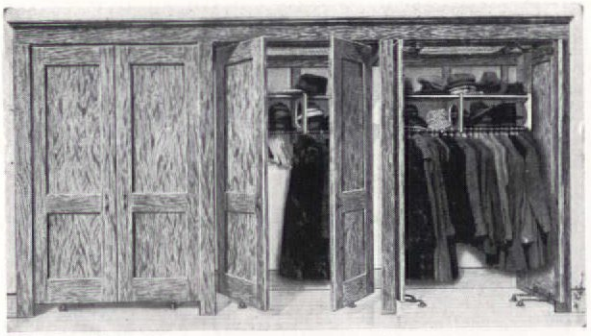
By THOMAS S. HOLDEN

(*Continued from page* 58)
Editorial Section

indicate that the decline of building volume has been a little less drastic there than in F. W. Dodge Corporation's territory. However, it is reasonable to assume that the participation of architects in western building programs has followed in the main the course apparent in the 37 eastern States. Sweet's Architectural Catalogues listed for 1932 catalogue distribution purposes 6,149 architectural firms in the 37 eastern States and 980 in the 11 western States; up to May 31, 1933, a total of 6,926 firms had received the latest edition of Sweet's.

Future Trends

It seems likely that improved conditions will tend rather more toward an increase in the number of architects whose projects go through than toward a large concentration of volume in the offices of a few. The outlook is generally much better for small building projects than large ones. The last boom represented overgrowth and overbuilding of large cities, urban land values and urban building types. The trend today is toward the suburbs, the small towns, the country. It is difficult to see in the near future any very large demand for big new hotels, office buildings, or loft buildings: large city apartments are less likely to be in great demand than smaller suburban apartment houses and one- and two-family buildings. Potential demand in large city-type buildings is principally in modernization, which may grow to very considerable volume, and in low-cost housing in blighted areas. Naturally, some of the anticipated public projects are likely to be fairly large. With the current trend toward decentralization of our cities there goes a tendency to small projects and fairly wide dispersion of work among many architects.



EVANS
"Vanishing
Door"
WARDROBE

●

Class J

equipped with either "Floor" type (as illustrated) or "Jamb" type hinges. This is Class D wardrobe if made with flush doors.

CLASSROOM WARDROBES

High in Quality—Low in Cost

This type occupies a recess flush with the wall. Plaster back and ends. No partitions, but with mullions between pairs of doors. Wire mesh ceiling. Blackboards if required.

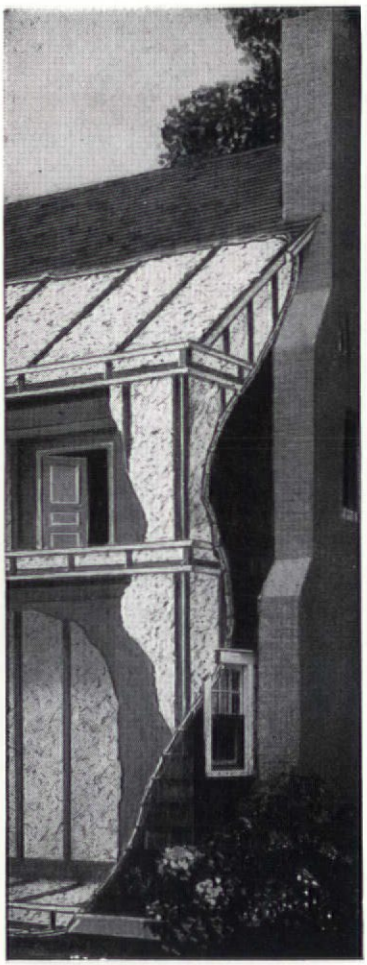
The "Vanishing Door" hinges on which the doors are hung are made with double pivoted arms and swing the doors back into the wardrobe entirely out of the way. Simple—trouble-proof—and last as long as the building.

Wardrobes are furnished complete in the knockdown, with all woodwork cut to size, and only need to be nailed in place. The hinges are easier to put on than common butt hinges. The entire cost of installation is small.

We make many other types of school wardrobes, fully illustrated and described in 1933 *Sweet's, Volume C, pages* 774-781.

W. L. EVANS

WASHINGTON, INDIANA, U. S. A.



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Hot, stuffy rooms can be made cool and comfortable by installing U. S. Mineral Wool.

Bedrooms directly under the roof and almost unliveable, can be transformed into surprisingly cool sleeping quarters.

And this additional comfort in your home can be made at a positive saving to you.

Our illustrated booklet tells how.

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New York

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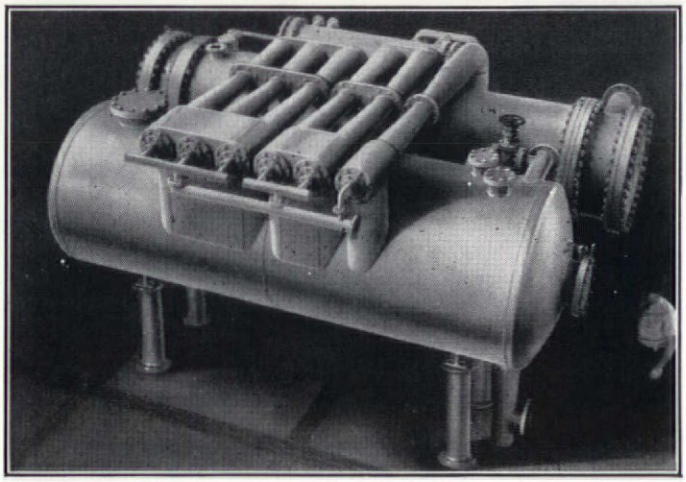
GREATEST NEWS IN AIR CONDITIONING

"ROSS" *Decalorator*

Product—Modern steam vacuum refrigerating apparatus offered by American Blower Corporation for air conditioning and process work in industries requiring chilled water at temperatures from 35° to 60° F.



Important Installations—Above shows type of ***Decalorator*** installed in conjunction with ***Sirocco*** air conditioning systems in such representative structures as British Empire Building, Rockefeller Center, New York City, and First National Bank Building, No. 2 Wall Street, New York City.

Operating Characteristics—The action of a Decalorator is as follows: chilled or decalorated water is produced in a Decalorator by the practical application of an age old and well known physical law, namely —water under high vacuum will vaporize at low temperatures. To produce evaporation, the sensible heat of the liquid is given up in the form of latent heat in the vapor. Chilling of the liquid is consequent to this conversion of heat. Water is chilled in a Decalorator by the maintenance of a high vacuum in a vessel into which water is sprayed. Condensers of the power plant type operating in conjunction with highly efficient steam ejectors produce the vacuum. Decalorators are available in sizes with cooling capacity from 24,000 B. T. U. to 48,000,000 B. T. U. per hour.

Outstanding Advantages—***A Decalorator has no moving parts.*** Consequently, lubricating costs, mechanical replacements and breakdowns resulting therefrom are entirely eliminated. Water is the only refrigerant used, which means safe, healthful cooling under all conditions and freedom from all odors. Live loads need not be considered in the foundation design. Can be operated by anyone capable of operating an ordinary steam boiler. Unusually low installation and operating costs. Only the simplest character of low and medium pressure piping is required. Any reputable heating and piping contractor is fully equipped to install a Decalorator.

Data—Phone our nearest Branch Office or mail the coupon below for facts on this great new development impossible to state here.

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MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881

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Please send me bulletin No. 2927.

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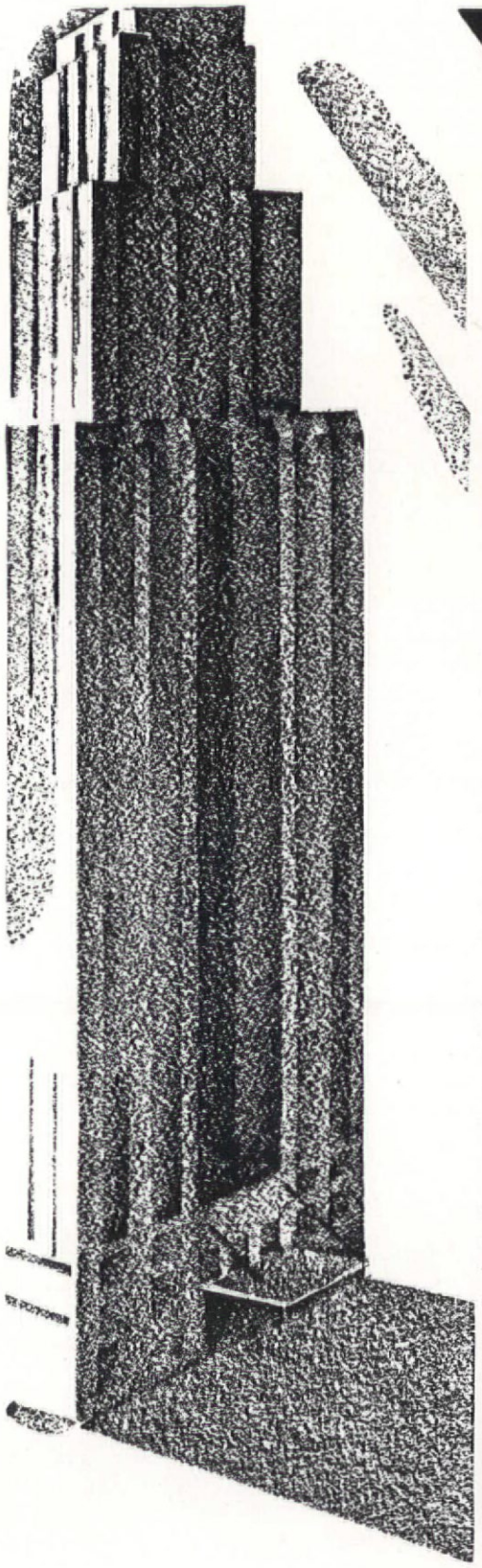
INDEX TO ADVERTISEMENTS

The italic lines appearing under the following manufacturers' names give the volume and catalogue page numbers of their catalogues filed in the 1933 Edition of SWEET'S ARCHITECTURAL CATALOGUES



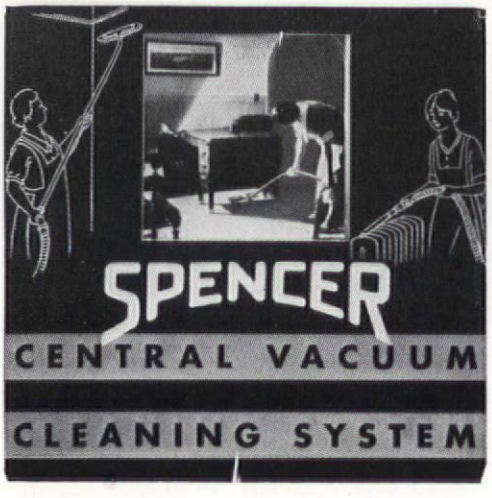
YOUR BUILDING TEN YEARS FROM NOW . . .

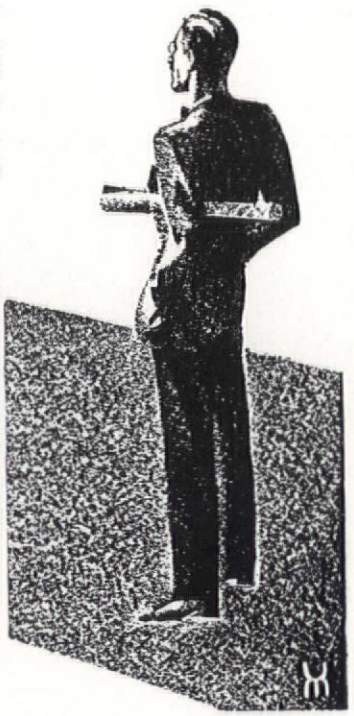
The outside will look the same, perhaps, but what about the inside?

Thousands of buildings that have the Spencer Central Vacuum Cleaning System are being cleaned just as well today, as at the beginning. Their cleaning costs are extremely low—the maintenance cost practically nothing. They are meeting the present situation, and will preserve their fine interiors and high class tenants for years to come.

But what about the building that has no Spencer Central System? Let's get down to facts on comparative costs. Perhaps a remodeling job with the Spencer Central System would make the building profitable. Or possibly its only the Spencer Heavy Duty Portable that is needed to swing the balance the right way.

Spencer Systems are used in thousands of schools, theatres and office buildings, factories and other buildings. We welcome the opportunity to discuss the possibility of reducing cleaning costs.





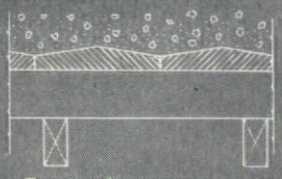
THE SPENCER TURBINE CO.
HARTFORD, CONNECTICUT

1346

MONOLITHS IN CONCRETE

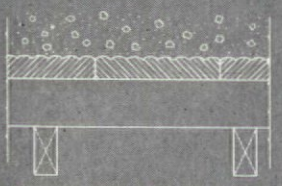
THE IDEAL STAGE SETTING FOR GREATER RETAIL SALES

DIAGRAM A



Forms for spandrels and area above door

DIAGRAM B



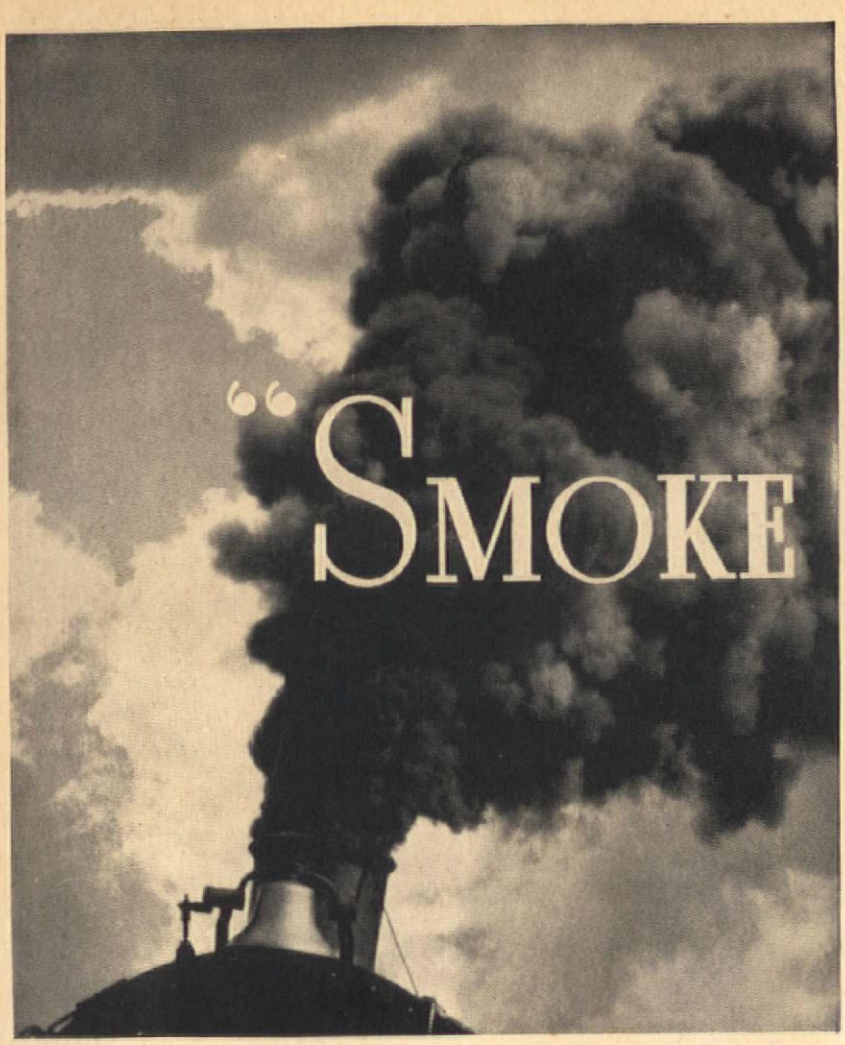
Forms for pilasters on either side of doorway

● Surfaces of this monolithic concrete building were cast in place from architectural concrete. Treatment of the spandrels and of the area above the door was produced with forms in which the boards were placed vertically. See Diagram A.

● Fluting in the pilasters on either side of the doorway was cast in forms constructed of vertically placed 2″ x 10″ planks, dressed on all four sides and routed. See Diagram B. The diagonal grooves were made by tacking strips across the routed planks of the form.

● If you want to build store buildings to attract customers, design in Monolithic Concrete. Write us for further data.

PORTLAND CEMENT ASSOCIATION 33 W. GRAND AVE., CHICAGO
CONCRETE FOR PERMANENCE



that silently rolls upon the clearer air"

ARE YOU RECKONING with its effect upon your product?

Smoke is often a violent corrosive agent. And smoke is well-nigh everywhere. Few materials are proof against its attack, its contamination. But there is one material that defies the most corrosive industrial smokes and fumes. That one is USS Stainless Steel. It is unaffected by sulphurous fumes, by atmospheric corrosion, by most of the common corrosive acids and alkalies. It is tough and strong, but readily workable. Write to us today for complete information on the various types of USS Stainless Steel for meeting particular requirements.

USS STAINLESS AND HEAT RESISTING STEELS

U S S CHROMIUM-NICKEL ALLOY STEELS ARE PRODUCED UNDER LICENSES OF THE CHEMICAL FOUNDATION, INC. NEW YORK, AND FRIED. KRUPP A. G. OF GERMANY

Illinois Steel Company
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CARNEGIE STEEL COMPANY
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SUBSIDIARIES OF UNITED STATES STEEL CORPORATION

The photographs illustrate the spaciousness achieved in remodeling the entrance of the Yeon Building, Portland, Oregon. This entrance change allowed for an additional income-producing street entrance shop.

The progressive management of the Yeon Building has taken advantage of low prices to rehabilitate their elevators. This greatly reduces their operating cost and assures their tenants of the smooth, swift riding comfort, quiet and efficient service which so definitely marks modern elevators .... developed by Westinghouse.

Westinghouse

Electric Elevators

Elevator rehabilitation problems referred to Westinghouse are given individual, careful study to insure the most economical, intelligent recommendations.