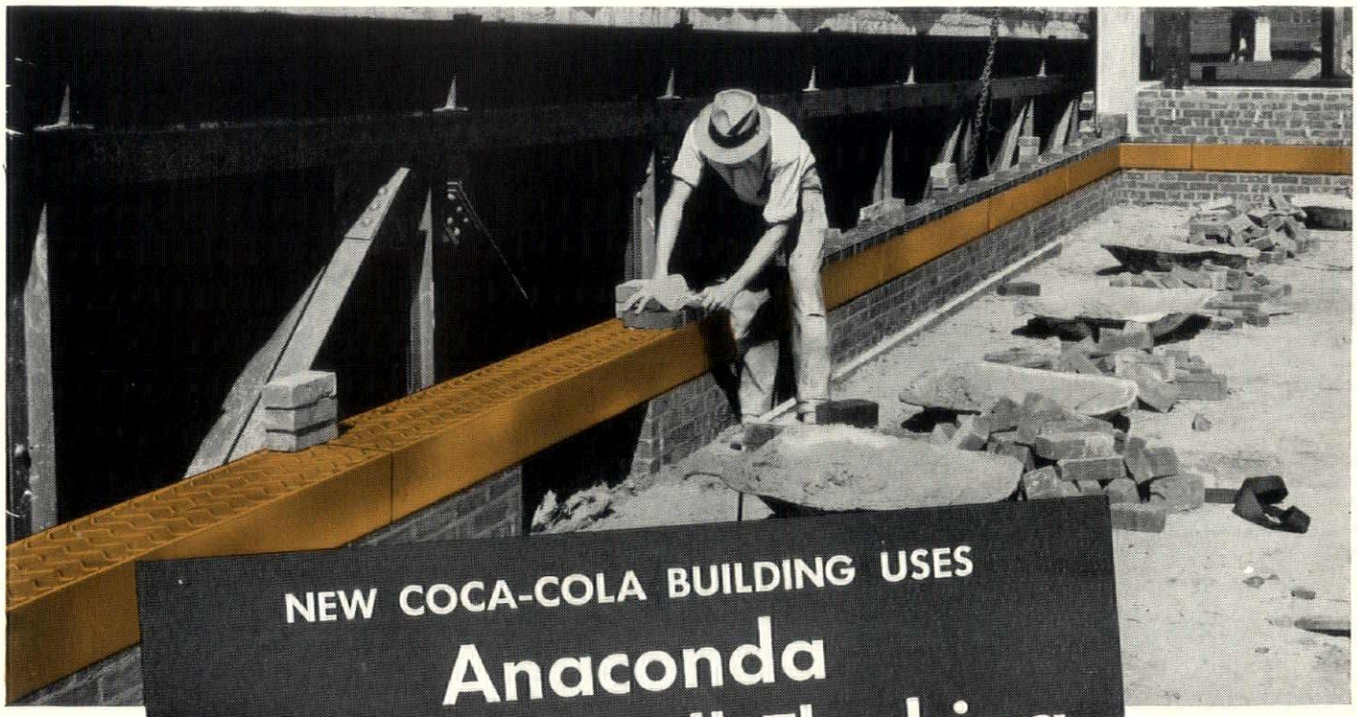
AMERICAN ARCHITECT

AND ARCHITECTURE

- WALTER GROPIUS
- THE NEW ARCHITECTURE IN PALESTINE
- HEATING MANUAL

JANUARY

1938



NEW COCA-COLA BUILDING USES

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J. M. Shelton, Architect, Atlanta, Ga.
James Stewart & Co., Inc., General Contractors, N.Y.C.

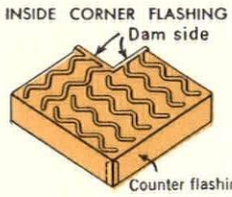
Efficient . . . positive . . . adaptable . . . durable and moderately priced

IN THE construction of the Coca-Cola Syrup Factory at Kearny, N. J., 7000 pounds of Anaconda Through-Wall Flashing* were used for the 12″ walls. This type of flashing was selected because of its unique design. An integral dam throughout its entire length gives thorough drainage in the desired direction. A series of zig-zag corrugations of the same height as the dam prevents lateral movement in any direction.

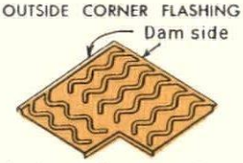
Anaconda Through-Wall Flashing is easily locked endwise, simply by nesting one or two corrugations. Made of 16-ounce Anaconda Copper, either plain or lead coated, these flashings are available in 5′ or 8′ lengths in a range of standard and special widths, and with various selvages. Publication C-28 describes and illustrates Anaconda Through-Wall Flashing in detail. A copy will be mailed on request.

One-piece inside and outside corner flashings are now available for both 8″ and 12″ walls. They are so designed that the corrugations will interlock with those of adjoining straight flashings, thus providing the same thorough flashing at the corners as on the wall.

*Pat. No. 1,906,674



Standard inside corner flashing unit. Dam on inside, drains out.



Standard outside corner flashing unit. Dam on outside, drains in.

38111

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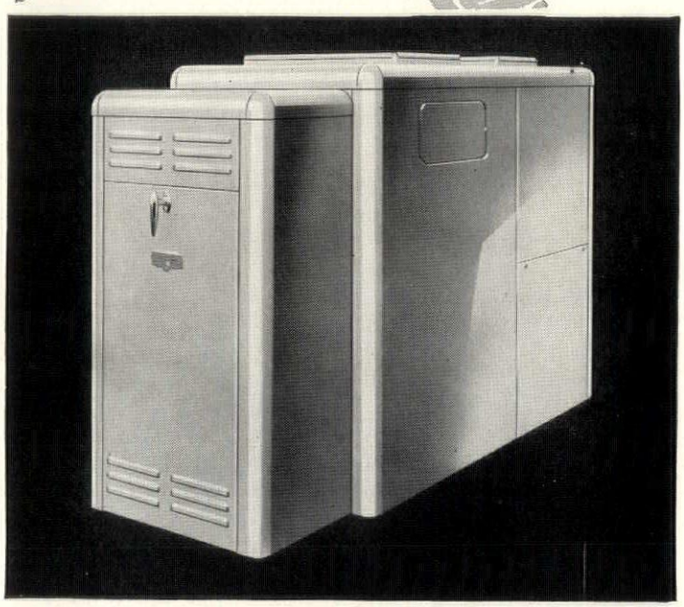

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Architects and Heating Engineers—you will find in the DIRECTAIRE a unit that permits air conditioning to be included in practically any home for which you are planning automatic firing, regardless of size or the kind of fuel selected. Full details on request. Write for them—TODAY!

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BYERS WROUGHT IRON in AIR CONDITIONING

Example by GRAHAM, ANDERSON, PROBST & WHITE . . Chicago Architects

● Where a large volume of water must be handled as in refrigeration or air conditioning, there is sure to be corrosion and consequently a place for wrought iron. Wrought iron won this place on the 30, 40 and more years of faithful service it has given in ice and refrigeration plants all over the country.

Illustrated is an example of the place that wrought iron is taking in air conditioning. When the Oak Park Store of Marshall Field & Company was recently air conditioned, wrought iron was specified for chilled and condenser water lines — an all-welded system.

There is ample evidence to justify the use of wrought iron in air conditioning. Comparative records show it lasts longer and costs less per year of service when it comes to handling water and brines.

If you are planning on air conditioning or refrigeration of any kind, you will be interested in the illustrated, technical bulletin, "Wrought Iron in Refrigeration and Air Conditioning Systems." Ask our nearest Division Office or write our Engineering Service Department for a copy. A. M. Byers Co. Est. 1864. Pittsburgh, Boston, NewYork, Philadelphia, Washington, Chicago, St. Louis, Houston, Seattle, San Francisco.

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AMERICAN ARCHITECT AND ARCHITECTURE

CONTENTS FOR JANUARY 1938

SPECIAL FEATURES

CURRENT ARCHITECTURE

TECHNICAL FEATURES

EVERY MONTH

Vol. CLII, No. 2665. AMERICAN ARCHITECT (Trade-Mark Reg. U. S. Patent Office), with which is combined ARCHITECTURE (Reg. U. S. Patent Office). Published monthly by Hearst Magazines Inc., 572 Madison Avenue, New York. Other Offices: 919 N. Michigan Avenue, Chicago; General Motors Bldg., Detroit; 132 Newbury Street, Boston. William Randolph Hearst, President; Richard E. Berlin, Executive Vice President; John Randolph Hearst, Vice President; Arthur S. Moore, Vice President; Earle H. McHugh, Vice President; R. F. Gardner, Vice President; T. W. Towler, Vice President; F. E. Hagelberg, Treasurer; R. F. McCauley, Secretary. Copyright, 1938, by Hearst Magazines Inc. Single copies, $1.00. Subscription: United States and Possessions, $3.00 per year; Canada, $4.00; Foreign, $5.00. Entered as second class matter, April 5, 1926, at Post Office, New York, under Act of March 3, 1879.

TRENDS

CONSTRUCTION

The volume of November building permits in Dun and Bradstreet's 215 selected cities dropped sharply to 23.3% below the preceding month of October. The total of $69,567,549 was 7.9% below November, 1936, and, with the exception of January of this year, was the lowest of any month since February, 1936. In New York City the decrease amounted to 35.5% from October levels while for the rest of the country it was equivalent to 17.2%.

■

"There is no crisis in the construction industry," began Mr. Thomas S. Holden, Vice President of F. W. Dodge Corporation, in a recent address before the American Statistical Association. Mr. Holden stated that a healthy recovery had been temporarily checked, but that it was likely to be resumed within a short time unless business conditions grow much worse than at present.

In a scholarly summary of past construction statistics, Mr. Holden showed that America has enjoyed periods of phenomenal growth during the eras of railroadization, industrialization and motorization. He does not believe that these previous booms are a dependable basis for forecasting the future, for they represent the frantic activity of a nation supplying an initial demand. Now, we are replacing and improving.

Construction recovery, to Mr. Holden's way of thinking, has been moderate, sane and healthy—and has not yet collapsed. "But," says Mr. Holden, "something else did collapse . . . the mythical housing boom that was invented and sold to the American people. Fragmentary statistics of past epochs have been dug up to prove that there have been housing booms in the past, that each successive boom has been bigger and better than the last one, and that the next one, scheduled to reach its peak in 1943, is going to be the biggest of all. Paleontologists dig up toe-bones to prove that there were dinosaurs a million years ago. I have never yet heard one argue that there would be another dinosaur in 1943."

In subsequent portions of his address, Mr. Holden developed the thought that there is no crisis in the construction industry and no emergency in the housing program—that the problems are those of adjustment to major changes in the forces that make for economic expansion. In concluding, he said, "The United States of America has had its era of colonization; it has been transformed into an industrial nation; it now stands upon the threshold of the era of civilization. The future of building is the future of the United States. For construction is not only the balance wheel of business; it is also the measuring rod of progress."

■

Is this a good time to build? So asked a questionnaire sent to 3,500 architects in all parts of the country by the Minwax Company of New York. Of the 316 answers received in reply, 74% were in the affirmative. In a brief summary of the survey's broad significance, it is stated:

1. While labor and material cost appear high the trend is to stabilize or move higher.
2. Financing is relatively easy to obtain.
3. Housing shortages exist in a majority of localities.
4. Land values are not now inflated but are likely to increase.
5. Rents are increasing or likely to increase and vacancies are negligible.
6. Contractors and architects are free to take on a large amount of new work.
7. 74% believe that *now* is a favorable time to build.

■

Another survey just completed is one made by the publication "Buildings and Building Management." This survey was conducted among a representative group of building owners and managers and indicates that throughout the United States over $63,000,000 worth of modernization work will be done in 1938.

The owners and managers represented in the survey control a total of 32,027 office, commercial and apartment buildings, and it is stated that 88.4 per cent of them contemplate partial or complete modernization of their properties during the coming year.

The largest volume will be spent in renovating office and commercial structures, the estimated total reported for that work aggregating $53,808,500. For modernization of apartment houses the estimated cost is $9,344,500. While plans for new construction are not included in the analysis, it is stated that replies were received from 180 building owners and managers indicating that they are planning the erection of new investment structures in 1938.

■

"Recommended Practices For The Economic Stability, Progress and Prosperity of the Construction Industry" is the title of a program suggested by the Construction Industries Association of 101 Park Avenue, New York City, as fundamental

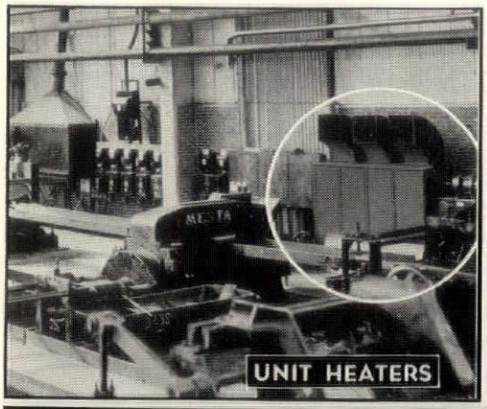
(*Continued on page* 8)

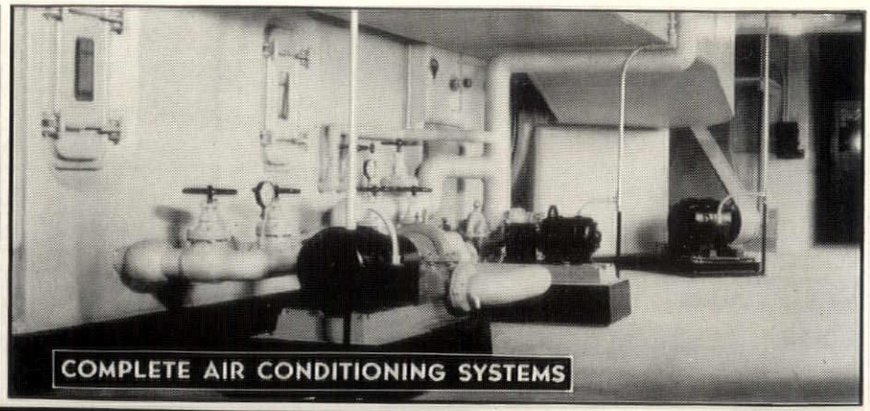
PHOTO: WIDE WORLD

The new concrete and glass church in Montrouge, recently opened to public worship by Cardinal Verdier, Archbishop of Paris, contrasts strangely with the old church in the background.

PHOTO: ACME

B. Charney Vladeck and Miss Mary K. Simkhovitch watch Mayor La Guardia swear in Alfred Rheinstein and Edward F. McGrady as members of New York's Housing Authority.





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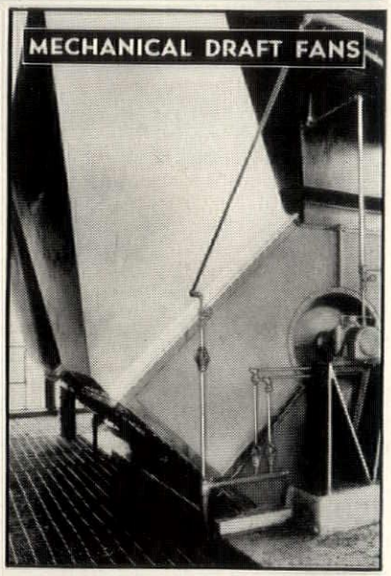

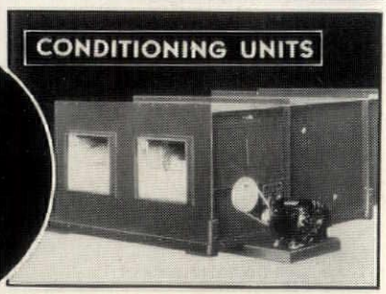

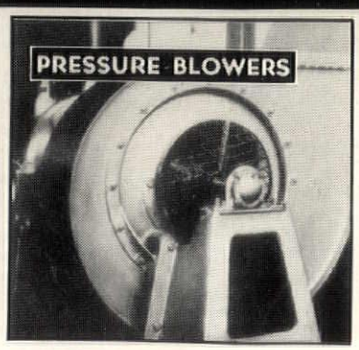

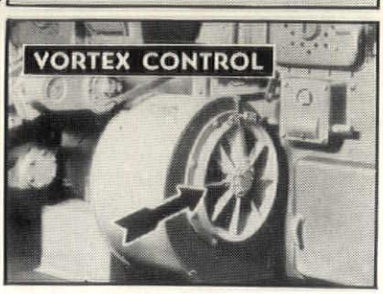

ARCHITECTURALLY SPEAKING

by OTIS ELEVATOR COMPANY

Let's say this is you burning the midnight oil over a rush job that is on your boards. Let's say you're going to specify a freight elevator for this particular job. You look like you're busy and we don't want to interrupt, but we'd just like to ask what will be your duty and platform specifications for that elevator?

★

If you're not quite sure, you're going to have to leave the board and do a little investigating of freight elevators in buildings of similar size and where the freight problem is similar to what can be expected in this new building you're working on.

★

We've been doing some pretty intensive investigating for about 10 years on this subject and we've studied a good many installations in that time. And we think we've uncovered something worth while for everybody concerned—the owner, the contractor, ourselves and other elevator manufacturers, and yourself. For instance, we've found that for average freight service in the smaller buildings one of two duty specifications generally fills the bill: (1) 2500 pounds capacity at 50 feet per minute, and (2) 3000 pounds capacity at 40 feet per minute. Also that two platform sizes cover the needs of most installations—either 5 feet, 6 inches wide by 6 feet, 9 inches deep, or 6 feet, 6 inches wide by 7 feet, 6 inches deep.

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To us this seemed a very important discovery because it suggested that these two sizes could be made up and carried in stock. They looked like the panacea for a lot of elevator blueprinting and specification-writing headaches because they met the specific needs of so many installations. So we now announce STANDARD FREIGHT ELEVATORS—manufactured in advance of order—*complete installation* ready for delivery in *one shipment* without risk of delay.

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To you this means complete preliminary information always available. An elevator of the correct type and size with a minimum of drawings and specifications. A cleaner job all the way through. And the least possible chance of owner dissatisfaction.

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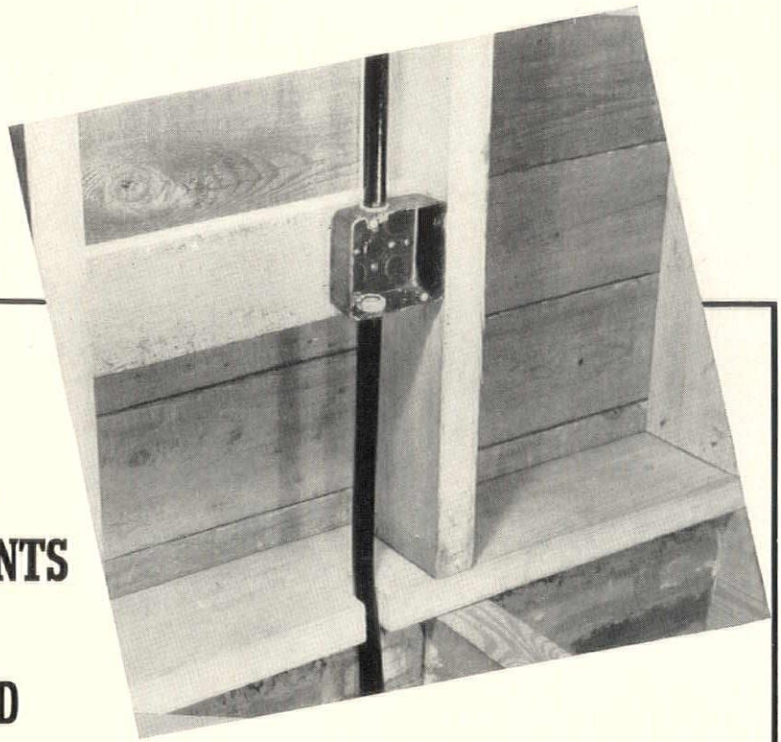
To the contractor this means the elevator is *delivered and installed* before an elevator "built to order" could be manufactured. No waiting until elevator is installed so that other work can go forward. He gets the job done when he *says* it will be done.

★

To the owner this means a freight elevator installation that *meets his needs* in every way. Service parts always available. A more satisfactory installation.

★

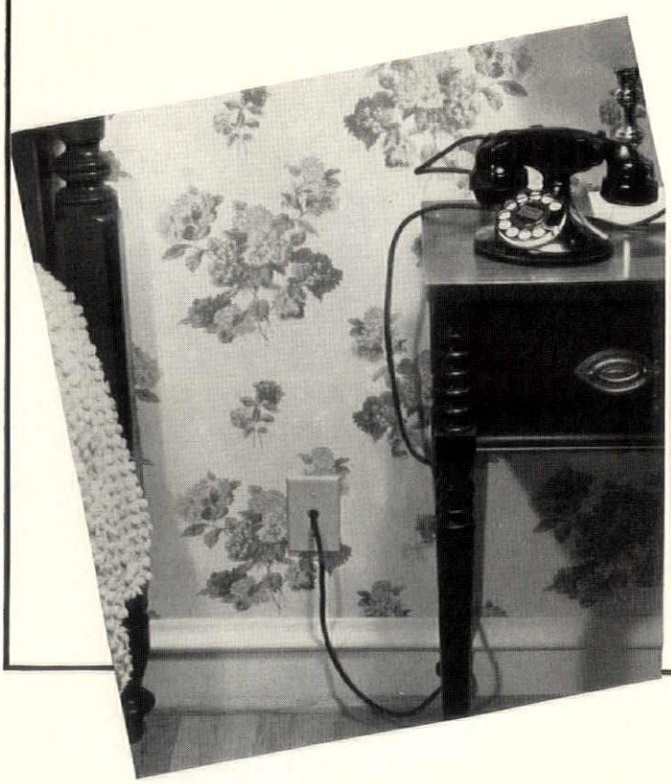
You can get complete information on STANDARD FREIGHT ELEVATORS available at *all* Otis offices.



9 OUT OF 10 CLIENTS DON'T UNDERSTAND

...that *conduit for telephone wiring costs very little.*

It is inexpensive to install conduit for telephone wiring in new construction. A simple pipe, running up inside the wall from the basement to the upper floors, is usually adequate for the small house.



...that *telephone conduit helps preserve the beauty of a new home.*

Conduit installed during construction to take care of future as well as present telephone needs eliminates the necessity for exposed wiring or for piercing walls and floors later.

...that *modern construction often makes conduit necessary in order to conceal wiring.*

Insulation, ducts, fire-stops and some of the new wall and floor materials make it impossible to "fish" wiring in walls and floors. If additional telephones, or changes in location, are needed in the future, conduit installed now will save trouble later.

Your telephone company maintains an "Architects' Service" to answer questions on cost or installation. Telephone engineers will be glad to help you develop practical and efficient conduit layouts for your projects — without charge.

TRENDS

(*Continued from page* 4)

economic principles of industrial recovery. In a preface to the "Recommendations" it is stated that stability and progress of the construction industry depend upon these three factors:

(a) Placing the buyer and seller on a par to assure fair competition, thereby

(b) Increasing efficiency through elimination of waste in all matters, and thus

(c) Providing an economic balance between consumption expenses and production income by co-ordination.

To create the conditions in which these factors may exist, the preface continues, it is essential that architects, engineers, builders and contractors cease destruction of their industry from within, and devote their time and energy to the reformation of all unsound bidding and general practices in vogue, condemn and abolish uneconomic plans and specifications that are contrary to the recommended practices.

The rest of the document outlines correct procedures for bidding, surveying and designing, material and labor specifications, etc. Purpose of these recommendations, it is stated, is to serve in co-ordinating the construction industry into a forceful and progressive body and to eliminate the conglomeration of chiselers who masquerade as builders.

■

Along these same general lines, the New York Chapter of the A.I.A. advocates reduction of construction costs through joint action of architects, engineers, builders and mechanics, involving adoption of new methods and materials.

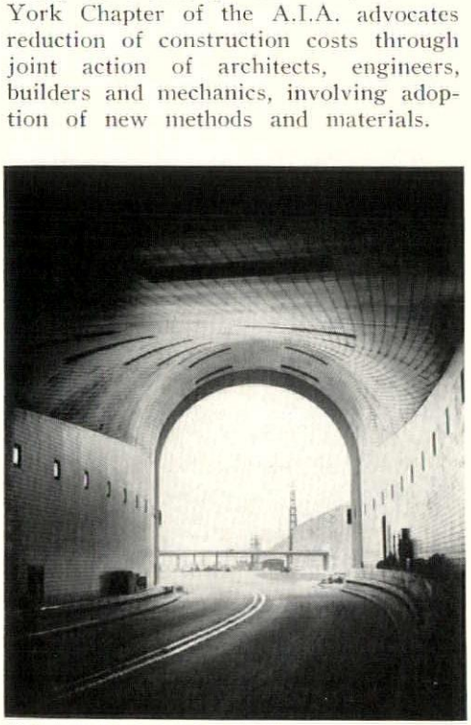


PHOTO: CHARLES PHELPS CUSHING

The Weehawken, New Jersey, exit of the new Lincoln Tunnel under the Hudson River.

Alfred Fellheimer has been appointed chairman of a committee of three to represent the Chapter in negotiations with the industry looking toward lower costs, improvement of working conditions, and gain in amount and quality of construction work in the metropolitan area. The other committee members are Robert B. O'Connor and L. Andrew Reinhard.

"The broad subject of detrimental code practices and jurisdictional disputes which seriously affect the construction industry, especially the effort to produce low-cost housing, is being taken up by the New York Building Congress, representatives of the contractors, and the architects' committee," it is explained in a statement issued by the Chapter.

"It is hoped that constructive action by agreement among these groups will result in such betterment of conditions as will encourage owners to recommence the building program which was under way in the spring and early summer of this year, but which has been interrupted by economic questions that have unfavorably affected plans for building.

"There are available many new materials and new methods of construction through which it should be possible to improve building technique and reduce cost. It is the purpose of the committee of the New York Chapter to make these betterments available to owners in the metropolitan district, and particularly to the government in its housing program."

■

High Costs do not necessarily prevent recovery in building, suggests Albert J. Evers of San Francisco, director of the A.I.A., in his annual report on conditions in the Sierra Nevada District of the Institute.

Says Mr. Evers:

"Building costs will probably remain high, and it is during periods of high building costs that most building has been done. Perhaps the pessimism of the last six months is not justified. I believe that the constant harping on the subject of high building costs and labor troubles has had a markedly adverse effect on building volume.

"Over the whole district there is complaint of rising building costs and a slashing of volume, for no apparent reason, since business as a whole in the seven Far Western states seems to have been surprisingly good for the first nine months of this year.

"Volume had been good in the construction industry until the end of September in the entire western area. In October it took a sudden downward plunge. Whether this is merely a recession or the beginning of a slump no one can definitely predict.

"Organized architecture as represented by Northern California, Southern California, San Diego, Santa Barbara, and Hawaii Chapters of the Institute, are in a healthful condition. These Chapters are developing splendid co-operaiton with engineers, contractors, producers and real estate groups, and they are attempting to solve long-standing problems with good chance of success.

"One must confess that, as a whole, future business conditions in the district seem rather uncertain. However, the probability is that if there is an optimistic note in the national scheme of things, an encouragement of business by the Congress, and a better stock market, the building industry and the architectural profession will have a reasonable chance of upturn in the volume and value of their business and professional work."

■

In a petition to President Roosevelt and members of the United States Congress, the A.I.A. officers and Board of Directors ask repeal of the surtax on undistributed profits of industrial corporations. The petition states that although the motive for this tax is to increase governmental income the end result is that tax collections are lessened because of the stifling effect on earnings of building construction industry and so-called capital goods industries.

The Illinois Society of Architects, acting in concert with other professional groups and representatives of the building trades in Chicago, recently addressed a similar petition to the President and Congress.

■

HOUSING

Charles D. Maginnis, President of the American Institute of Architects, in a recent release to the press assured the country that architects are ready to shoulder their part in translating the Housing program into practical achievement. Said he:

"President Roosevelt has embarked on a great enterprise whose validity and beneficence to the nation are beyond controversy. It might fittingly have been entered on in the days of our prosperity as a fine gesture of statesmanship. As it is, the provocation had developed curiously.

"We mourned over the Great Depression as over an unmitigated calamity. Emerging slowly out of it, however, we perceive that it gave as well as took away. In a time of spiritual unsettlement we got

(*Continued on page* 12)

MAKE THE HOUSES YOU DESIGN COMPLETE BY SPECIFYING G-E HOME WIRING

A home without adequate electrical wiring today is only half a home. Many people have realized this fact to their sorrow after finding that the lighting in their new homes is insufficient, that the control of electrical outlets is inconvenient, that electrical appliances cannot be used efficiently and conveniently.

Protect your clients' comfort and your reputation by specifying G-E Home Wiring and G-E Wiring Materials. You can then be sure that the wiring is adequate and lasting — that full use can be made of electrical equipment and appliances.

G-E Home Wiring, of course, includes enough outlets. But, more important, wire sizes are large enough and the wiring is laid out so that lamps and appliances will operate efficiently and can be used conveniently. G-E Home Wiring plans are adaptable for any size or type of home. G-E Wiring Materials are designed to be used together and are of uniform high quality.

For more information about G-E Wiring Materials and G-E Home Wiring, see Sweet's Architectural Catalog for 1938 or write to Section CDW-821, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC

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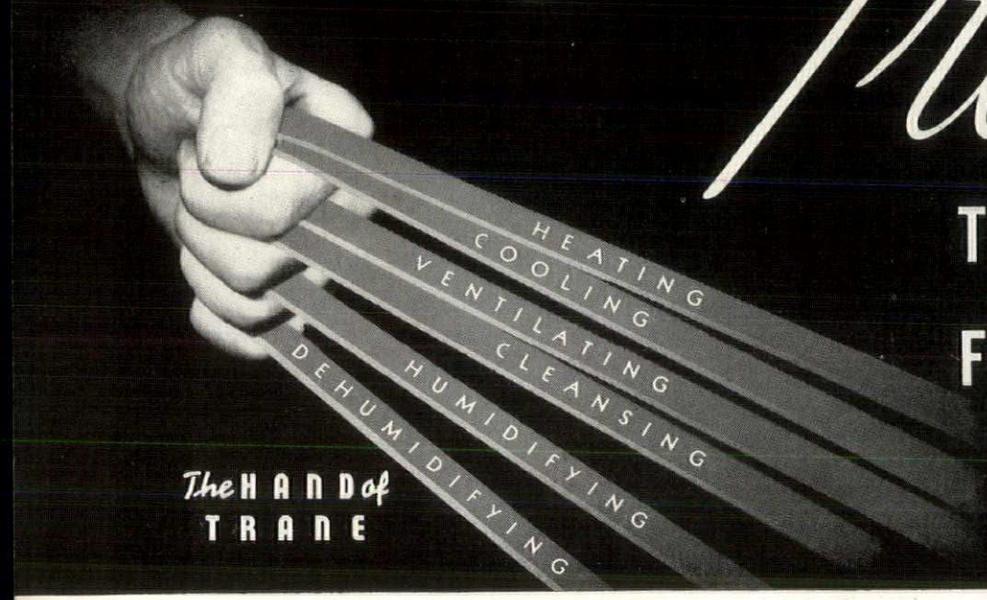
TO CLEANSE IT, FOR HUMAN COM



The HAND of TRANE

GREAT BUILDINGS

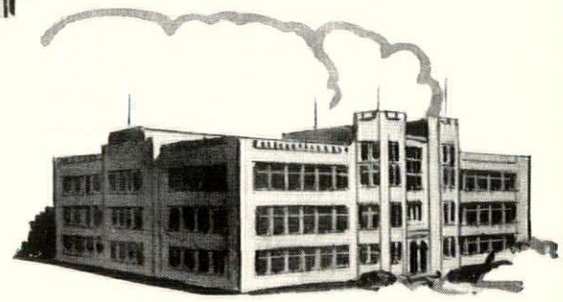
Scanning the weather map we encounter such outstanding Trane large building installations as: Mayo Clinic, U.S. Supreme Court Building, Wrigley Building, 1939 World's Fair Administration Building, Imperial Bank of Canada, among many.

APARTMENTS

Structures like the following indicate the high level of acceptance of Trane heating and air conditioning in the apartment field: Rockefeller Apartments, New York City, Kennedy-Warren Apartments, Washington, Royal York Apartments, Century Apartments, New York, etc.

HOMES

Homes for every man, in every state in the union, are delightful places to live, thanks to Trane Convection heating and Trane Air Conditioning. Among the homes of Tycoons, here are a random few from the long Trane list: Pickfair, the residence of Mary Pickford, O. O. McIntyre residence, Ryerson Residence, Residence of Col. R. R. McCormic, Residence of Eugene O'Neill, "Lady Esther" Residence, Residence of Cardinal Mundelein.



SCHOOLS

Trane and education are well met. The widespread installation of Trane equipment in schools and colleges throughout the country is evidenced in these important installations: Berea College, Indiana Univ. Medical School, Texas A. & M., Louisiana State University, Memorial Union, Univ. of Wisconsin, Purdue, Stanford University, University of Virginia.

HEATING AND AIR CONDITIONING TO THE N^{th} DEGREE

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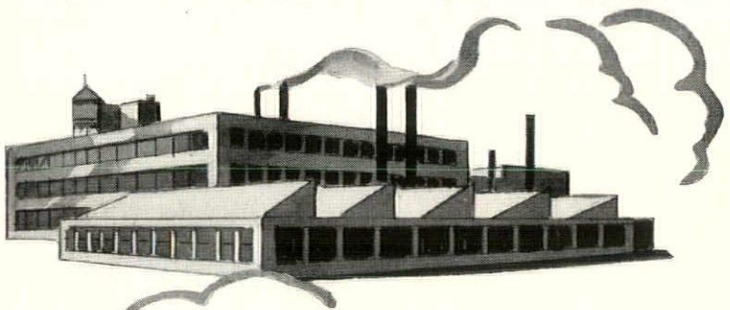

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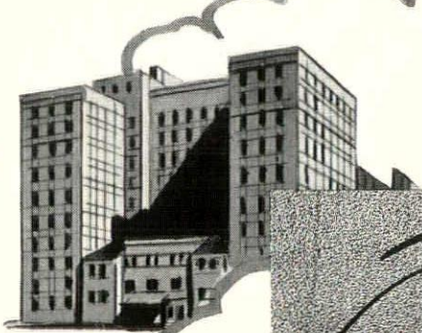

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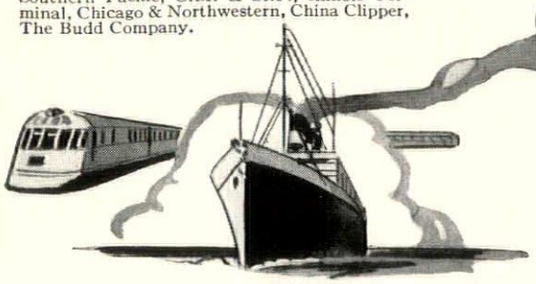

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TRENDS

(*Continued from page* 8)

a stark and revealing view of our social order, which disclosed unexpected and perilous weaknesses. It awakened the social consciousness of the nation to the need of remedies. And we took critical account of the state of our national health, we perceived the slum.

"How long its significance might have remained undetected in the general sweep of our materialistic order cannot be guessed, but there was small hint in our history that we perceived the menace of this cancerous spot. It was a wretchedness which we accepted as fit enough for the elements of our cities who largely created it. The slum, however, has been a vexing and challenging problem in Europe for centuries. In the European economy, however, it was too dangerous a phenomenon to be ignored.

"The modern democracies and the authoritarian states with differing philosophies have addressed it with an equally intelligent and scientific efficiency. President Roosevelt, convinced of its outstanding claim to the support of Government, has now constituted slum clearance one of the great interests of his administration. In the Housing Act, now to be generously amended, there has been set up a plan which contemplates with the co-operation of states, municipalities and private groups, the construction of areas of low-cost housing, with a corresponding evacuation of existing blighted areas. . . . "Hitherto, the cost of the architect's service has been an impediment to his association with the more modest type of dwelling and, as a consequence, the buildings in this class, which represent a preponderant proportion of our construction, are a pervasive and unsightly liability of our landscapes. A system of architectural group service has now been instituted, and will be comprehensively extended, which will provide for the individual owner, the aid of talented domestic architects at a cost in keeping with the low capital expenditure, so as to insure the adequate co-operation of the architectural profession in this great national opportunity.

"The architectural profession of America, conscious of its obvious responsibility for the success of this great construction policy has pledged the Government its earnest collaboration. It is to be hoped that in a spirit of enlightened patriotism all interests which can assist will not fail it."

■

The need of Architectural supervision in providing proper protection for mortgage loans is further indicated by a survey just completed by the Westchester Chapter of the A. I. A. Statistics obtained from 60% of the lending institutions in Westchester County, New York, showed that about one half of these institutions are now lending on mortgages or making construction loans. Twenty per cent stated that they required the full service of an architect in connection with all houses on which they issued mortgages. Twenty-five per cent expressed agreement with the principle that the interest of both lender and owner requires complete architectural services during construction. There was no disagreement whatsoever as to the soundness of this principle.

However, it was brought out that twice as many builders and contractors as architects are acting in a supervisory capacity for the banks.

■

Frameless wooden houses to help meet the need for low cost modern homes are being given final tests by the Forest Service of the United States Department of Agriculture. The Forest Products laboratory, after over two years of investigation, reports that it will soon have plans for a modern 4-room house costing between two and three thousand dollars. The "4-room house" consists of a living room, kitchen and two bedrooms, a bath and a utility room, kitchen equipment includes an electric refrigerator, bathroom fixtures, plumbing, heating plant and electrical wirings. The construction system may be adapted to larger homes with proportionate savings in cost.

It is explained that the new house is built of prefabricated plywood panels. These are made by glue-welding sheets of plywood to both sides of a light interior framework. An interesting feature is that furnace and other tests show that the new construction will pass the most stringent trials prescribed by the National Association of Fire Underwriters of the United States.

■

THE COMPETITION MOVEMENT

"Architectural competitions are the best method of selecting designs for, and architects to superintend the erection of, buildings where the expenditure of public funds is involved," states a resolution recently adopted by the New York Chapter of the A.I.A. The Chapter recommended to Secretary of the Treasury Henry Morgenthau, Jr., that the competitive method be applied experimentally to six Federal projects in the State of New York.

According to a statement by the Chapter, architects feel that their profession has been menaced by State and Governmental agencies which have set up bureaus to take over work which more properly belongs to the Architect in the field of private practice. The Federal Government has usurped the functions of the architect, and this policy of usurpation has been followed by states and cities, it was declared.

"In England, France, Italy, and other countries," the Chapter statement said, "competitions have proved stimulating to national architecture.

"Employing this practice, the Royal Institute of British Architects has successfully solved England's architectural program. Since the World War, 470 open competitions to select architects for public buildings have been held in England, and have resulted in better architecture and lower costs. The United States should profit by British experience.

"It is paradoxical that in this country, where free competition has been the backbone of success, the architects should be forced to fight for Federal and State recognition of the fairness and value of competitions.

"Under the pressure of emergency, the Office of the Supervising Architect in Washington developed from a small supervising unit to the largest architectural planning factory in the world. Before the present Administration came into power, it was the usual practice to hire private architects for all large work and for most of the small work.

"Now architectural design has become the function of the Procurement Division of the Government, which has swallowed the Office of the Supervising Architect. Under present conditions it is practically impossible for a private architect to obtain federal work from the Procurement Division.

* * * * *

"It is the aim of the architectural profession to bring about a return to the policy of employing private architects in governmental work. The existing system, which excludes architects from a sphere of public service which is preeminently their own, should be abolished."

The Philadelphia Chapter of the American Institute of Architects has gone on record in favor of competitions, and has expressed disapproval of "bureaucracy" in government architecture. Other Chapters of the Institute are expected to support the position of the New York and Philadelphia groups.

Wesley S. Bessell has been named chairman of a New York Chapter committee to direct the movement. Other members are Lorimer Rich and Frederick J. Woodbridge. First gun fired in the campaign was to send Honorable Otha D. Wearin's article "The Competitive Principle" reprinted from the November issue of American Architect and Architecture to every member of Congress.

(*Continued on page* 106)

ANNOUNCING

The Pittsburgh Corning Corporation

A subsidiary of America's two outstanding glass companies Pittsburgh Plate Glass Company and Corning Glass Works formed for the purpose of developing and manufacturing glass blocks, structural glass and related products.

FOR many years, the name "Corning" has meant research in glass . . . and a famous manufacturer of technical glass products. And for half a century, Pittsburgh Plate Glass Company has been known as the world's largest manufacturer of flat glass products.

Now these two leaders in glass have formed a separate corporation . . . the Pittsburgh Corning Corporation . . . whose purpose is the advancement of glass in the architectural, building and decorating industries. The new company will offer a coordination of research, engineering and manufacturing experience unparalleled in the glass industry. And it will make available to the building trades the latest technical achievements in glass.

The Pittsburgh Corning Corporation will produce glass block, glass tile, colored structural glass and related products. Each of these materials will be identified by the name "PC" as a member of the Pittsburgh Corning group of products. Carrara Structural Glass, which has been for many years manufactured and sold by the Pittsburgh Plate Glass Company, will now be manufactured by Pittsburgh Corning Corporation as one of the new organization's leading products.

The formation of this new company will not affect in any way the diversified interests of either the Corning Glass Works or the Pittsburgh Plate Glass Company in their other fields of glass manufacturing. Sales of all Pittsburgh Corning products will be handled through the nation-wide sales organization of the Pittsburgh Plate Glass Company.

We are confident that the activities of the Pittsburgh Corning Corporation . . . its products, its research and its advisory services . . . will result in greater creative opportunities for the architect, builder and decorator.

PITTSBURGH CORNING CORPORATION

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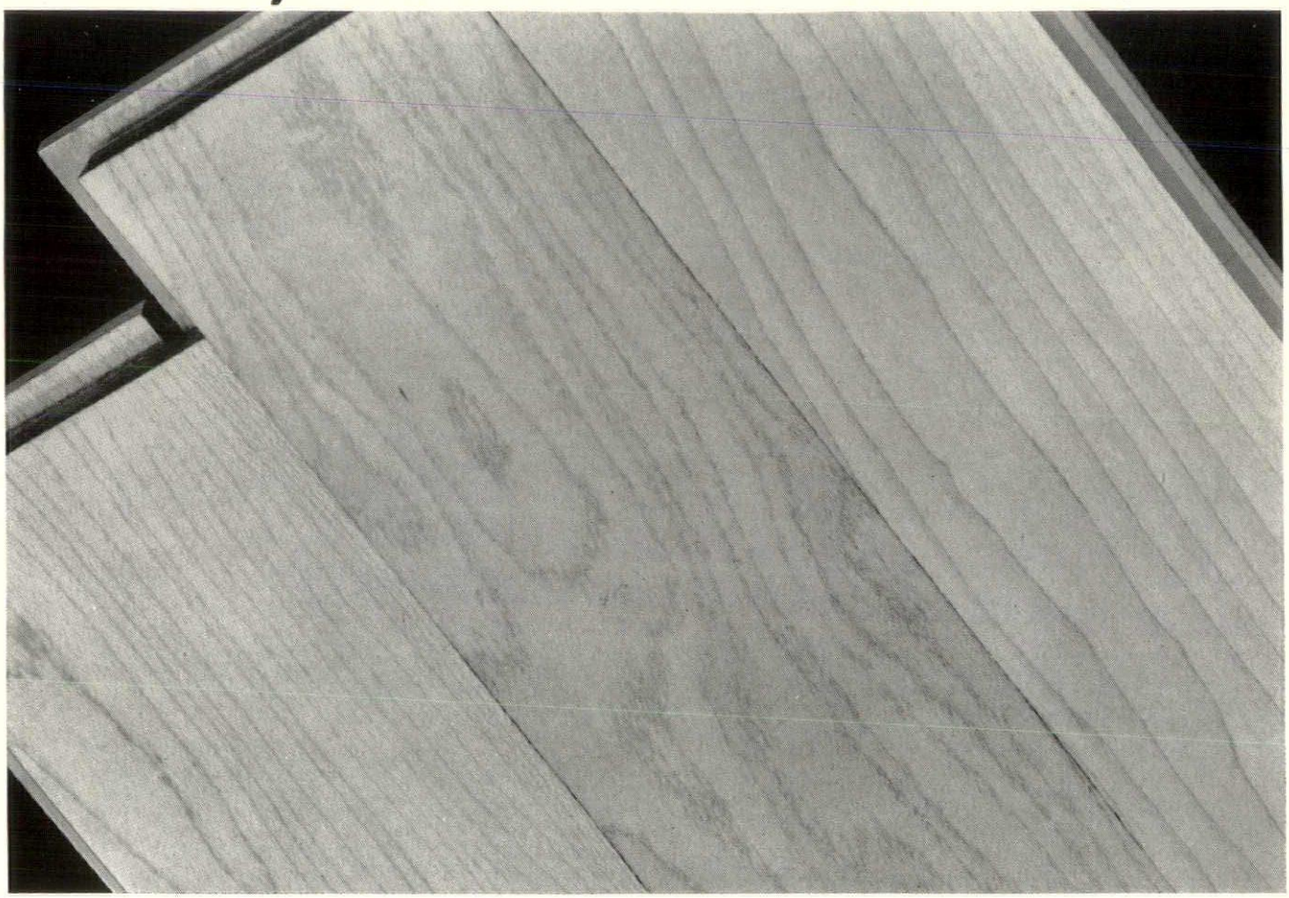

This photograph shows **MFMA** *Northern Hard Maple Flooring—2¼" face width*

Even in a photograph, you can see the remarkably fine, smooth grain, the toughness and tightness of Hard Maple's fibres. You can almost *feel* the velvet-smoothness of its surface. Your mind's eye will tell you that only the hardest of hardwoods can possess this clear-cut, enduring beauty.

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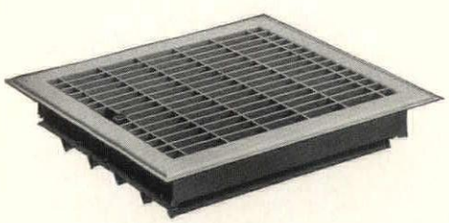

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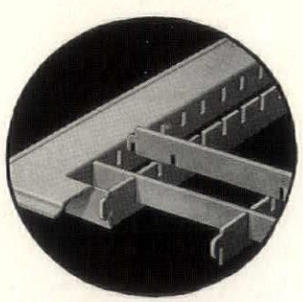

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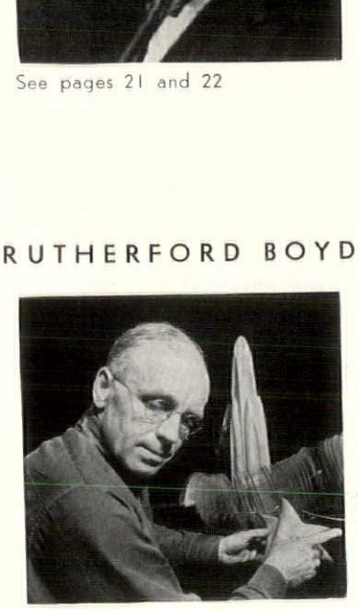
ARCHITECTS

DR. WALTER GROPIUS



See pages 21 and 22

was born in 1884, the son of a well established architect. After graduation from the Technische Hochschule of Munich, he spent several years in architects' offices, and then traveled for two years in England and Italy. Returning to Berlin, he entered the office of Peter Behren, then the most famous of German architects, and it was here that Gropius developed the theory of contemporary technique on which his work is based.

His first major step was the design of a factory in Alfeld in 1910. It led to a commission for the Hall of Machinery at the Cologne Exposition—the most advanced piece of architecture built before the war. After three and a half years of distinguished war service, Gropius was made director of the Grand Ducal Art School at Weimar. His experiments in education soon made the academy the most famous architectural school in Germany. When the School was moved to Dessau, Gropius built a complete group of buildings for it that represented the largest modern project executed up to that time. They remain to this day an impressive example of his extraordinary skill.

In 1928 Gropius resumed practice in Berlin. Here his work on many important buildings further demonstrated his talent for raising ordinary building to the level of fine architecture. Several years later Gropius went to London because of the political pressure at home. He was warmly received and remained there until February, 1937, when he came to this country to take up his position as Professor of Architecture at Harvard University. Since his arrival in this country he has been most active in all phases of architecture, lecturing constantly, investigating materials and methods of building, writing, and acting as adviser to the recently opened New Bauhaus in Chicago.

RUTHERFORD BOYD

See pages 23-26 inclusive

modestly comments: "Born in Philadelphia, brought up among the chips and shavings in my father's shop. He was an artist, sculptor and woodcarver. Studied painting at the Pennsylvania Academy of the Fine Arts and Art Students' League. Began as an illustrator, became Art Editor of various leading magazines. Escaped from this servitude after twelve years into commercial illustration and designing of many kinds. Have redesigned several old houses in Pennsylvania and New Jersey. More recently the new Yalden Sundial at Wood's Hole, Mass.

"Conceiving Design as the great fundamental in all visual arts, I have spent most of the last decade in writing, lecturing, but more significantly in completing at the bench many developments in abstract form, carving them in wood, plaster, synthetic plasters and stone. This past year largely given over to the abstract motion picture 'Parabola.' Planning other cinema pictures and a comprehensive exhibit of my designs.

"Much to my regret, I now give little of my time to tennis and gardening-building."

Mr. Boyd may be remembered from his exhibition of abstract models held at the Architectural League, N. Y., in 1935. A previous article, "The Controls Over Design," was well illustrated with photographs of these earlier models.

BERTRAM A. WEBER,

See pages 31 and 32

practicing as White & Weber, was born in Chicago, 1898, the son of Peter J. Weber, well-known Chicago architect, under whose guidance architecture became a fascinating field of study. He graduated from Massachusetts Institute of Technology in 1922, then undertook a study tour of Europe, one of the outstanding broadening influences of his education. Work in the office of Howard Shaw and Peter J. Weber continued until the death of his father in 1923, when he entered into independent practice. A partnership with Charles E. White was formed and there followed a long, mutually happy relationship in which the work was divided, Charles White handling most of the specifications, contracts and construction, and Bertram Weber the design and production of drawings.

Since the untimely death of Mr. Charles E. White in August, 1936, though practicing alone, Mr. Weber continues to use the name White & Weber. The work of the firm has always included a large volume of residential construction, as well as commercial and institutional.

They have recently been architects for the Haish Memorial Library, De Kalb, Ill.; the Oak Park, Ill., Post Office, and one of the Associated Architects for the Julia Lathrop Housing Project, Chicago.

At present Mr. Weber is vacationing in Key West, Fla.

IRWIN S. CHANIN

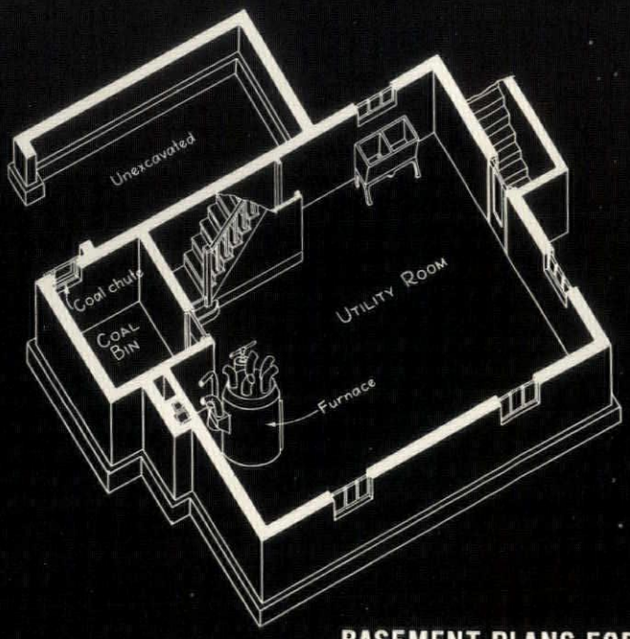
See pages 61-64 inclusive

was graduated from the engineering school of Cooper Union, shortly before the beginning of the World War. After working for a short time as a draftsman, he entered the army and served as an engineer, working behind a barbed wire fence in the Great Lakes area upon the design of buildings for the Chemical Warfare Service.

Returning to civilian life in 1919, he began to build one-family and two-family dwellings in Brooklyn. His activities as an engineer and builder first included small business buildings in Brooklyn and Manhattan and from 1925 to 1927 legitimate and motion picture theatres, including the original Roxy, at the time of its completion the largest theatre in the world. Mr. Chanin built the Chanin Building in 1928 and shortly thereafter the Century and the Majestic, 30-story blockfront apartment houses on Central Park West of which he was both architect and engineer.

The Offices of Irwin S. Chanin are now engaged in the development of Green Acres, a "planned residential park community" of winding parks, cul-de-sac safety streets and other provisions for a complete community life. Green Acres is located in Valley Stream, Long Island, and is planned to contain about 1,800 small houses.

MODERN BASEMENT DESIGN FOR *Clean heat*



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2 **Economy:** Modern *bituminous coal* is the lowest fuel in first cost, the cheapest by far to burn. Tremendous unmined supplies scattered throughout the country insure plenty of fuel in the future, which means that your clients will not face rising prices due to imminent shortages of supply.

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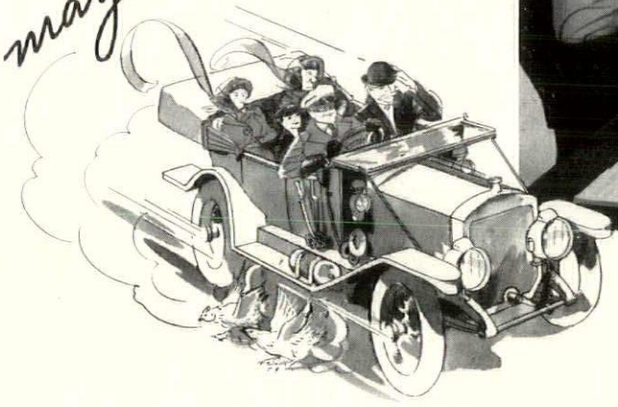

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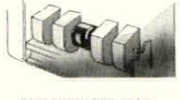

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The New Herman Nelson Air Conditioner for Schools prevents harmful drafts by assuring that *all* air discharged into the room is maintained at the desired outlet temperature. *No* part of the air is colder or hotter than necessary to maintain the desired room temperature. Thus, the New Herman Nelson Air Conditioner for Schools can discharge air, cool enough to prevent overheating, into the classroom without danger of drafts.

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ENCOURAGING HOUSING

THE big job in building is to catch up with the physical needs for housing. The President and Congress are pushing through new legislation to that end. The producers, leading manufacturers of building materials and equipment, are looking forward with high hopes to a mass market of new houses. Architects are wondering where they can join directly in the movement and whether they will participate in the low-cost projects or will be content with the collateral increase in general building.

It is fairly easy to estimate the number of new dwelling units needed in this country each year for the next 10 years. It is not so easy to estimate the size of the building program that will be recorded in building permits at the end of 1938, or of 1939. It is useful to set down in this connection a few of the more important factors, both pro and con, which will finally determine construction activity.

PRO	CON
1. New legislation, providing easier financing terms, lower interest rates, smaller equities, and long term amortization.	1. High building costs, labor and materials.
2. Government insurance of loans (government as the potential "bag holder").	2. Increasing unemployment, less desirable credit risks.
3. Publicity, advertising and propaganda on the part of government and of industry.	3. Business contraction (forty billion dollar stock market decline).
4. Large deposits of idle funds seeking investment.	4. Business uncertainty, fear of hampering legislation.
5. Statistics proving need for new dwellings.	5. High real estate taxes and appraisals.
6. Continual advance in the rental scale.	6. Profit taxes.
7. Capital participation through fear of inflation (hedging).	7. Fear of possible deflation.
8. Large scale building favored for efficiency and economy.	8. Unintegrated industry, few building organizations ready for larger scale housing production.
9. Desire of workers for homes of their own.	9. Inefficient building procedures and techniques.
	10. Potential owners' desire to remain mobile.

The emphasis of the new legislation is definitely in favor of the large scale building units, either apartments or subdivisions, whereas previous legislation was aimed more at the individual home. It seems evident that the control of the new building operations will be largely in the hands of entrepreneurs known as "operative builders" or "speculative builders." Their profit will come from knowing how to buy and how to sell, as it has in the past. Realistically, then, the architects can participate in this picture only by co-operating with these builders, by becoming entrepreneurs themselves, or by forming an entrepreneur group, of which they would be a part.

Co-operation with operative builders can take many forms and it would be up to the individual architects to determine just which form is most advantageous to them. For instance, the co-operation may be—

1. That of pooling interest with the operative builder in a stock company or a partnership.
2. It may be in selling his services to the operative builder as an independent professional architect on a percentage fee, cost-plus or lump sum basis.
3. He may become a salaried employe of the entrepreneur to turn out plans for houses or apartments.
4. He may manufacture plans for sale to the operative builder.
5. The architect may act as the representative of the lending institution, either in checking and approving plans and specifications, or as inspector of construction, or both.

It is to be expected that the profession will be of service in all of these ways. The fact that large scale operations are to be encouraged means greater opportunity for the profession, for the large scale operator appreciates the value of architectural service to a far greater extent than the small speculative builder, and the architect's fees can be more readily absorbed in the large operation.

But the small operative builder will also be in the field, as he gives greater or lesser weight to the pros or cons listed above. It is in this smaller-project field (which may in the aggregate represent as much or more capital actually than the large) that the difficulties of insuring adequate architectural service are most troublesome. The small operator is most anxious to keep down costs by eliminating architectural services as far as possible. He prefers to buy plans at from $5 to $25 each, either from a plan book or from some struggling draftsman. It is hardly possible to require such builders to employ registered architects for houses costing under $5,000. How, then, can the architect serve the public by preventing the erection of poorly planned, poorly designed small houses? One solution seems to be offered by the example set by a group of architects in Memphis in co-operation with the Federal Home Loan Bank. They have proved to the lending institutions that they offer a necessary and superior service in connection with the production of small homes, and they have produced stock designs, and will produce others, which are available to any builder as *instruments of service*. Further architectural service is required in the use of these designs, such as the letting of contracts and a specified number of inspections during construction. The banks of Memphis, realizing the value of these services as a protection for their loans, are co-operating with the architects to the fullest extent. It behooves the architects of each and every community in the United States to make their plans now for doing their part in the housing program that must soon get under way.

Kenneth K. Stowell

EDITOR

(Overleaf) Photo: Dr. Paul Wolff from Black Star, Sea and Sand

TOWARD A LIVING ARCHITECTURE

BY DR. WALTER GROPIUS

1. ORNAMENT AND MODERN ARCHITECTURE

SO MANY people ask, "Why do modern architects use so little ornamentation?"—"Why were so many attempts at creating modern ornament doomed to failure?" History shows that genuine ornament originates only during harmonious periods of the human race, when man, following his natural impulse to play and to adorn his environments, seeks to shape the inward intentions of an *established* society rather than mere personal feelings. It shows that true ornament is the result of the unconscious work of a whole period of civilization, not of individuals; that it is the last organic refinement to its buildings and things—a creative expression, not a matter of taste. Is our time congenial and ripe for this performance? No. The present attitude towards ornament is very feeble and superficial. Unable to produce an ornament of today which would appeal to every one — unable because our social structure is still in a state of transformation—we satisfy ourselves with rehearsing again and again bygone forms and ornaments. More and more replacing genuine creative impulse by scholarship and taste, decorative charm borrowed from vanished periods has become the substitute for true ornament.

● Nothing illustrates the dilemma better than our passion for the oriental carpet used in our homes. It appeals to us aesthetically; we sense its creator's harmony, which *we,* ourselves, have lost, and we feel that he is closely related to its pattern; but this pattern, originating from a world which is foreign to us, holds no significance for us, not being in any way associated with our life. For the nomad, however, in his tent, this carpet narrated the history of his people and their religion in ornamental symbols deeply rooted in his soul; its ornament was an organic part of his civilization, of his life. He would deplore these poor barbarians of today who use the sacred fabric of his prayers by dozens, in halls and dining rooms, in an attempt to compensate their own paralyzed imaginations. Our creative power is gagged by the spirit of imitation, of substitute and aesthetic "ressentiment." The scholar and the art historian are standing in the limelight; the few creative artists stay in abeyance, unheard by the masses. Our houses are museums instead of places to live in. The blight of ornamentation has fallen on all our intimate surroundings.

● The human being, lost in the increasing chaos of mechanization, became timid and uncertain how to give expression to his inward intentions; his imagination became stunted. The *horror vacui* broke loose, filling any decent empty space on walls, floors, furniture, and lampshades, with unorganic emblems, symbols and ornaments, as supposed sedatives for the troubled soul. A revolution was due.

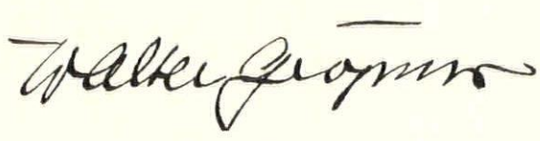
● Modern architecture represents the vital reaction to this chaotic confusion—a vigorous attempt to rid us of these hopeless narcotics and to find again a true expression which may mirror our very life of the machine age. The new vision in architecture presumes that man should be the focus; that he

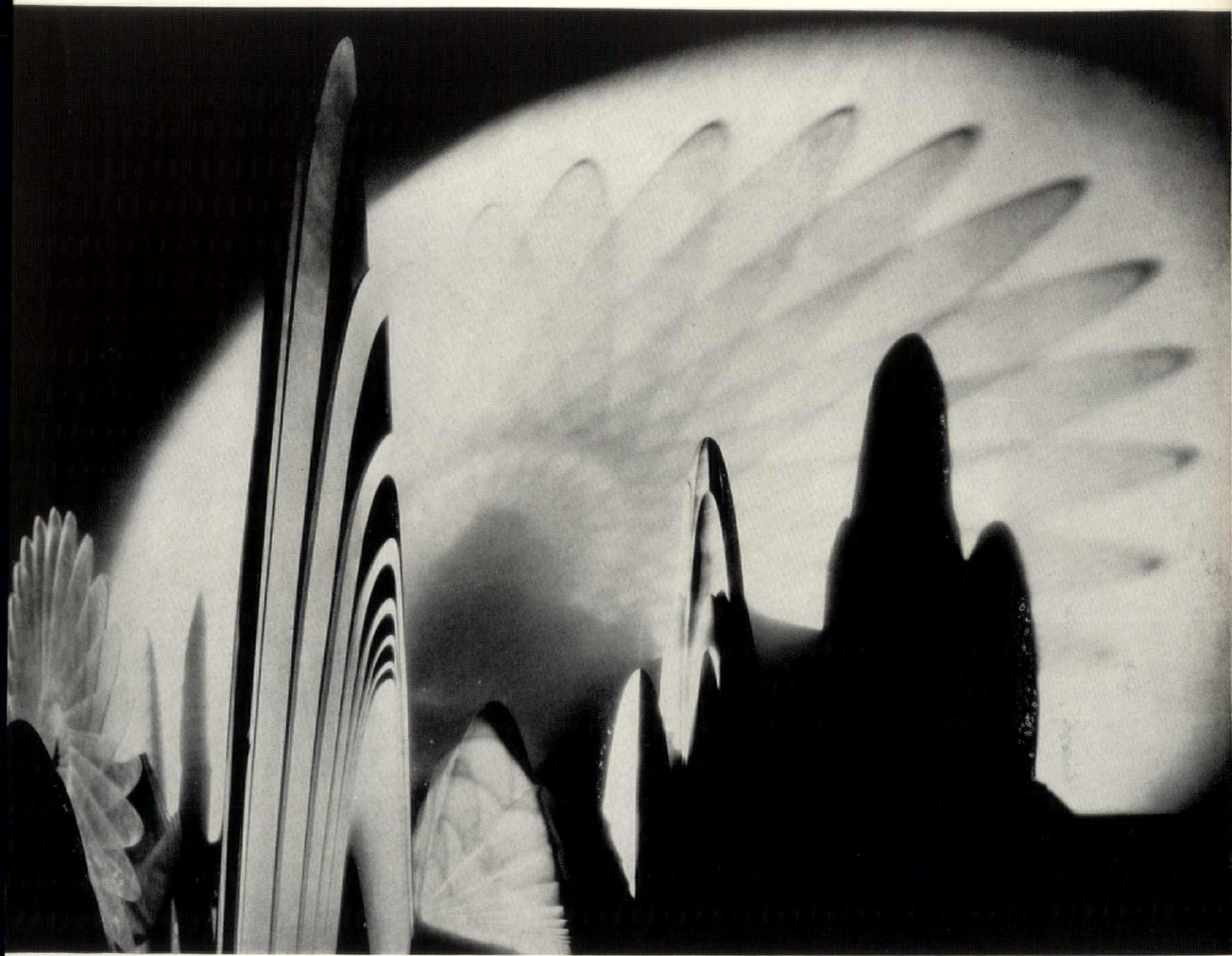
needs quietness and repose in the rush of our life, that his distracted nerves, so dangerously shattered by the intolerable noise of traffic and by the continuously changing scene of life, must be balanced by the harmony of his dwelling. Quieting surroundings, simplicity, and harmony of forms and colors, instead of a superabundance of bygone or meaningless forms and ornaments, prepare for his "creative pause." They will fit him to relax, to contemplate, to think precisely, and to produce new ideas. Our rhythm of life and our mentality differ entirely from those of a Rococo or Georgian period and this new environment should be the very medium of expression for the creative artist. His power of imagination, his vitality, have been absorbed so far by the creative effort towards a new understanding of space, by his research into the integral elements of our new conception of design, and by the struggle of coming to terms with the machine. This revitalizing process, corresponding to the shift towards a new social structure, must be settled before the refinement of the new form and of a new ornament of our own can originate. This ornament does not yet exist. Individual attempts at a modern ornamentation passed by quickly, as they were only transitory fashions—not the result of a common social ideal within the community as a whole. The present "streamline" fashion, for instance—a thoughtless misuse of true dynamic forms of speedy bodies for bodies which are static, such as furniture and the like—will be doomed to failure, of course, just as were all the other fashions.

● But the first symptoms of refinement in modern architecture are becoming apparent. A true modern architect—that is to say, an architect who tries to shape our new conception of life, who refuses to live by repeating the forms and ornaments of our ancestors—is constantly on the lookout for new means of enriching his design in order to enliven the starkness and rigor of the early examples of the architectonic revolution. His increasing ability to introduce refined industrial processes of surface treatment into his compositions, by emphasizing the contrast of their component parts with different materials and different textures, indicates the probable direction of further development towards ornamentation. The great variety of industrial textures—ribbed, corrugated, punched, spotted or mottled, derived from their manufacturing processes—offers new elements for an artist's ornamental composition. By contrasting them with other surface finishes, mat or polished, dark or light, rough or smooth, his imagination will find an innumerable wealth of combinations which one day may far surmount the ornamental glamour of old times. Our confused minds will become proud and confident at last in the knowledge that we have at our disposal such brilliant new means for shaping the image of our modern life.

● Meanwhile, we have another healthy way in which to overcome our bastard civilization of borrowed ornaments. If traditional form becomes hollow and insignificant, man must turn back to nature; his source of eternal renewal. Closer contact with nature will render us more productive. The forms of nature are never dull, can never offend as man's work may do. So the modern architect has started to open up our towns by letting nature reconquer the stony desert of our living places. He is beginning to realize that, by blending architecture and vegetation, a truer way of enriching our surroundings may be found than by any ever so skillful application of so-called traditional ornaments. Growing trees and plants ingeniously interwoven on and between buildings, with vistas opened and shut out, enhance the mutual effect of plants and buildings. The shadows of trees, shrubs, and flowers, in sunlight or in artificial light on exterior or interior walls, purposely combined with the various textures and materials of their surfaces, present to us a beautiful screen of patterns which impregnates our imagination with ever-changing vivid impressions.

● We feel bored, at last, by the eternal masquerade of classical decoration. A constructive period has started to conquer a decorative past. Instead of wearing again and again that self-deceiving garment of former periods—that phantom of tradition—let's face the future. *Forward* to tradition! The ornament is dead! Long live the ornament!



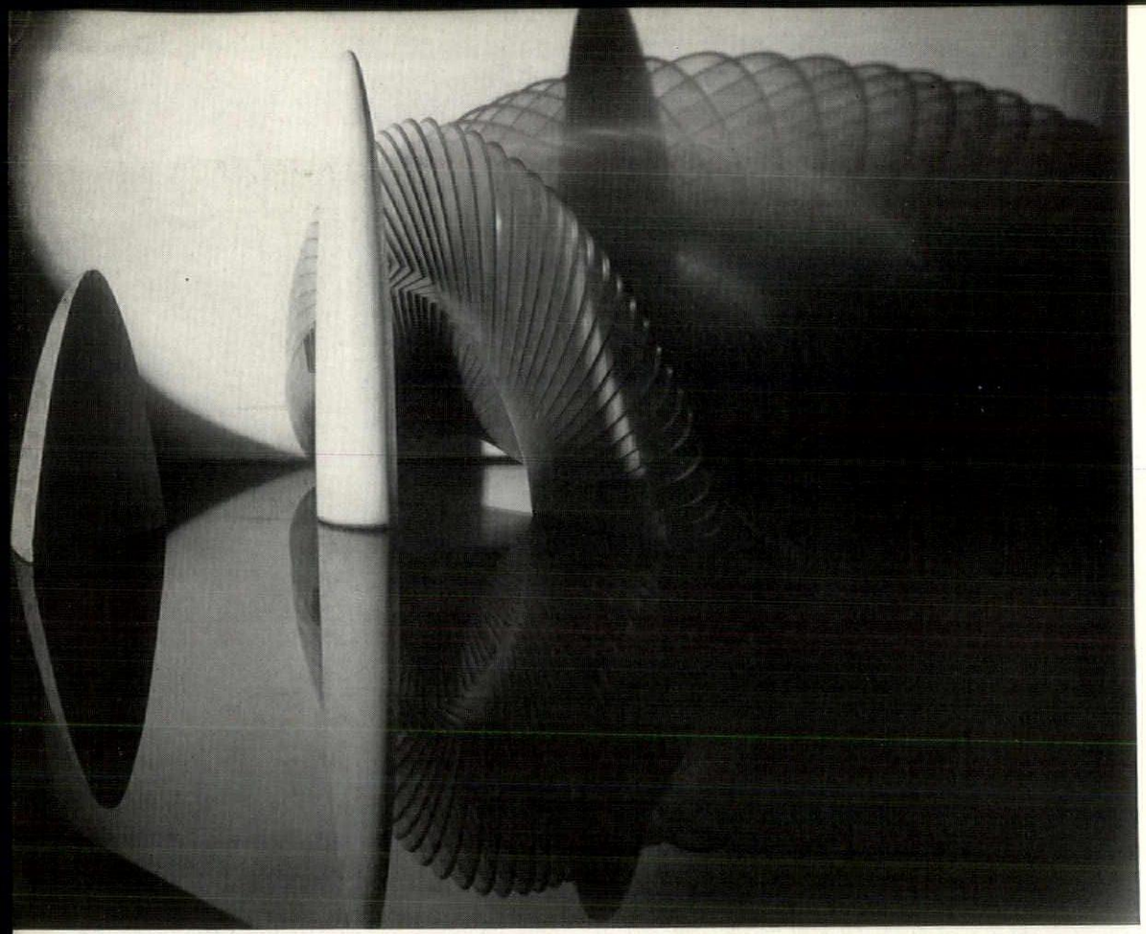


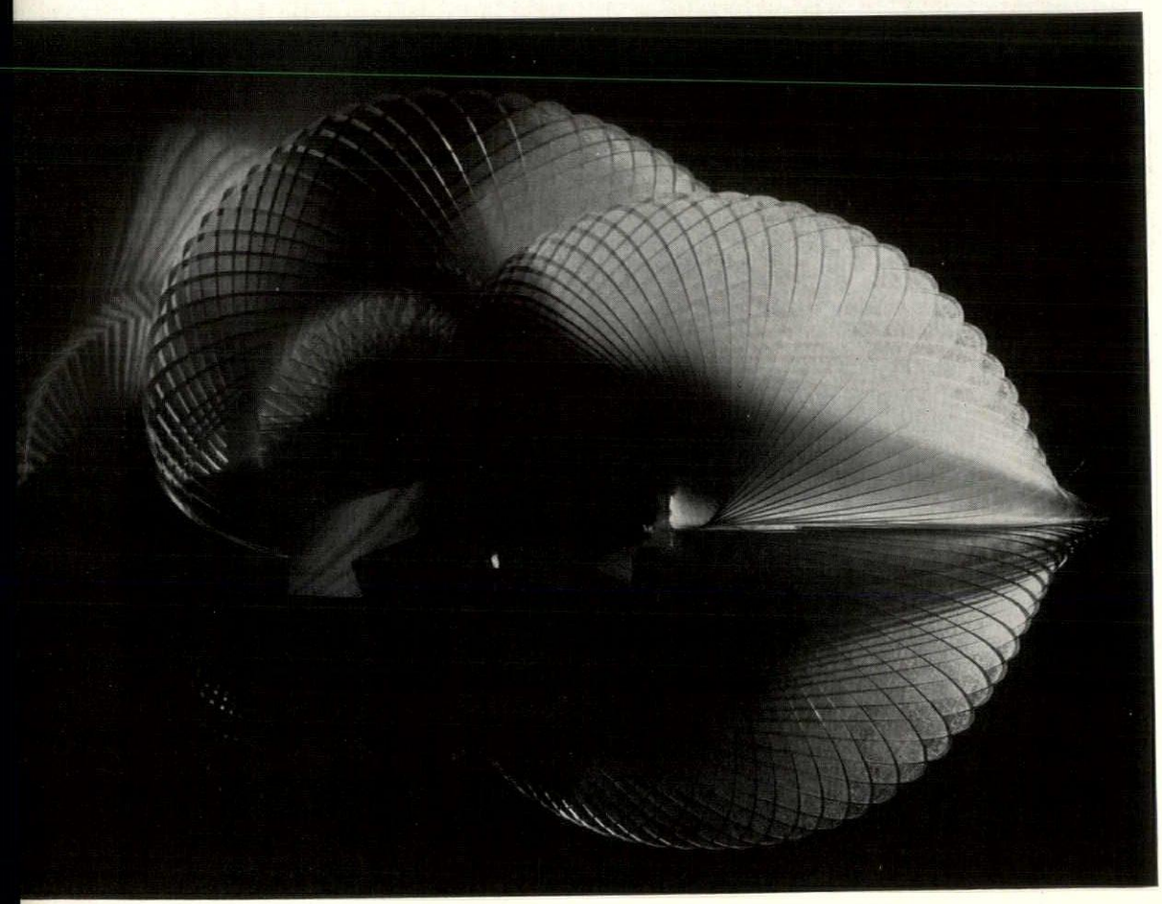
PHOTOS: TED NEMETH

PARABOLA—A STUDY IN LIGHT AND FORM

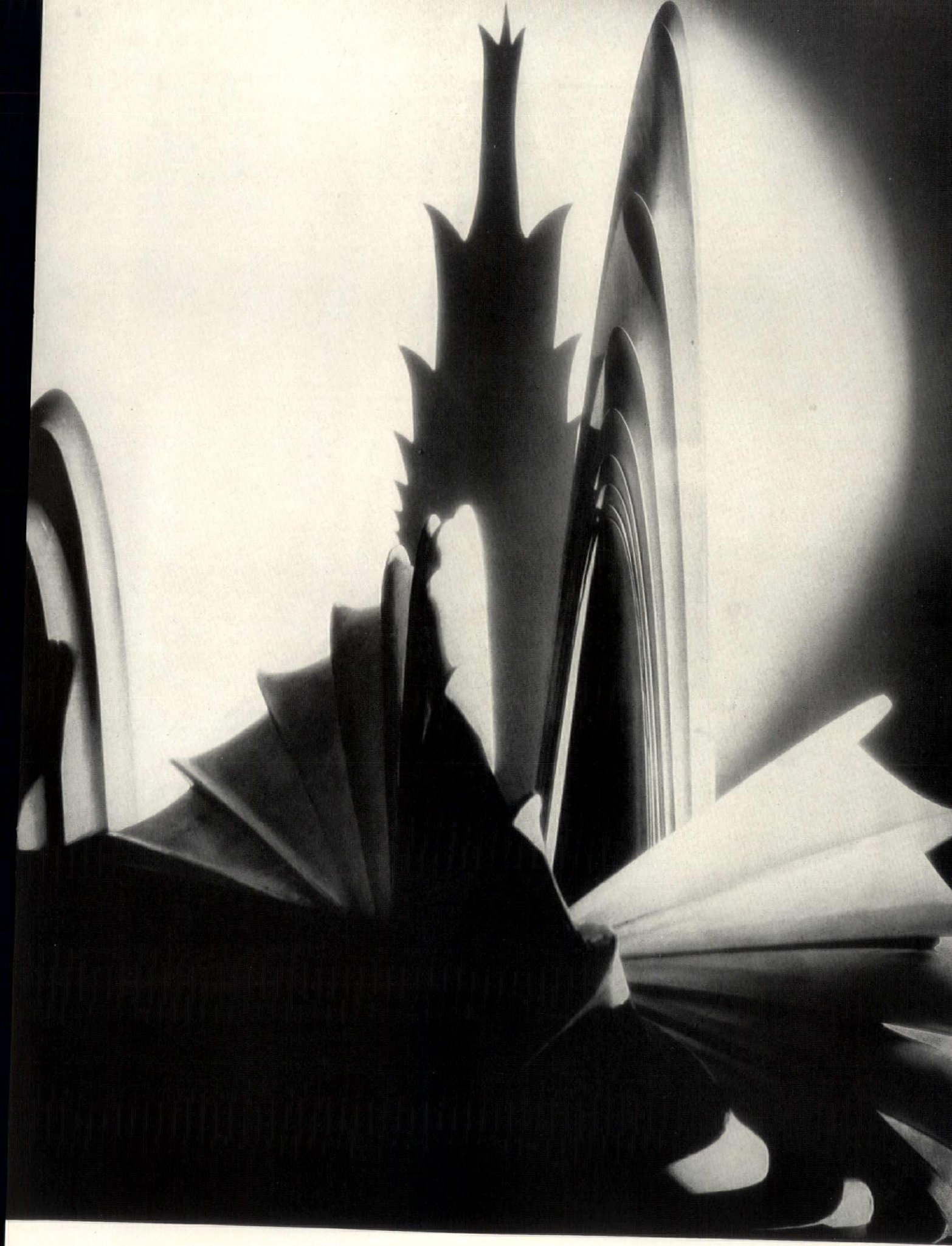
By RUTHERFORD BOYD

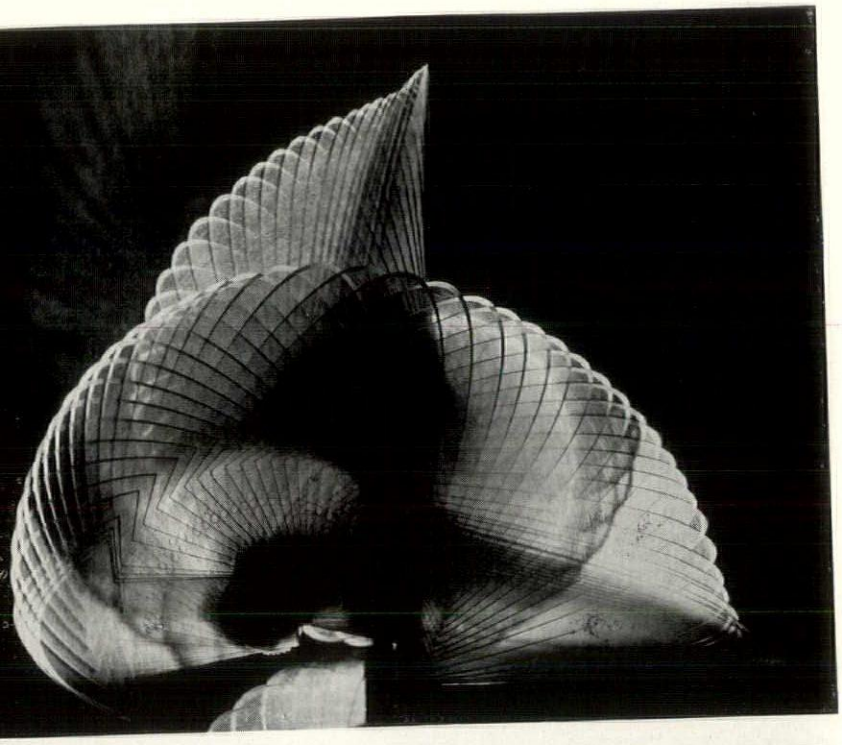
Today, beyond pleasure and profit, we have in the cinema not a new gadget, but a great instrument for use in science and the arts. In the new film, called "Parabola," that unique conic curve is the source of all its visual unity and variety of form. It demonstrates something of the power for education inherent in the cinema and will stimulate architect and designer with its vision of this single abstract form, the parabola, dominating and controlling a new visual experience synchronized to the sound patter of the music

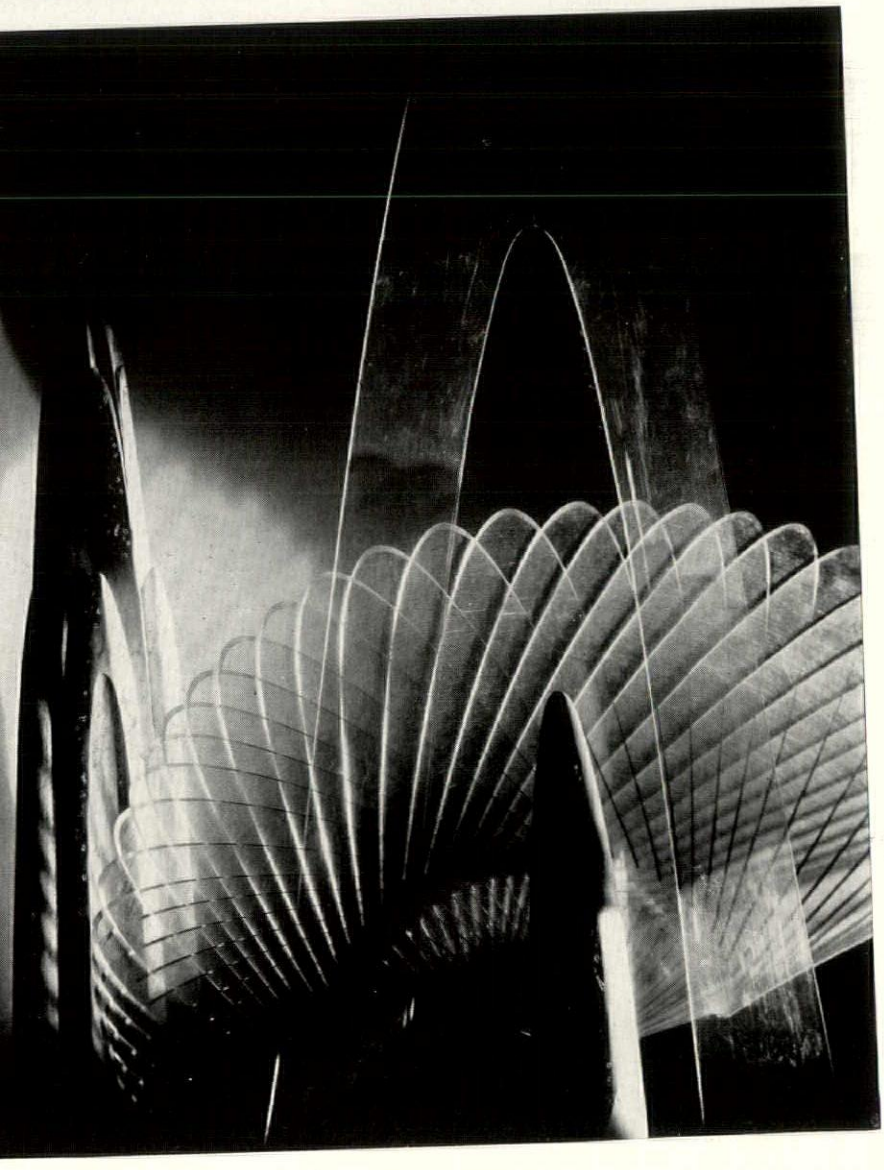




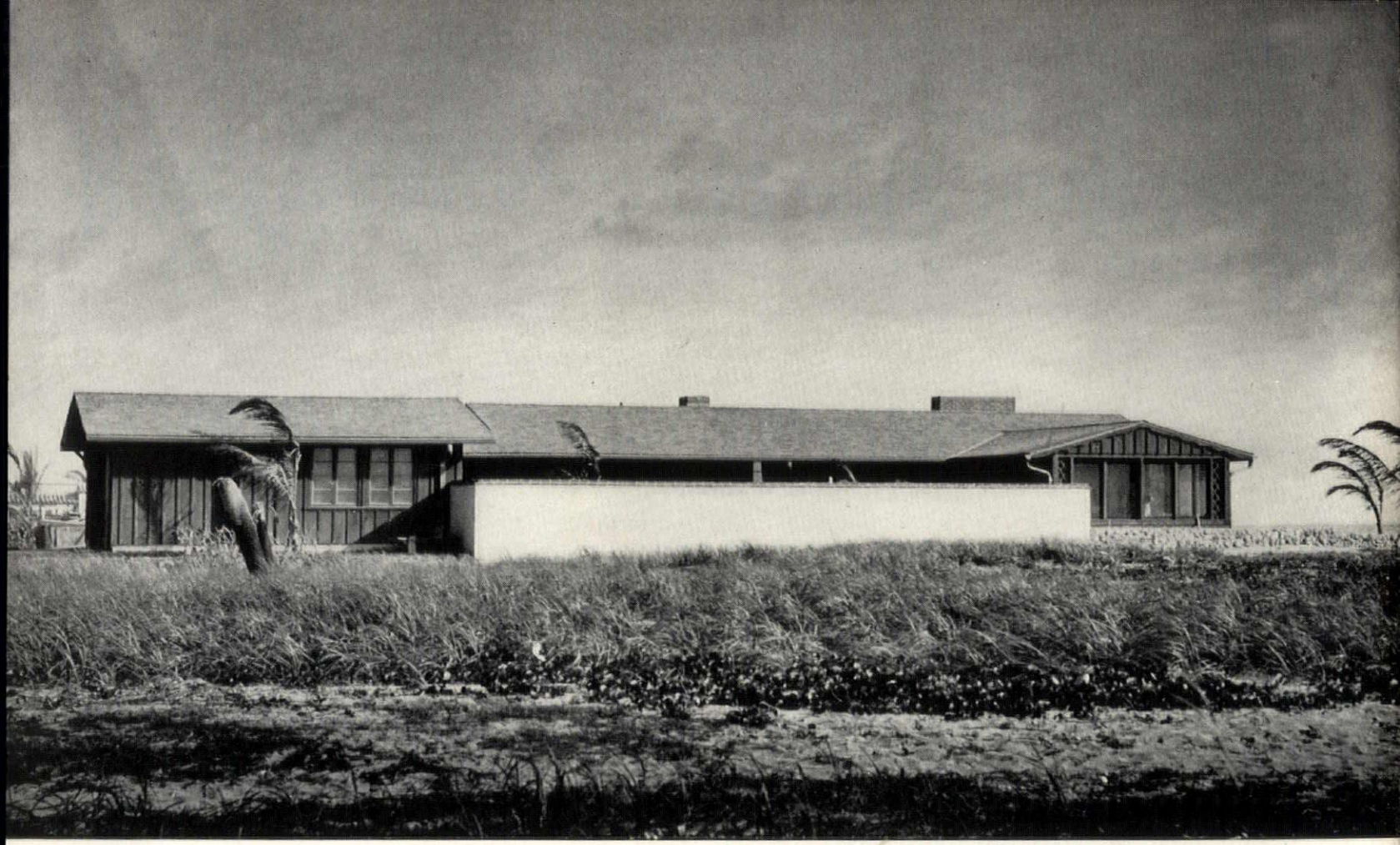
On black glass (left) are reflected two cones, each composed of over sixty laminations arranged parallel to the slope, hence each section is a parabola. As all edges are part of the curved conical surface, they project and reflect scintillating lights. These parabolas are pivoted so that the cone can be developed in great variety. (Above) Two parabolic designs carved in plaster, one with an elliptical base; note the parabolic contour of spotlight and shadow patterns. On facing page, the tower carved in limewood has profile of semi-parabolas in proportional intervals. The foreground form, carved in plaster, is created by moving a single curve through twenty-four equal spaces, its base chord serves as the diameter of a central vertical circle. All the surface modulations are parabolic in their main contours and thus give a rhythmic fluency to each individual design





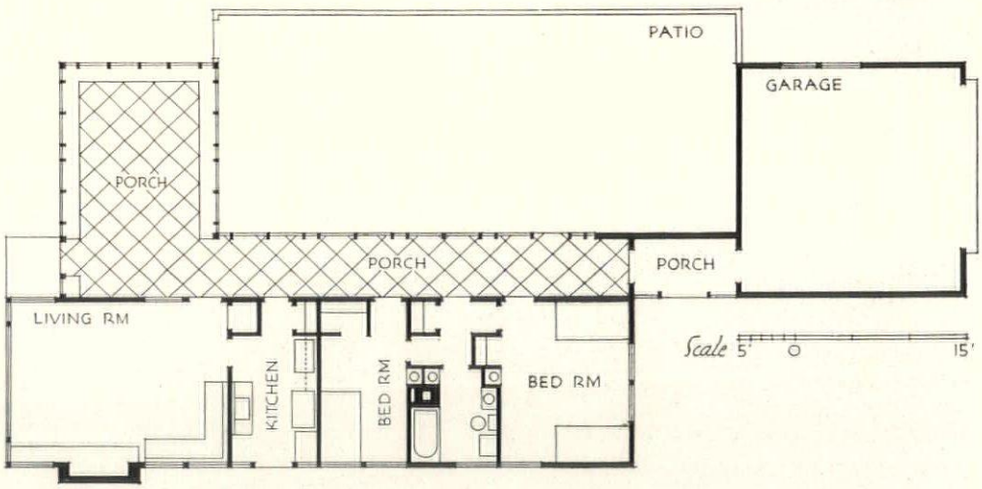


Above are two laminated cones in another sequence, moving on black glass with wing-like reflections beyond. Below, a large arch of two parabolas spans a widespread conical fan; on the left, carved in avodire, is a form of pentagonal parts set in elliptical niches cut in the main shaft. The cover shows seven parabolic tridimensional themes, two carved in ebony. Of course these "stills" can not convey the continuity of movement and light as a whole. All the forms were conceived and executed by Rutherford Boyd, director of the abstract film, "Parabola"; produced by Expanding Cinema (Mary E. Bute and Ted Nemeth) with music by the contemporary composer, Darius Milhaud. The picture is nine minutes in screening time

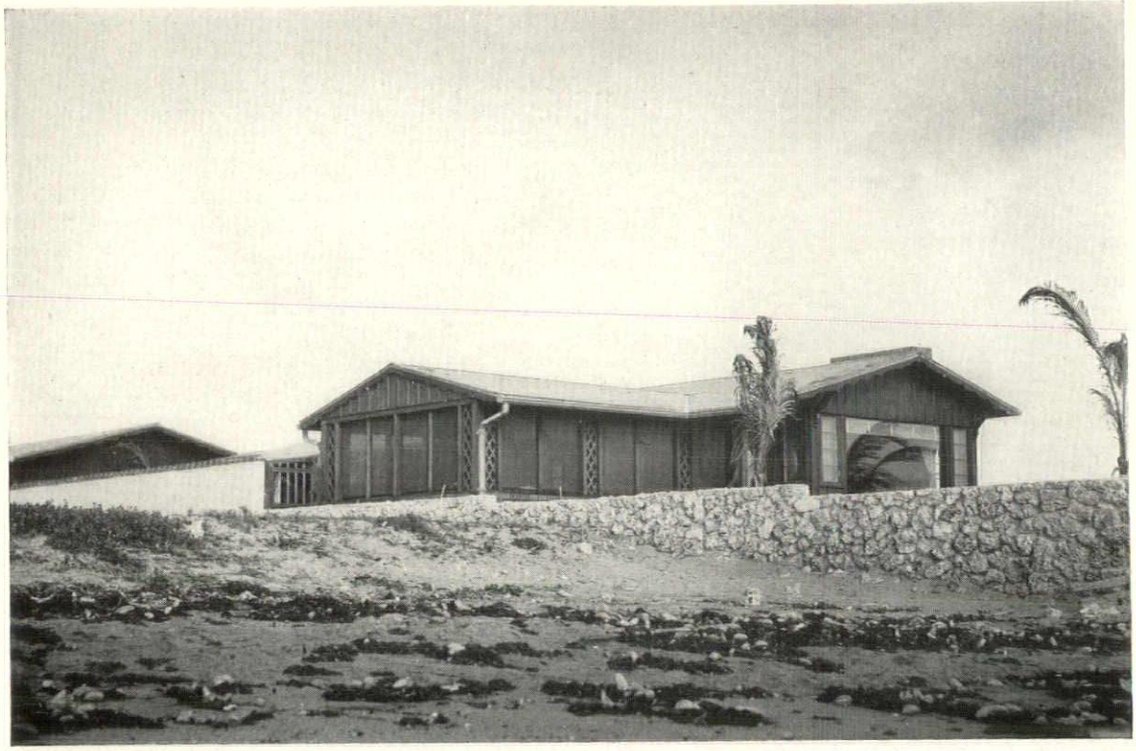


HOUSE FOR E. ROYCE ARMSTRONG, MIAMI BEACH, FLORIDA

PERKINS, WHEELER AND WILL, ARCHITECTS



• During the past few years there has evolved a new architecture, notably in California and Florida, that refutes pertinent arguments that very little stylistically modern domestic work in this country has anything to do with either American standards of taste or native building traditions. This vacation house is a fine example of the new *metier*. A one-story building, its horizontal elements are stressed so as to tie it in to its ocean front location. Although designed for a semi-tropical setting, it could well serve as a master pattern for houses on a large level site in almost any section of the country



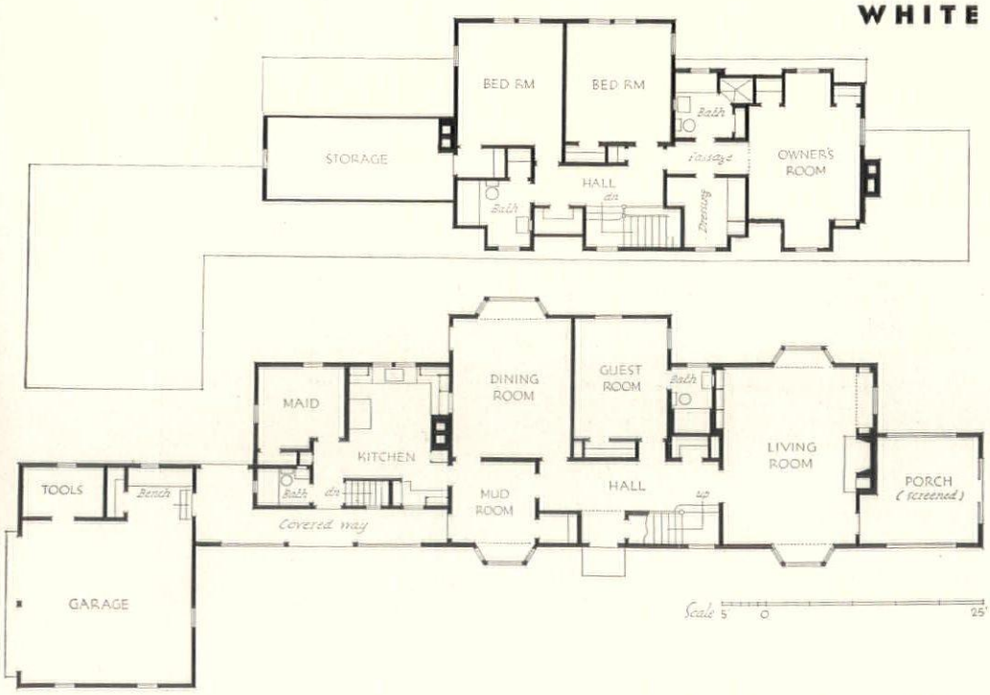
Constructed entirely of wood with 2x6″ stud frame with diagonal sheathing, it has cypress siding on both exterior and interior walls. In the interior the cypress is stained and waxed. Foundations are of concrete and the flooring is of asphalt tile on concrete. Roofing is of asbestos shingles. Wood casement windows are used throughout. Rock wool is used for insulation and a large fireplace and electric reflector installations supply any necessary heating. Roof ends have shaped aprons

HOUSE FOR E. ROYCE ARMSTRONG • PERKINS, WHEELER AND WILL, ARCHITECTS

PHOTO: HEDRICH-BLESSING

HOUSE FOR ROBERT HILTON, BARRINGTON, ILLINOIS

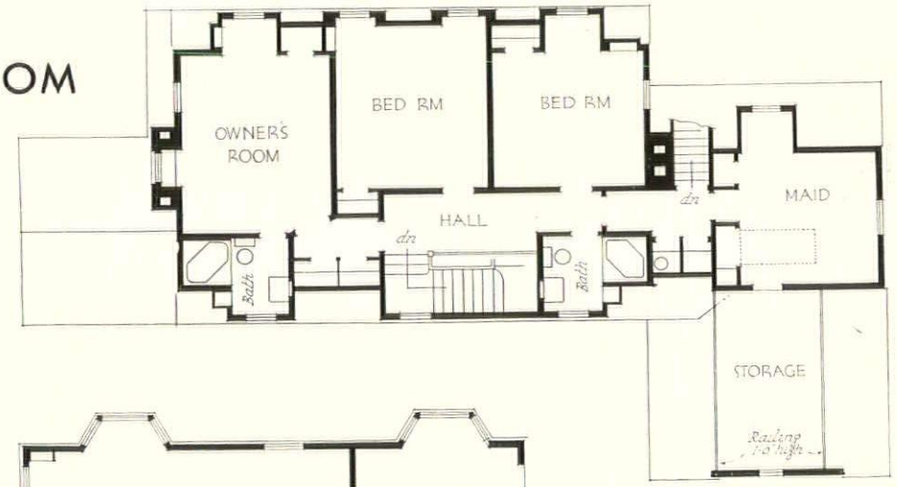
WHITE & WEBER, ARCHITECTS

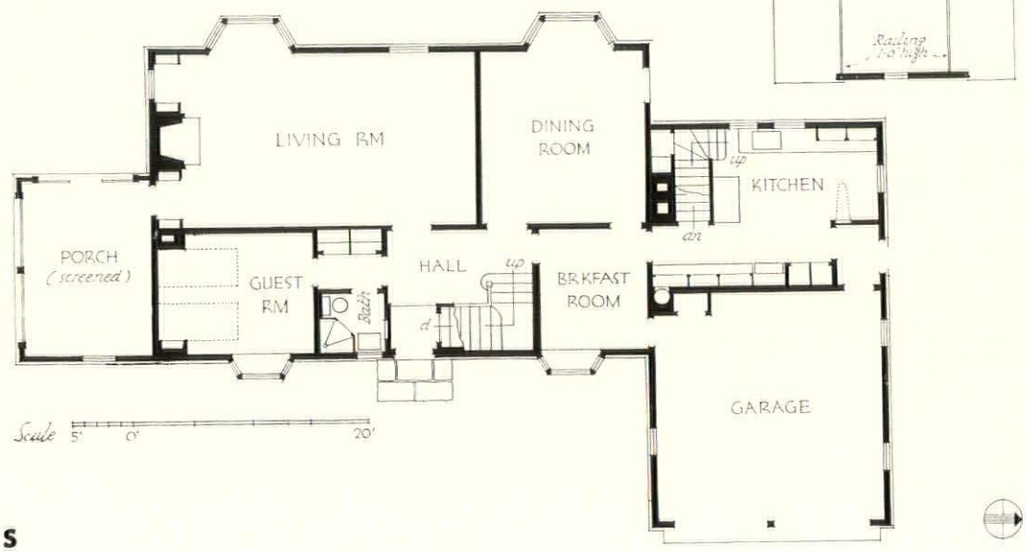


• In the main the design of this house does not deviate much from the accepted standard of what the moderately large country house should be, except that it is cleaner in treatment than most. Of standard frame construction on a concrete foundation, it is finished with white Creo-Dipt 18″ singles 7″ to weather. Interior partitions are 2x4 studs, ⅜″ Rocklath and ½″ plaster. Red oak flooring is used throughout. Double hung windows are of wood. 16″ wood shingles 5″ to weather are used for roofing. Insulation is rock wool. An unusual feature of the plan is the mud room for a family that is interested in gardening and outdoor pursuits

PHOTO: HEDRICH-BLESSING

HOUSE FOR R. C. OSTERSTROM
WILMETTE, ILLINOIS





It is self evident that the formality of traditional design is not always in harmony with the requirements of modern planning. It seems a pity that the architects were forced, by the prejudices of a suburban community, to use such anomalies as curtained windows in the garage, on the garage doors and on one wall of a porch. Aside from this the house is beautifully organized in plan and design. It is of standard frame construction on a concrete foundation. Slate roofing and Balsam wool insulation are used

WHITE & WEBER, ARCHITECTS

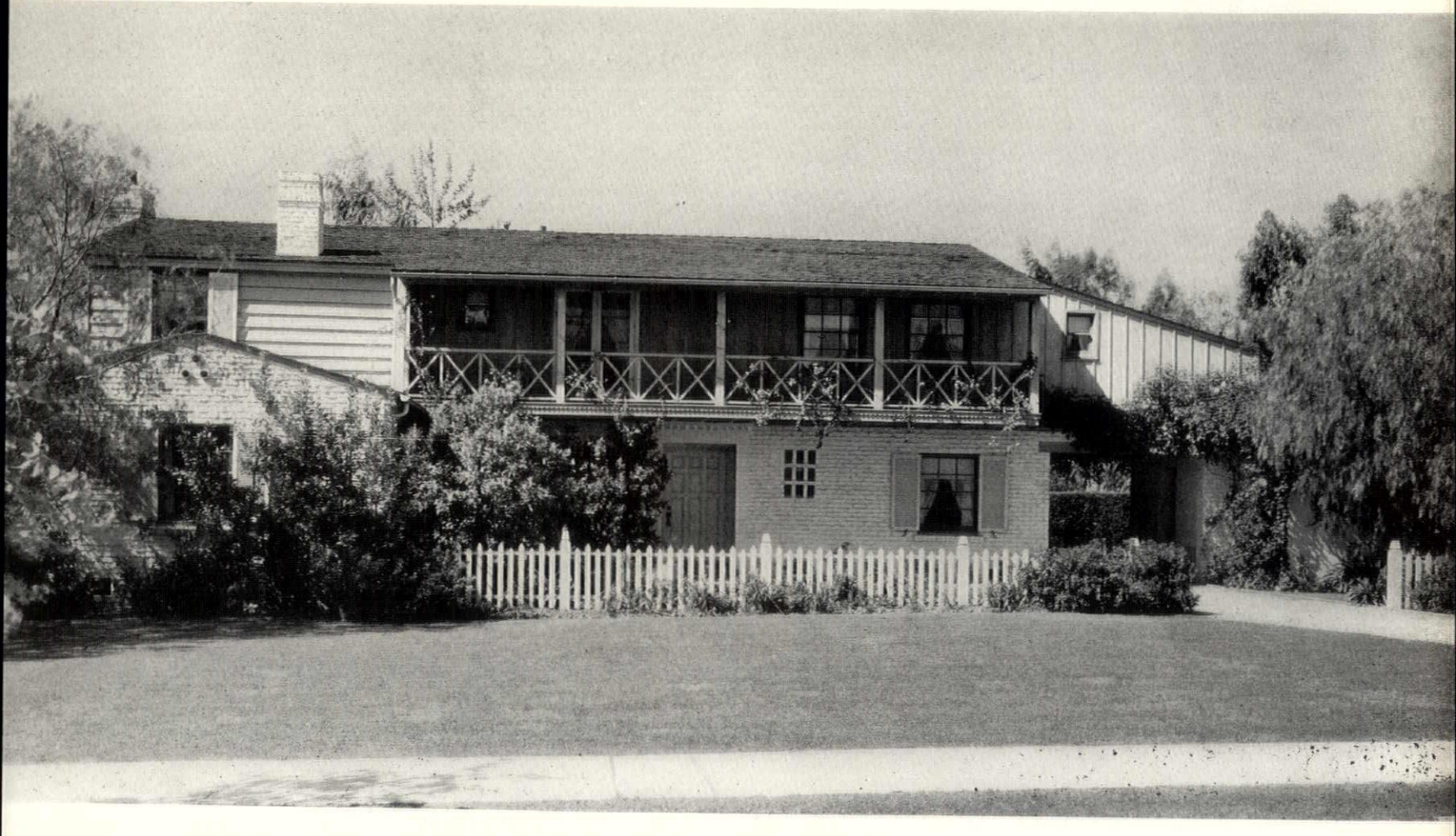
HOUSE FOR ALAN W. BURTON
WEST LOS ANGELES, CALIFORNIA

CHARLES O. MATCHAM, ARCHITECT

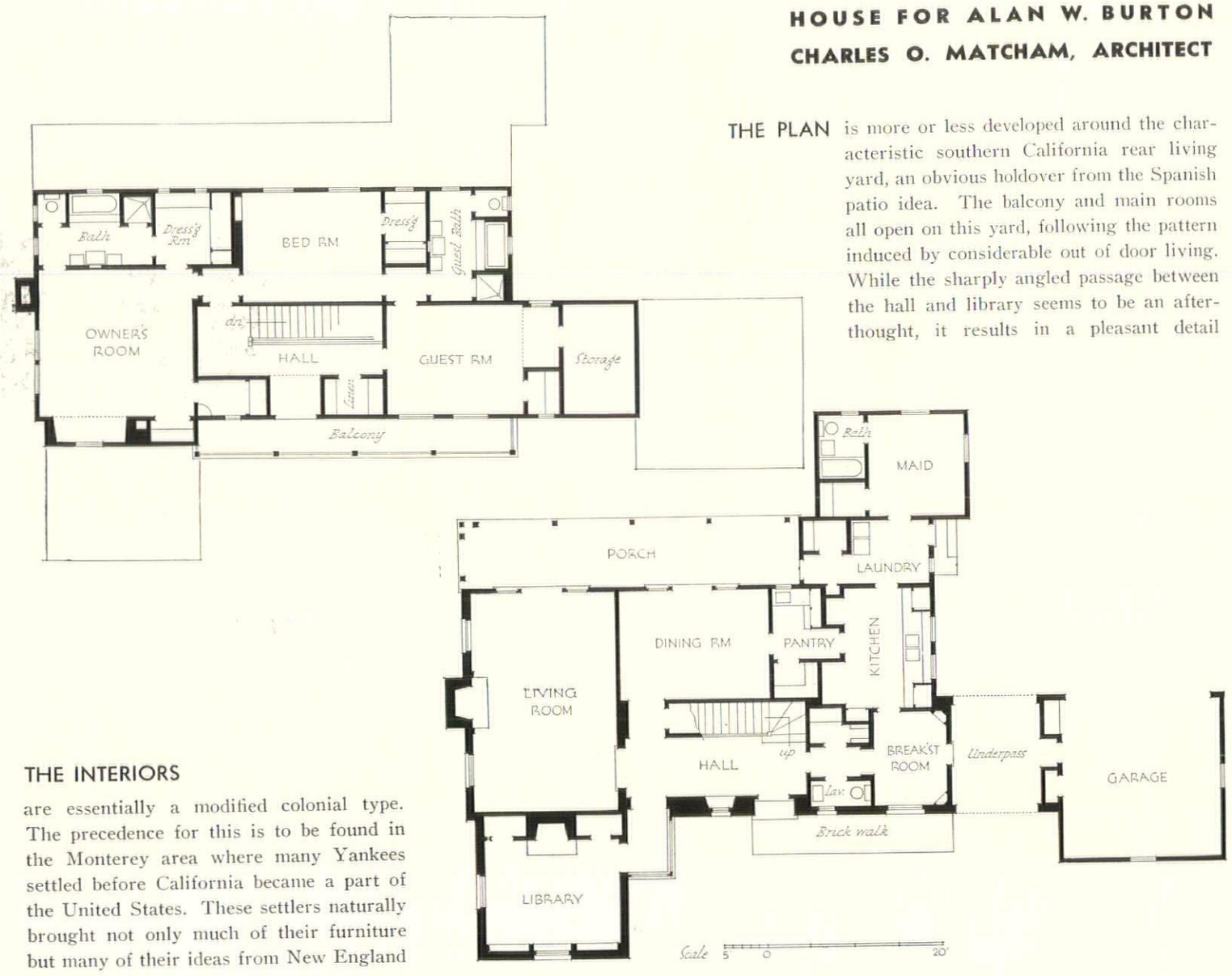
OFFICE OF EARL HEITSCHMIDT,
CHARLES O. MATCHAM, PAUL O. DAVIS

PHOTOS: MOTT STUDIOS

• Each section of the country has some-one pet architectural style that is looked upon as traditional. In the Los Angeles section, for instance, we find the nineteenth century ranch house adapted to "town house" needs. The result is usually very pleasant, texturally interesting and replete with that intangible quality known as charm. Of standard frame construction, the first floor on the street front is of whitewashed brick veneer. The second floor exterior is a combination of ship lap siding and vertical siding with battens. The picket fence, leanto roof of the garage and simply designed porch railing contribute a special graciousness



HOUSE FOR ALAN W. BURTON
CHARLES O. MATCHAM, ARCHITECT



THE PLAN is more or less developed around the characteristic southern California rear living yard, an obvious holdover from the Spanish patio idea. The balcony and main rooms all open on this yard, following the pattern induced by considerable out of door living. While the sharply angled passage between the hall and library seems to be an afterthought, it results in a pleasant detail

THE INTERIORS

are essentially a modified colonial type. The precedence for this is to be found in the Monterey area where many Yankees settled before California became a part of the United States. These settlers naturally brought not only much of their furniture but many of their ideas from New England

THE NEW ARCHITECTURE IN PALESTINE

MATERIAL ASSEMBLED BY JOSHUA HUBERLAND, ARCHITECT

PHOTO: I. KALTER

1 — (See plot plan, following page)

WORKERS' CO-OPERATIVE FLATS, TEL AVIV
J. NEUFELD, K. RUBIN, A. SHARON, I. DICKER, ARCHITECTS

• The modern Jewish settlements in Palestine began their existence in the eighties of the past century. These settlements, mostly agricultural, were started in all parts of the country and land acquisition stretched as far afield as the Houran, in what is now French Syria.

• Development was slow for a number of years until it was entirely stopped with the outbreak of the World War. Political and diplomatic efforts which followed resulted in the issue of the Balfour Declaration by the British War Cabinet on November 2, 1917, proclaiming the Jewish rights in Palestine and the intention of establishing there a Jewish National Home.

• At the end of the war there were some 60,000 Jews in Palestine, but the adverse economic, political and social positions of Jews in the Diaspora and the encouragement derived from the establishment of British rule during the past seventeen years increased the Jewish population to about 450,000.

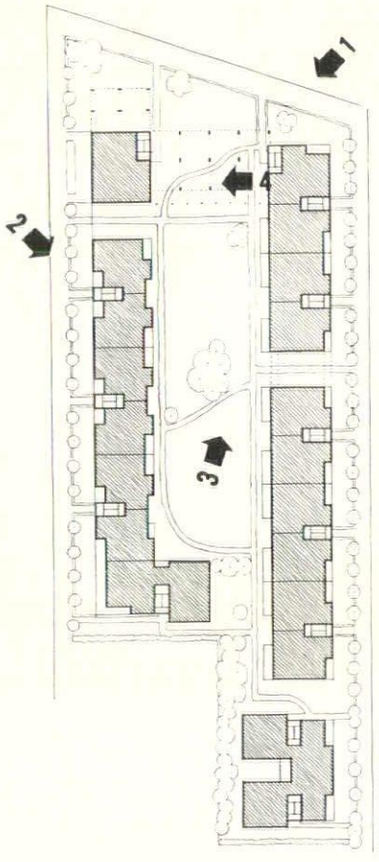
• In general, the climate of Palestine is Mediterranean, similar to that of Spain and Italy; but snow sometimes falls in the Jerusalem District in winter, and summer nights are usually cool in the hill country; the Jordan Valley is subtropical all year.

• The architecture in Palestine has for many years been Arab in character. But the Jewish settlers coming from various European countries have brought with them a different standard of living, as a result of which a new architecture has been established in this ancient land. This new architecture is mostly modern European in character and has not yet been adapted to meet local climatic and other conditions. The European architect coming to practice in Palestine is immediately confronted with special problems of ventilation, fenestration, construction and use of materials, in addition to a lack of competent labor. The new buildings in Palestine must therefore be considered as the first step in the development of a truly national architecture.

2

PHOTOS: I. KALTER

One of the most recently completed projects, this block of flats is the result of one of the many workers' housing co-operatives working in close association with a group of architects. The site plan follows the usual orientation of apartments facing east and west in order to take advantage of the prevailing winds



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WORKERS' CO-OPERATIVE FLATS, TEL AVIV

J. NEUFELD, K. RUBIN, A. SHARON, I. DICKER, ARCHITECTS

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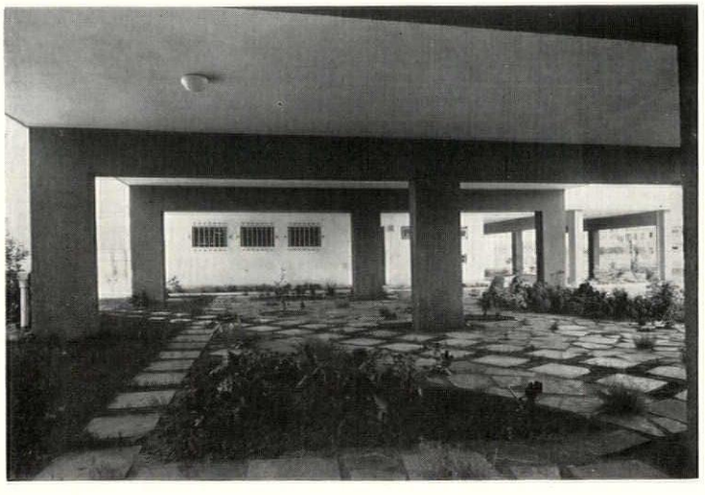


PHOTOS: I. KALTER

1

2

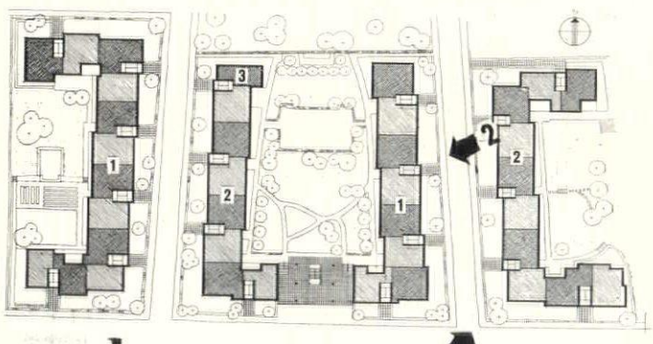
WORKERS' CO-OPERATIVE FLATS, TEL AVIV
A. SHARON, ARCHITECT

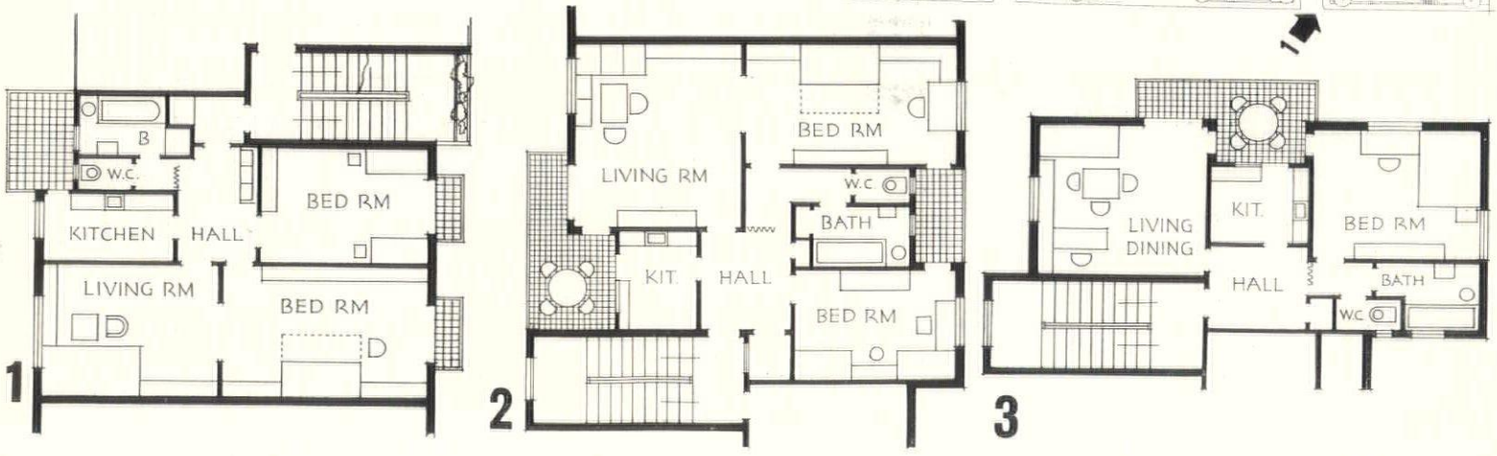
As the result of an analysis of hygienic and climatic factors by the workers' housing co-operatives, the following standards were arrived at and incorporated in the dwellings:

1. No block should be more than two rooms deep, permitting east-west cross-ventilation. Diagonal ventilation from north or south is highly desirable.

2. The importance of the terrace, particularly to the west, as an outdoor living room cannot be exaggerated. Local conditions favor a kitchen, which is part of the living accommodation and may be differentiated into kitchenette and dining recess. The flat should contain a large living room, kitchen and terrace to the west, bedrooms and sanitary offices to the east.

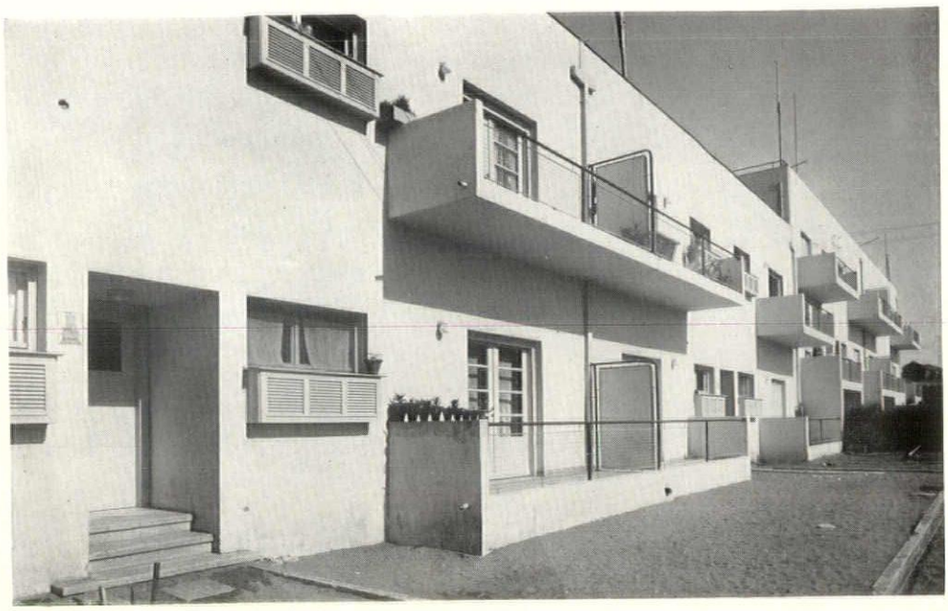
An inspection of the detail plans below shows the marked degree of success achieved by the architect in applying these requirements.





WORKERS' DWELLING HOUSES, RAMAT GAN

J. NEUFELD AND I. DICKER, ARCHITECTS



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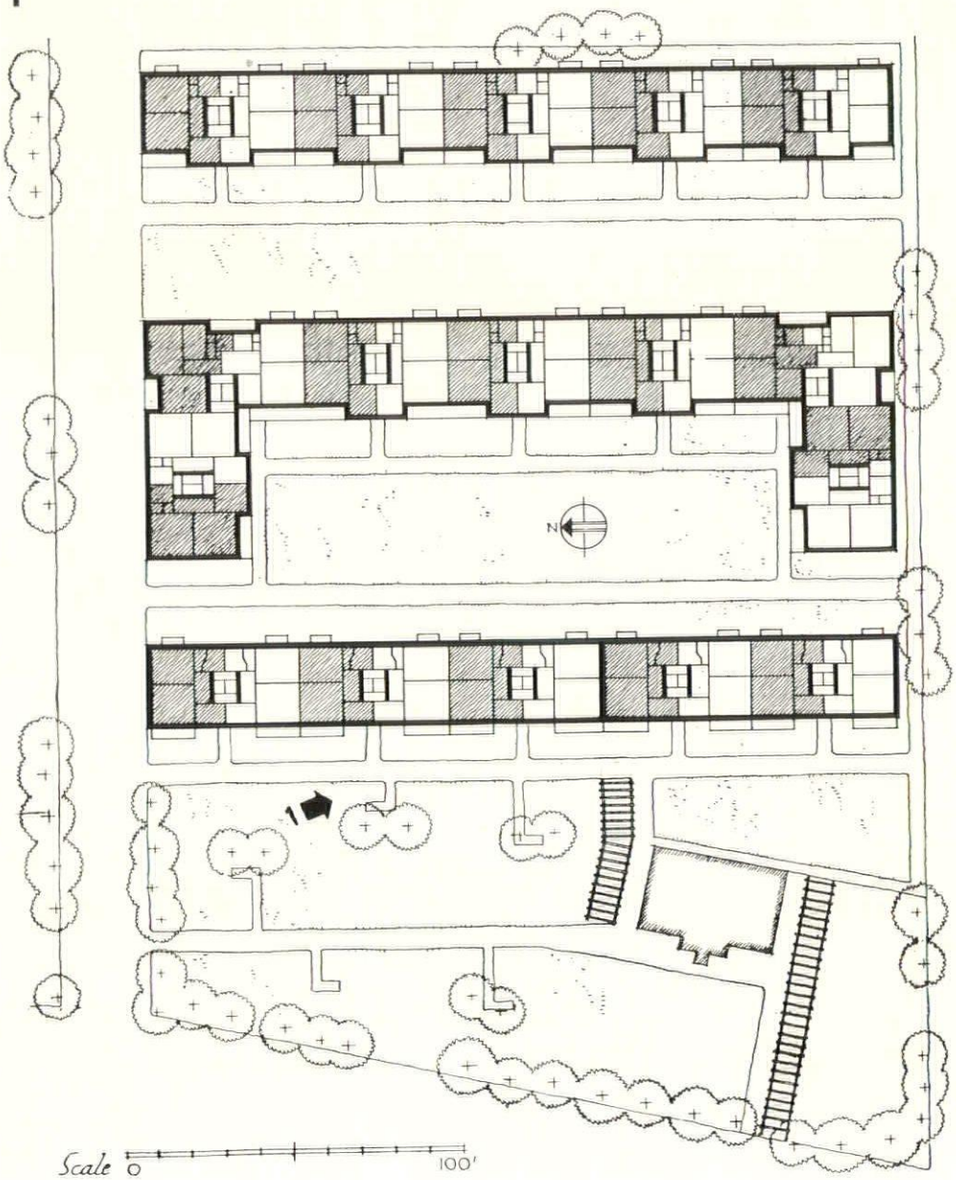
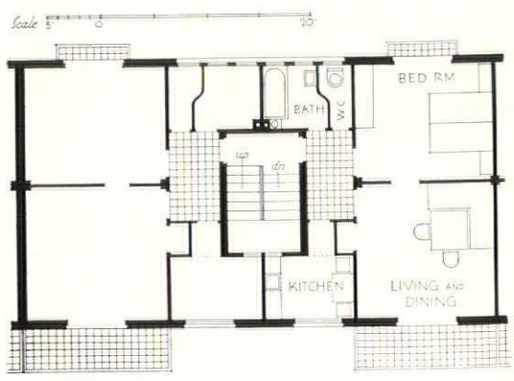
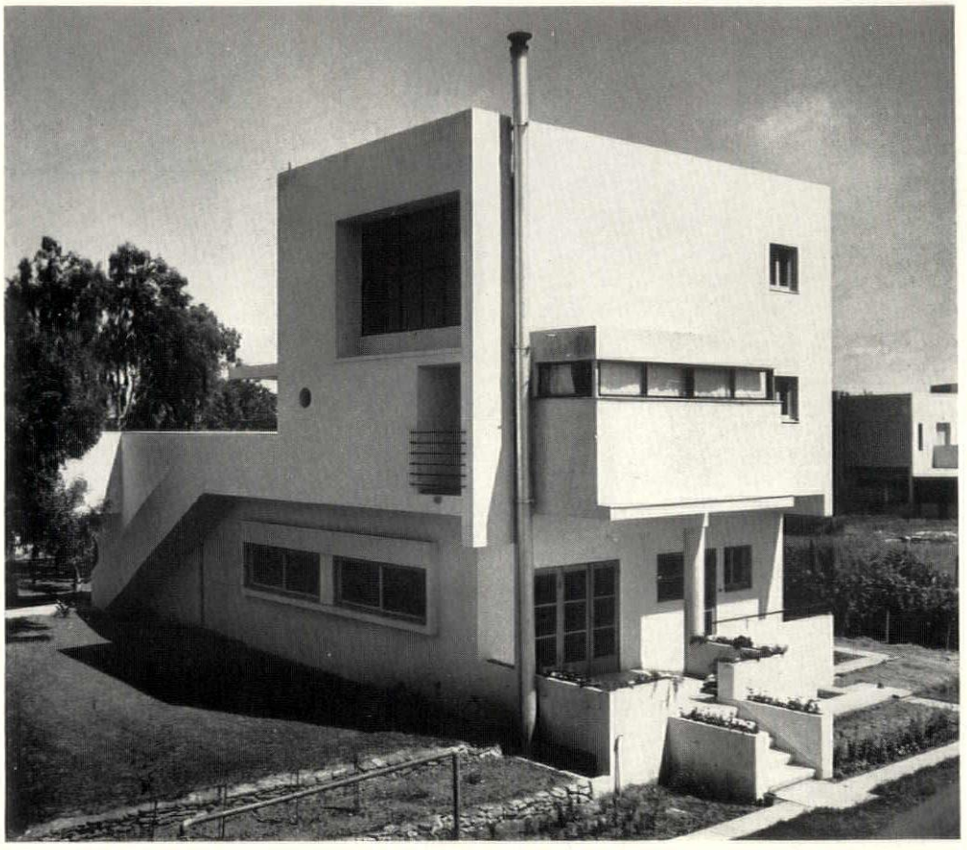


These minimal dwellings reflect very clearly their European antecedents, both the work by Dutch Architect Oud at Kiefhok and the low-cost housing erected at the Stuttgart Exposition in 1927. The site plan has the usual amenities of approximately 40% coverage, and east-west orientation. Due to strictest economy, balconies in this case do not project partly within the main confines of the dwellings, but extend their entire depth beyond the exterior wall. Stairs are completely enclosed, receiving secondary light from the kitchens and from overhead. Construction is of concrete





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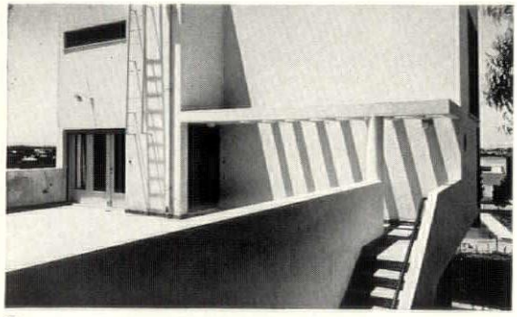

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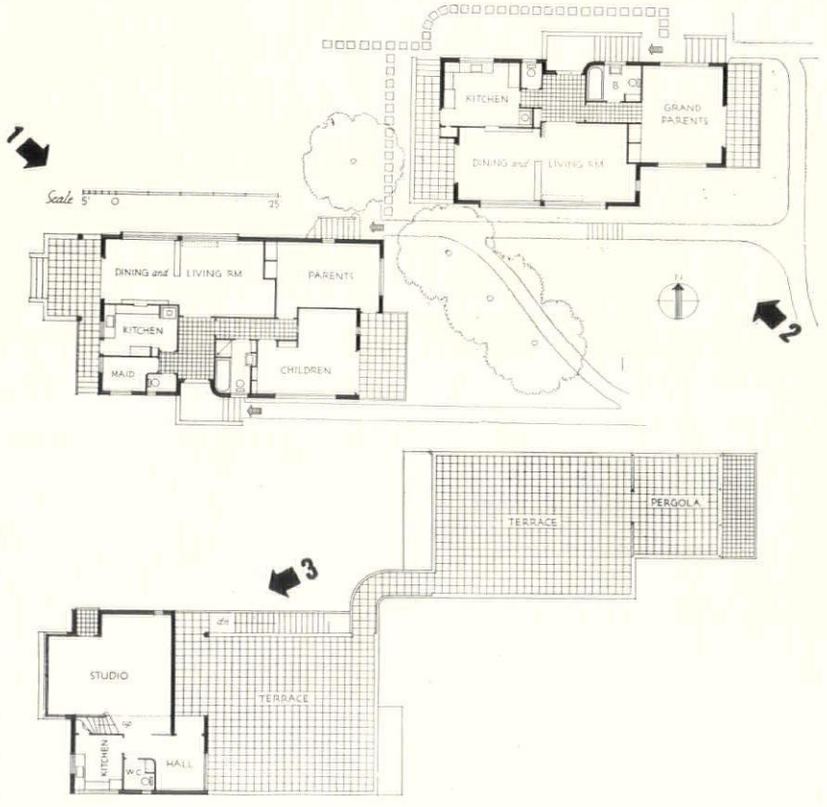
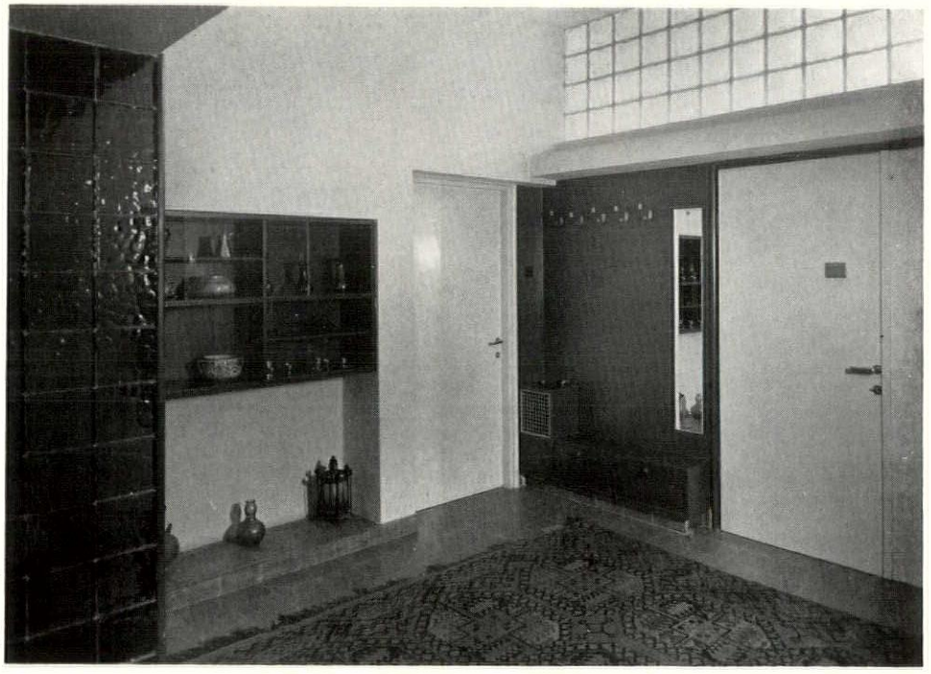


VILLA IN TEL BENJAMIN
SAM BARKAI, ARCHITECT

A rather unusual problem of unifying two detached one-story houses is successfully solved by means of a continuous roof terrace between them. On one of the houses there is a large studio penthouse with separate amenities and outside stairway. In general, the building follows the rather stark unbeautiful Russian interpretation of Corbusier precepts in which fenestration is exceedingly free and mechanical devices are frankly accepted as part of the design. The plan, as in most new domestic work, is candidly Germanic.

1

A large central hall clearly divides the living elements of this house. Again essentially a German type plan, the bedrooms are all off the east because of the prevailing east wind during the night. During the day the wind is from the west and logically the living-dining room is on that side. Built of brick with a plaster finish, the foundation is concrete. The typical pergola on the roof is also of concrete. Roofing finish is of tile since it is used as a dance floor. It is also interesting to note that a house in this climate has an oil-burning central heating system.



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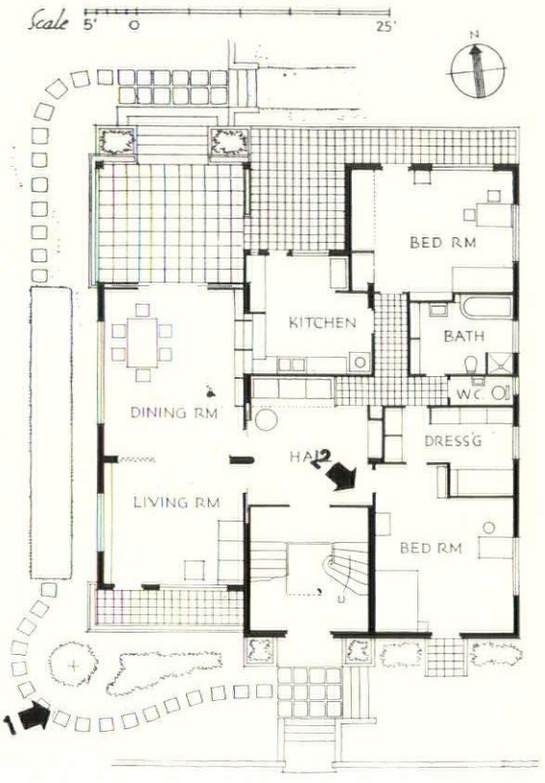


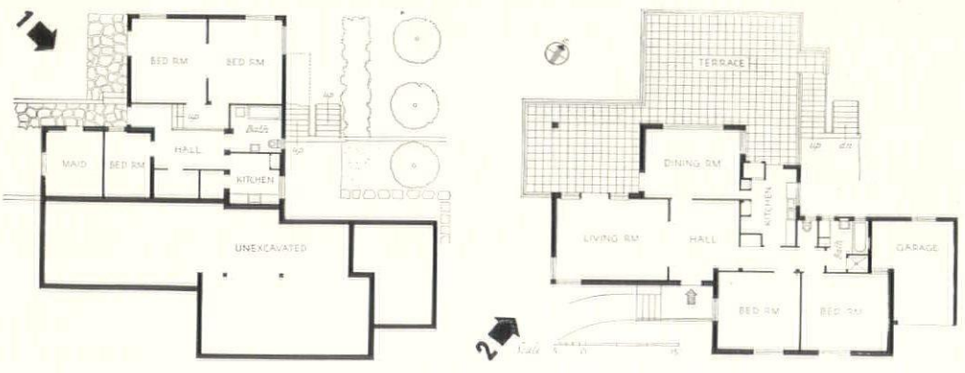
VILLA IN TEL AVIV, SAM BARKAI, ARCHITECT

1

2

VILLA IN TEL AVIV, N. SALKIND, ARCHITECT

Built upon a small sloping lot this house was designed so that each floor is a self-contained apartment connected only by outside stairways. The plan, obviously inspired by modern French precedent, is unusually adaptable to American needs. The studied handling of large plain surfaces with free, deeply revealed fenestration is reminiscent of much contemporary architecture in French and Italian colonies in North Africa. The heavy treatment of the square column and roof over the second floor terrace is especially effective



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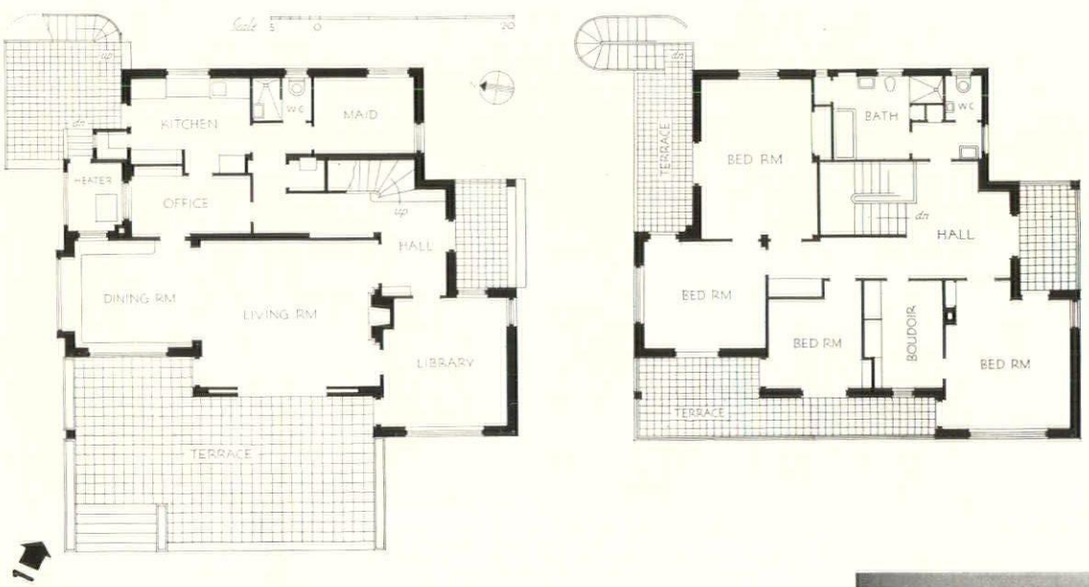
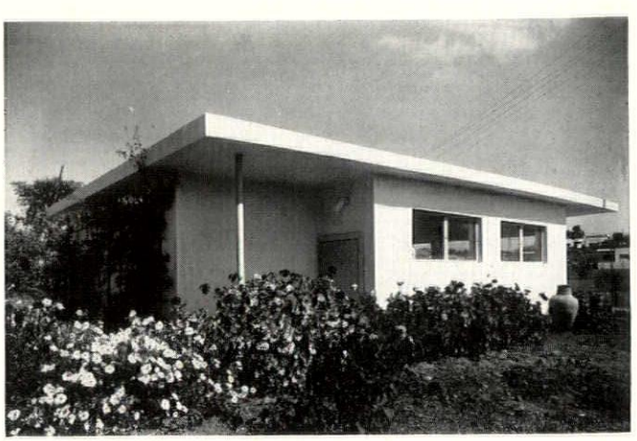
PHOTOS: I. KALTER



This country house is located on a large quadrant-shaped lot, and provides for garage and laundry in two entirely separate buildings. Main terraces face west and are partly covered. The garage building (right) faces on the street, and is a good example of the simple thoroughness achieved by the architects in general throughout Palestine.

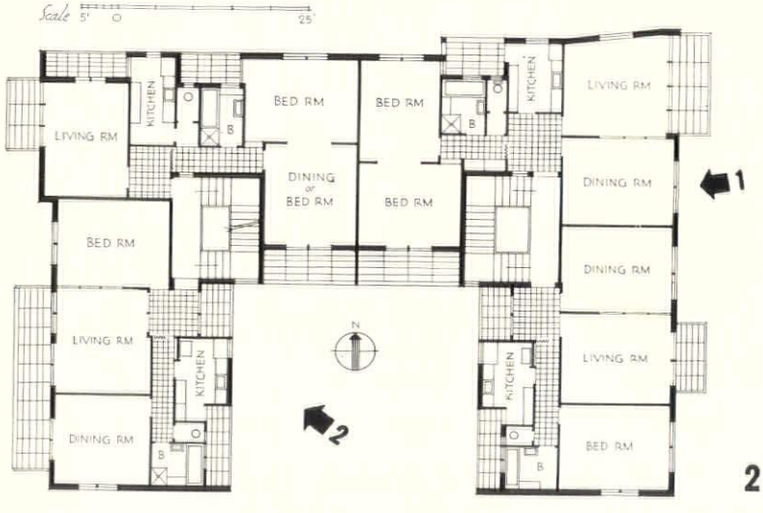


VILLA IN TEL BENJAMIN, N. SALKIND, ARCHITECT

APARTMENTS

1

APARTMENT HOUSE, TEL AVIV **Z. RECHTER, ARCHITECT**



TYPICAL FLOOR PLAN

2

Although of a refined type of design in the matter of details, the individual apartment layouts seem ill-organized. Services such as kitchens and baths, which do not demand cross-ventilation, are placed at extremities with double exposure at the expense of more important rooms. These service elements, at the same time, reap the benefits of the protected and well-treated court. Such inconsistencies are fortunately rare, however, and it is possible that they occurred against the will of the architect. Appointments within the building are in keeping with the exterior refinements.

APARTMENT HOUSE, TEL AVIV
D. KARMI AND Z. BARAK, ARCHITECTS

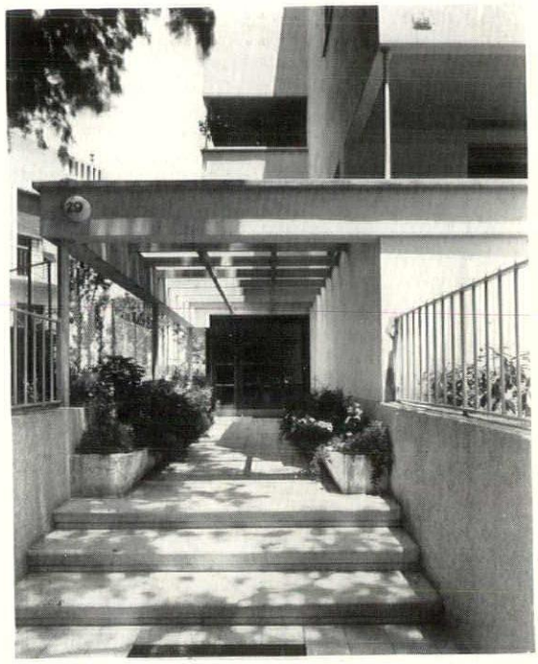
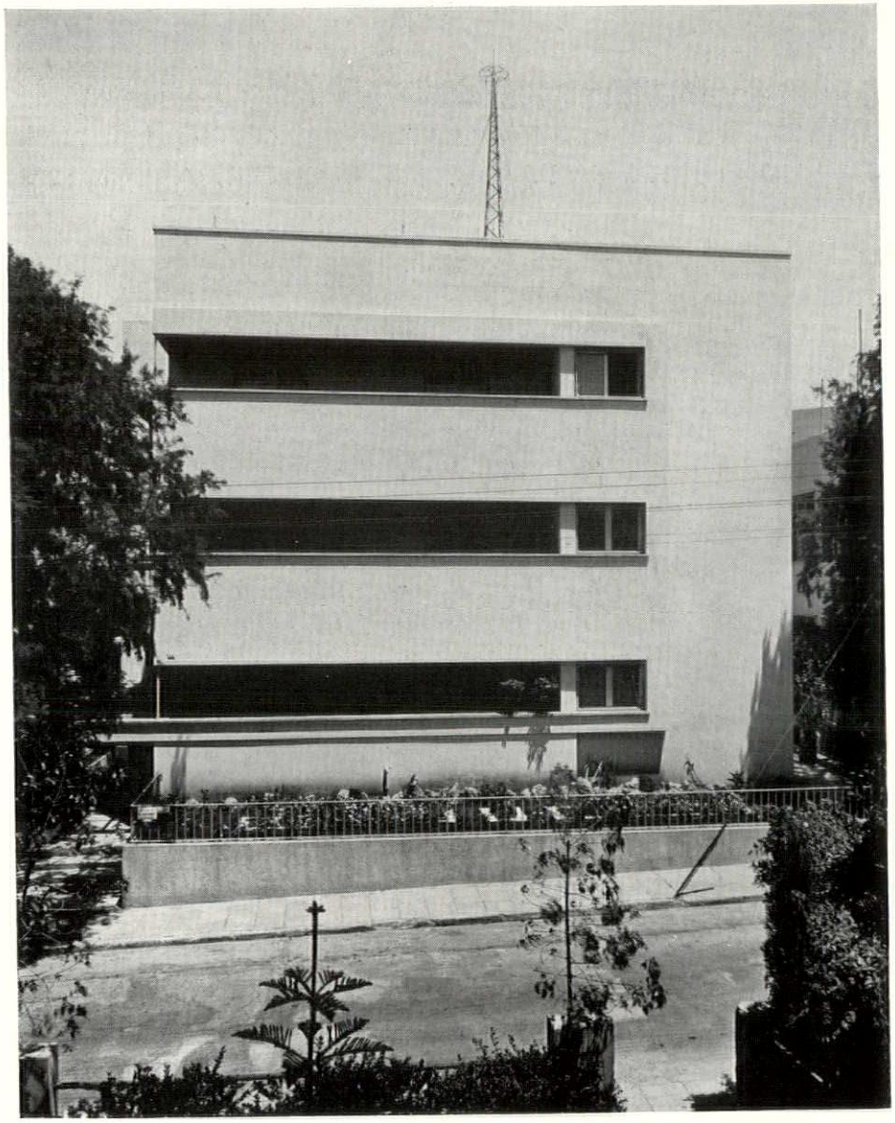


PHOTO: I. KALTER

1

An irregularly shaped lot added to the architects' problem in this instance, yet the manner in which the building was made to fit the site is most ingenious. With the minor exception of just one of the major rooms, the irregular areas were absorbed by elements of a purely secondary nature, the entrance hall, bath room and service stair landing. The individual apartment layouts, exclusive of the usual covered balconies, are not unlike many to be found in this country, and in the spatial relationship of the rooms might well serve as an example to be followed. Exteriors are extremely simple, the covered balconies serving to reduce the apparent fenestration motifs to a minimum.



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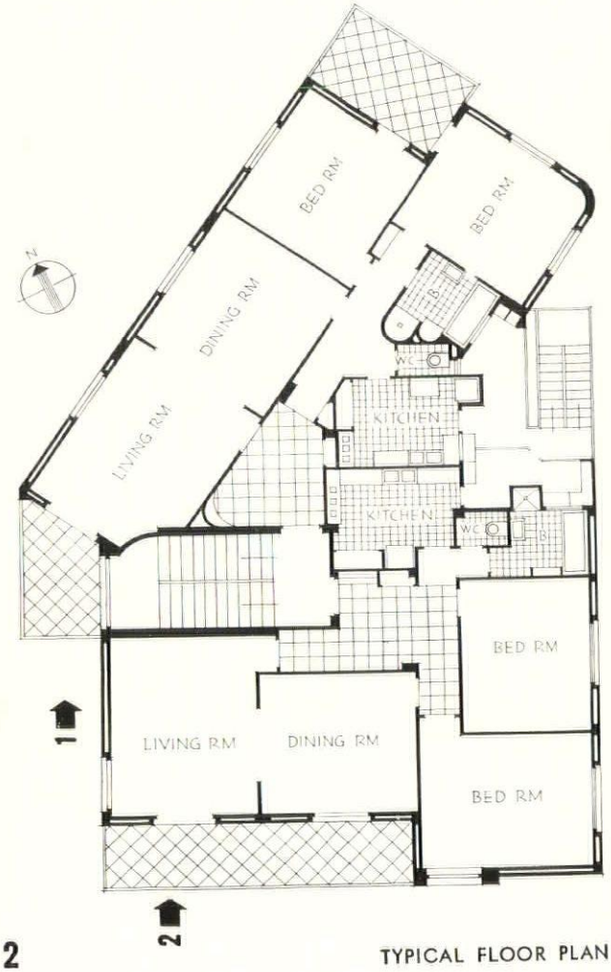
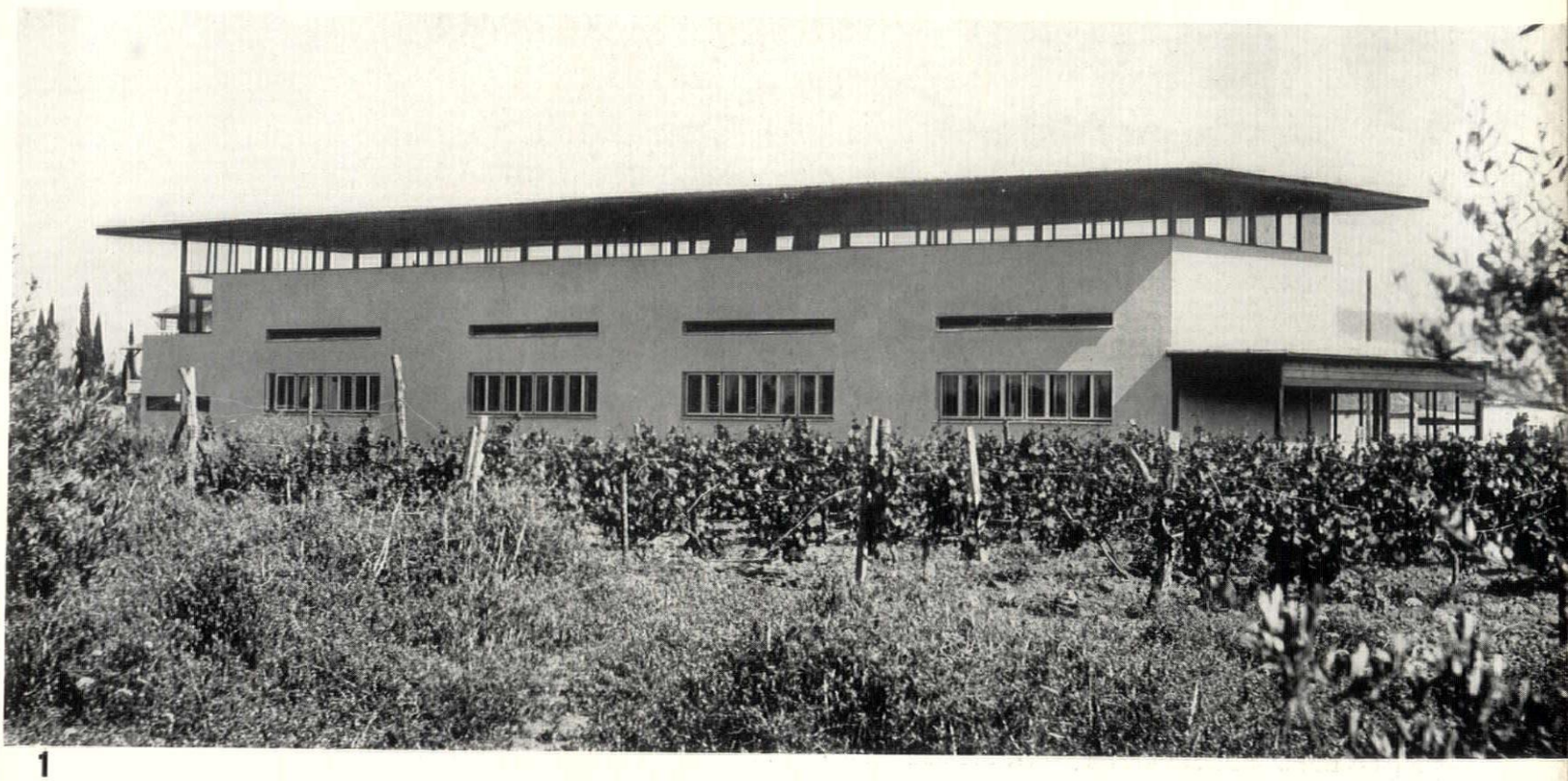


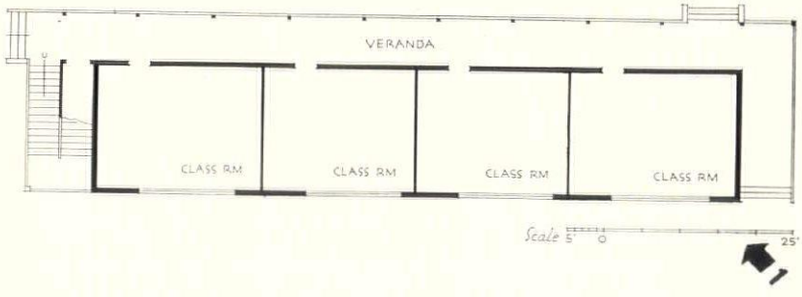
TYPICAL FLOOR PLAN

EDUCATIONAL



1

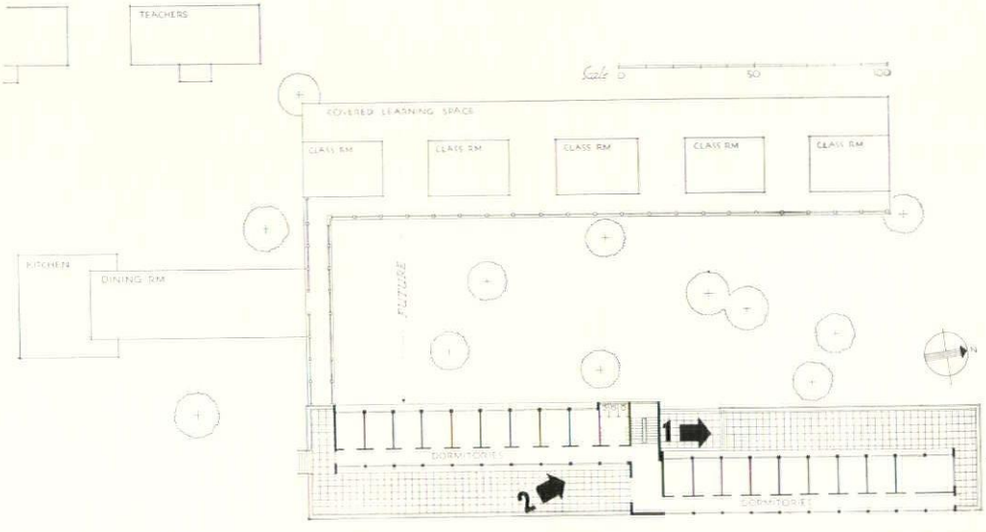
ELEMENTARY SCHOOL, DAGANIA
RICHARD KAUFFMANN, ARCHITECT



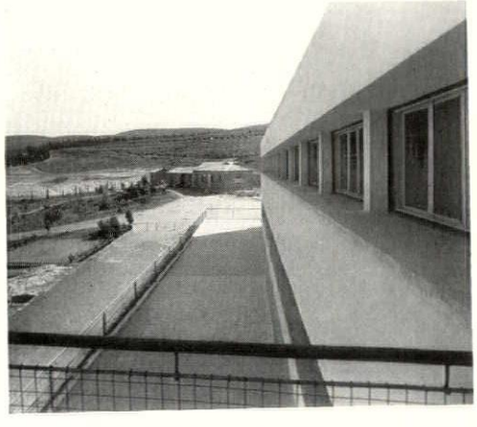
This building, situated in the depression-zone of the Jordan River Valley and experiencing a year 'round sub-tropical climate, is approximately 600 feet below sea level. The lofted roof is no mere stylistic affectation in this instance, but a tested method of allowing free circulation for cooling breezes, thus avoiding the absorption of the hot sun rays by the ceiling. Shallow windows, high in the outside walls, allow complete cross-ventilation and add their cooling benefits to the already described method. Construction is of reinforced concrete frame with plastered brick walls. The lofted roof is of wood, covered with asbestos sheets.

PHOTO: I. KALTER

CHILDREN'S SETTLEMENT, MISCHMAR HA-EMEK • J. NEUFELD, ARCHITECT



This partially completed children's settlement is one unit of an extensive projected colony. At present the existing building is made to serve all living requirements. As was found typical of apartment and residential work, the building faces east and west to take full advantage of prevailing breezes. The deep window recesses in this case afford some protection from the sun, and are supplemented by the installation of roll-shutters in the space above the window heads. The space created below the windows is used for storage cabinets



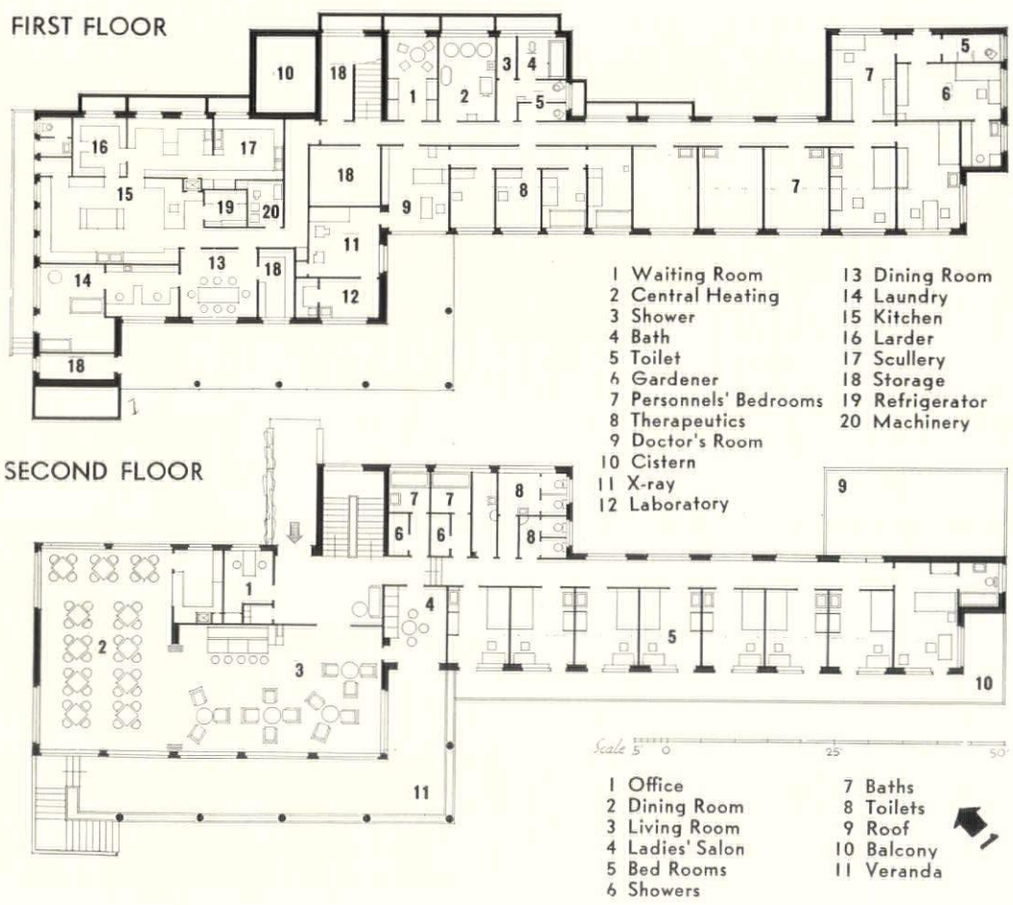
1

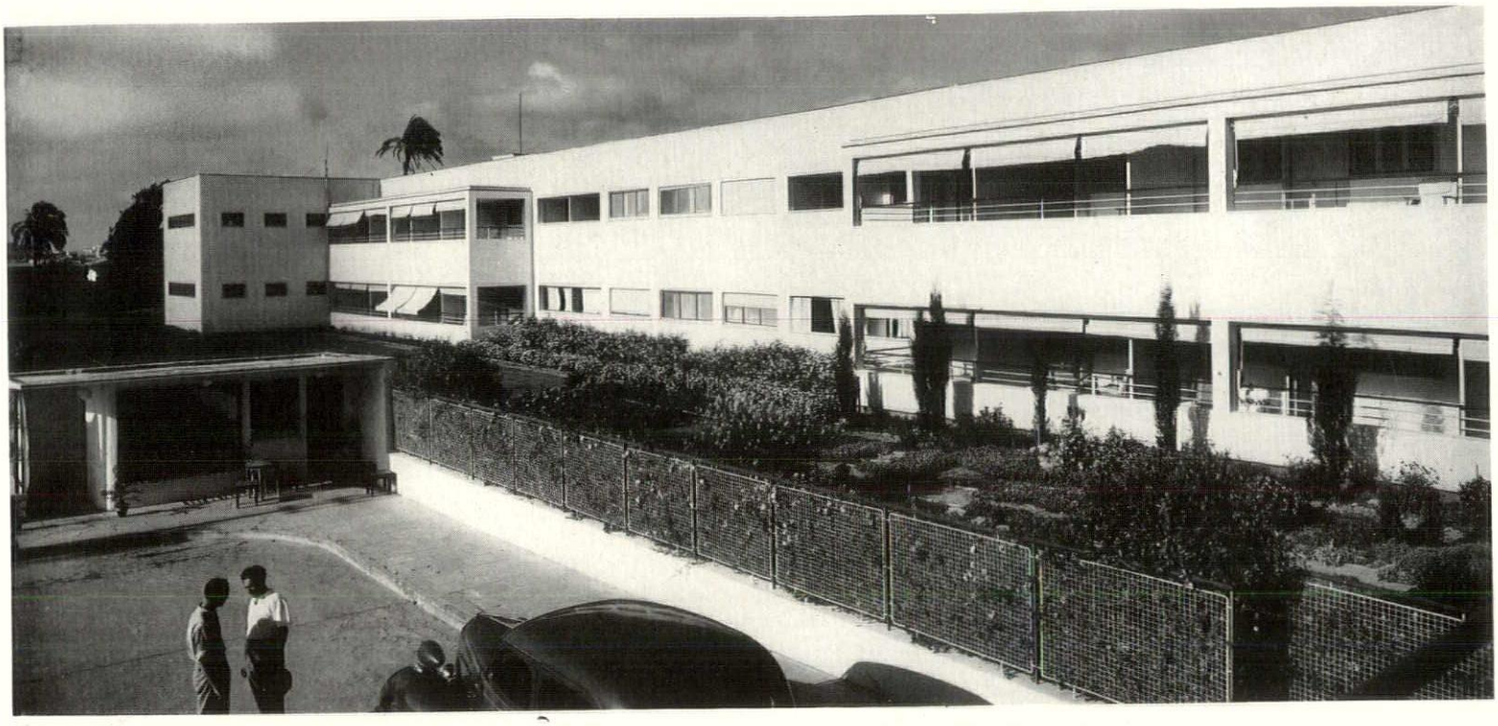
2

1 PHOTO: LOEWENHEIM

CONVALESCENT HOME, CARMEL
RICHARD KAUFFMANN, ARCHITECT

Erected on Mount Carmel, this sanatorium commands a beautiful view over the Mediterranean. The western elevation (above) with its sun-protected terraces in front of all the rooms, allows the cool western breezes from the sea to ventilate the entire building. The basement contains the main kitchen and various other services and the ground floor includes all public rooms, plus some patients' rooms. The entire second floor is devoted to patients' rooms alone. Construction is of reinforced concrete frame with walls and floors of terrazzo. Heating is by means of a central system and Oil-O-Matic





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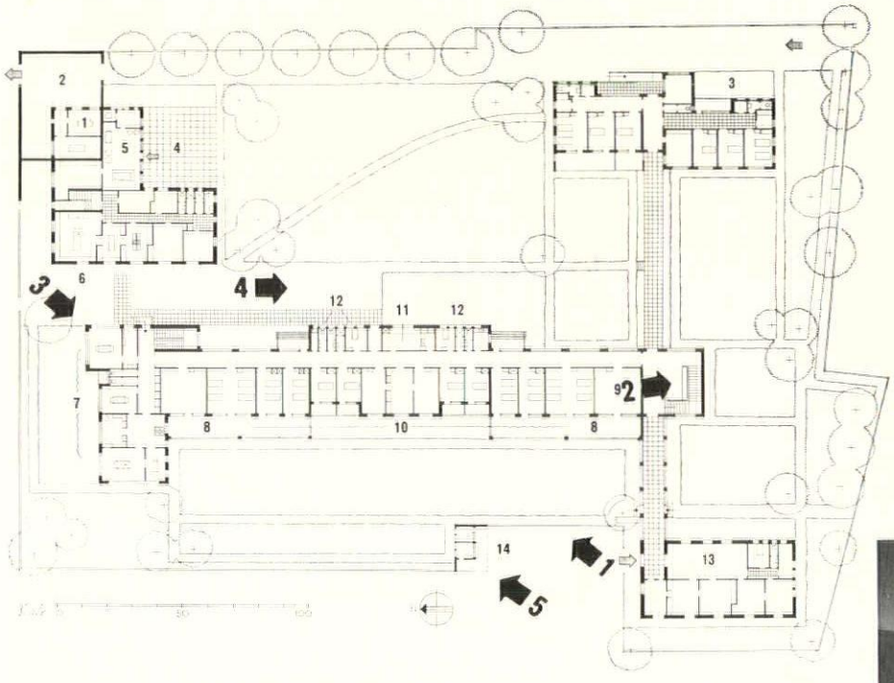
ASSUTAH PRIVATE HOSPITAL, TEL AVIV

J. NEUFELD, ARCHITECT



1 Post Mortem
2 Court
3 Isolation
4 Laundry Court
5 Laundry
6 Kitchen Wing
7 Surgical and Nursery Wing
8 Open Terrace
9 Day Room
10 Wards
11 Tea Kitchen
12 Wash Rooms, Toilets
13 Administration Building
14 Flower Shop

Erected in 1935 by a co-operative group of German emigré physicians, this hospital was planned to serve the then rapidly growing town of Tel Aviv. Ample land was procured to allow freedom in planning and privacy for the many necessary units. All patients' rooms face west and include air channels that open on the east facade to catch the prevailing night breezes. Two- and four-bed wards have balconies and all single rooms have private sitting terraces.

2

3

4

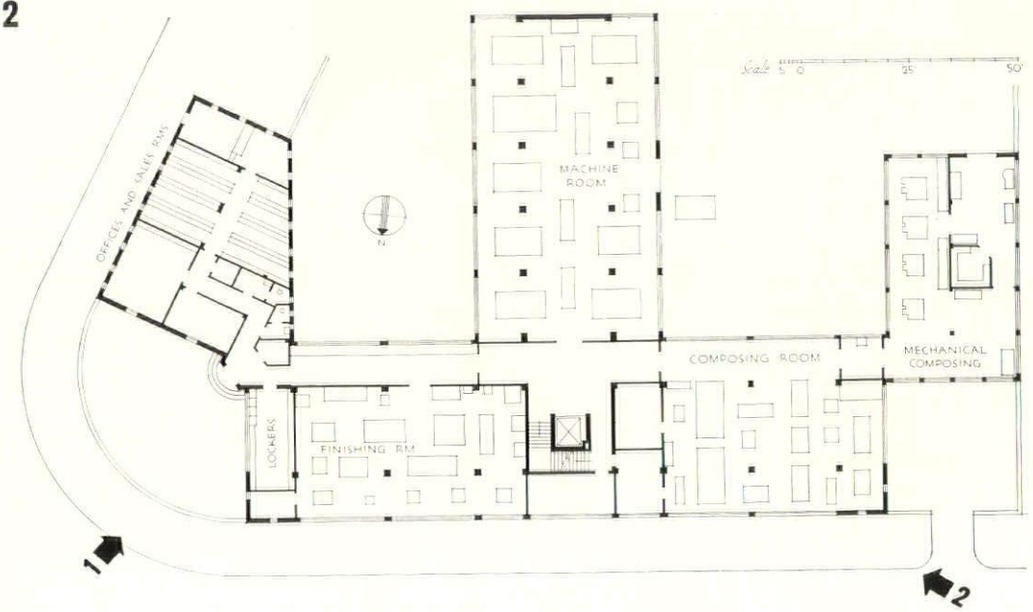
The surgical and nursery wing (3) includes four operating rooms and the necessary services. The view of the east court (4) shows the one-story isolation ward at the left and the service wing of the main building at the right. An old English building law requires that soil and vent stacks be on the exterior of all buildings, and their use in this instance adds quite a decoratively gay effect to an otherwise severe surface. The flower shop (5) is located near the main entrance outside the hospital grounds. The architectural use made of its many purely engineering features, such as the diminishing thickness of the roof slab and the utilization of the lally-column for supporting display shelves, make this one of the most attractive and ingeniously devised buildings of the entire group.

5

G O V E R N M E N T A L

1

2

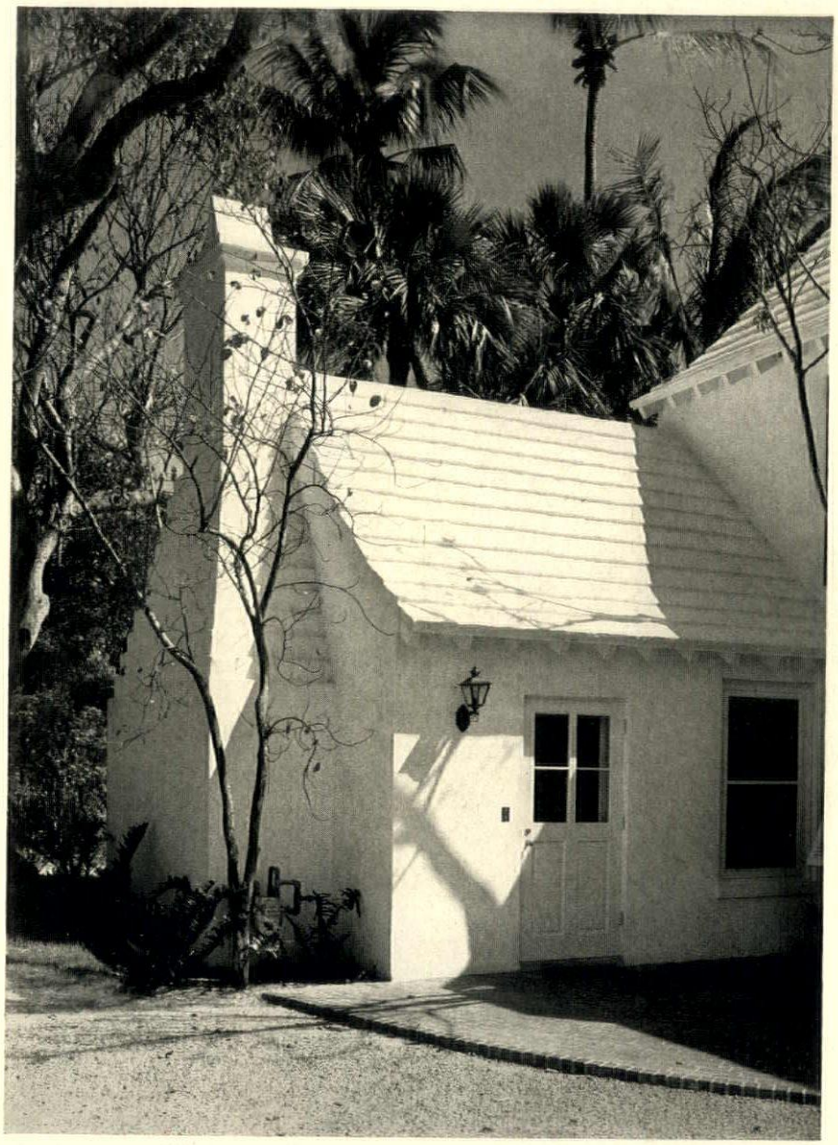


Located on a site reserved for industrial buildings, this printing plant has many of the characteristics found in residential work. Openings are kept to a minimum unless amply protected from the sun's rays by some type of overhang. The building throughout is of reinforced concrete, with the machine room and mechanical composing room separated from the rest of the structure by expansion joints to lessen the transference of noise and vibration. The second floor is set back all around and is used solely for storage. Provision has been made for the extension of this storage area over the machine room when required

PRINTING PLANT, JERUSALEM
AUSTEN ST. B. HARRISON, ARCHITECT
F. W. FOSTER-TURNER, ASSISTANT ARCHITECT

PORTFOLIO

OF ROOF TEXTURES



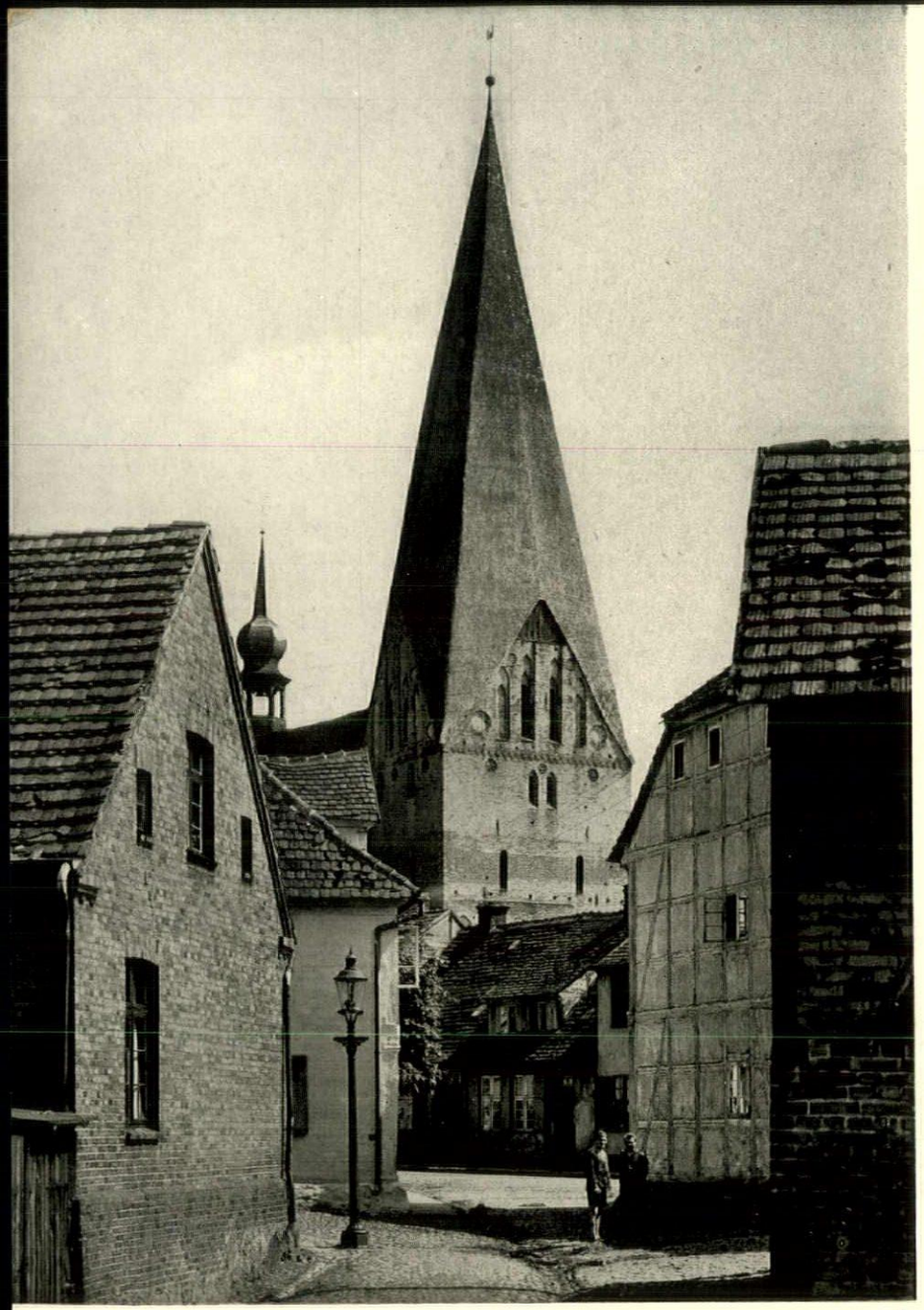
House in Miami Beach, Florida. John L. Volk

Number 135 in a series of collections of photographs illustrating various minor architectural details

PORTFOLIOS IN PREPARATION—Mt. Vernon, February . . . Rain Leader Heads, March . . . Gate Post Tops of Wood. April

The editors welcome photographs of these subjects . . . Forms close eight weeks in advance of publication. A list of the subjects that have appeared will be sent upon request. Certain of these past Portfolios are available to subscribers at 25 cents each; or five subjects for one dollar

SHAKES & SHINGLES



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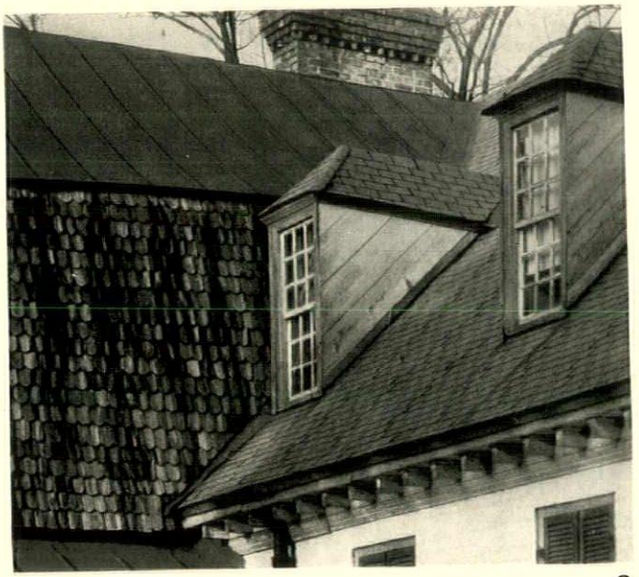


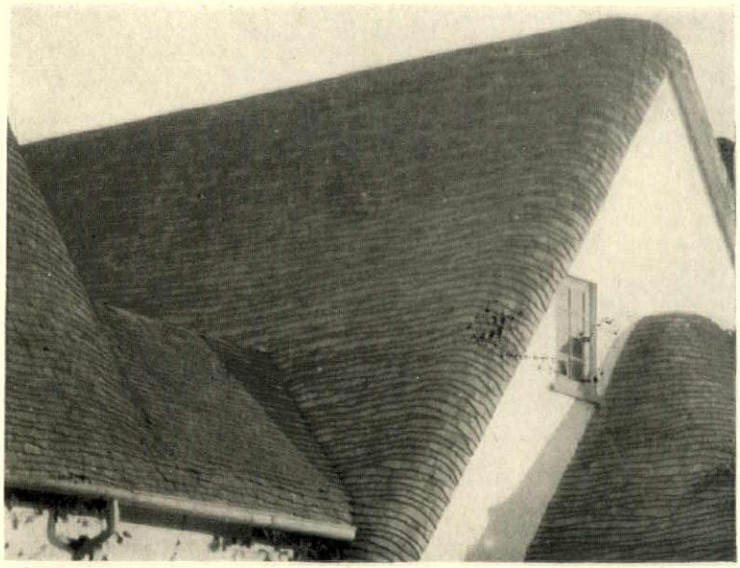
2

Textures and craftsmanship go hand in hand with a fine romantic air. Herein lies the danger. Speak of the craftsman and you immediately conjure a picture of a benign, philosophical, large knuckled old gentleman who tells you about the good old days when—. This is obviously ridiculous. There is just as much skill required in making (and, incidentally, as much texture of surface) corrugated metal as there is in hand splitting shingles. The only difference is a matter of taste and economics.

Wood has from earliest times been a favorite American roofing material. This is due to many things; it is abundant, it has a fine natural texture, it is very workable and, lastly, it lends itself to almost every type of design and surface finish from the most whimsical to the downright functional.

1. Old roofs in Buetzow, Germany
2. "The Mansion," Bowling Green, Va.
3. Old house, Middlesex County, Va.
4. House in St. Davids, Pa., Mellor & Meigs
5. House in Los Angeles, Calif., Charles R. Fargo
6. House in New Brunswick, N. J., A. Saxe
7. Cottage, Candlewood Isle, Conn., R. C. Kilborn
8. Garden House, New Rochelle, N. Y., Frederick G. Frost

3



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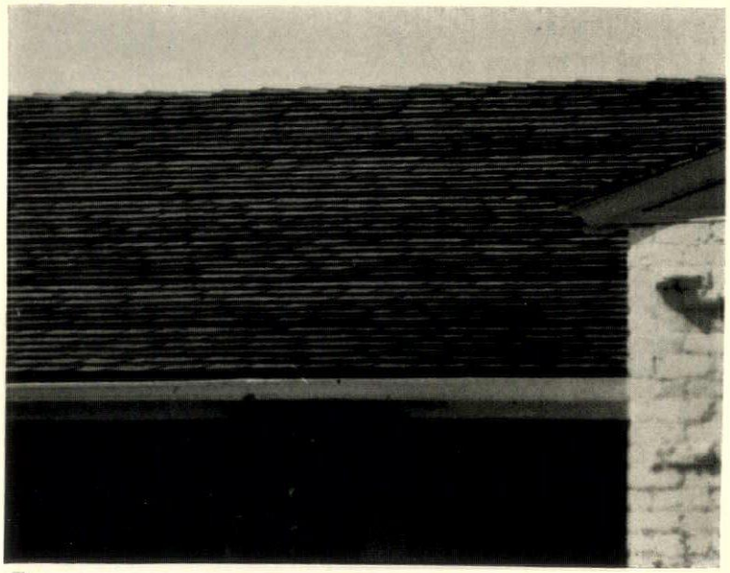

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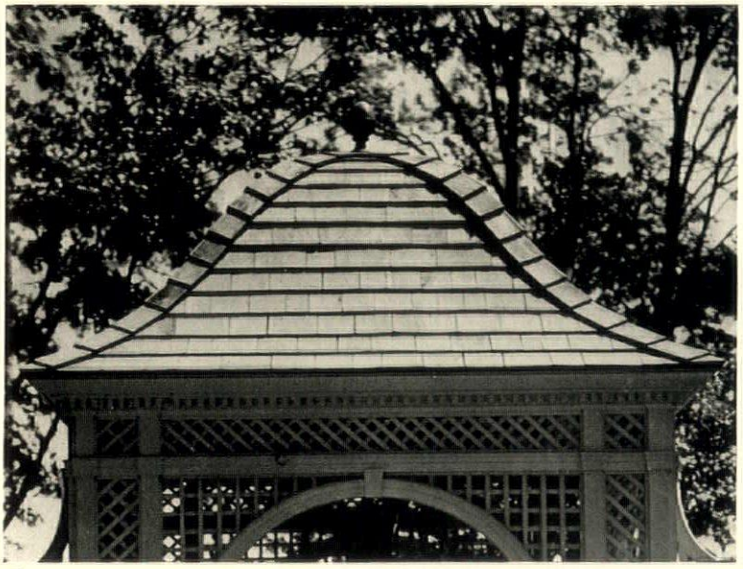

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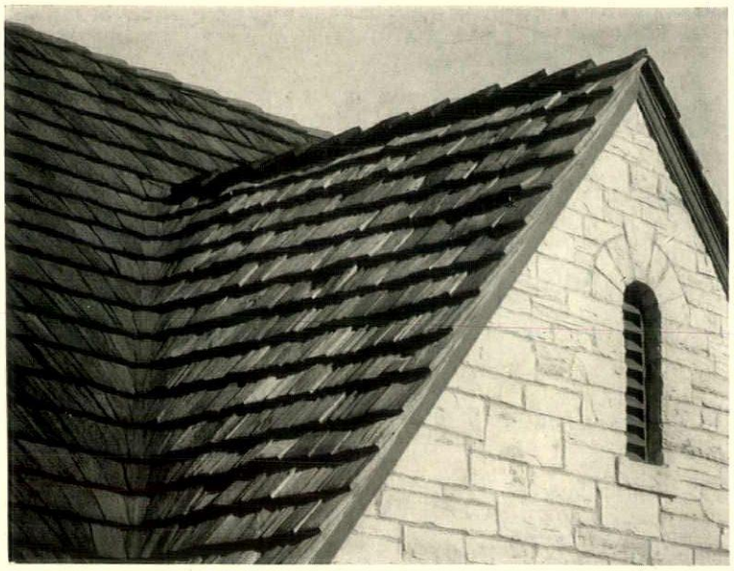

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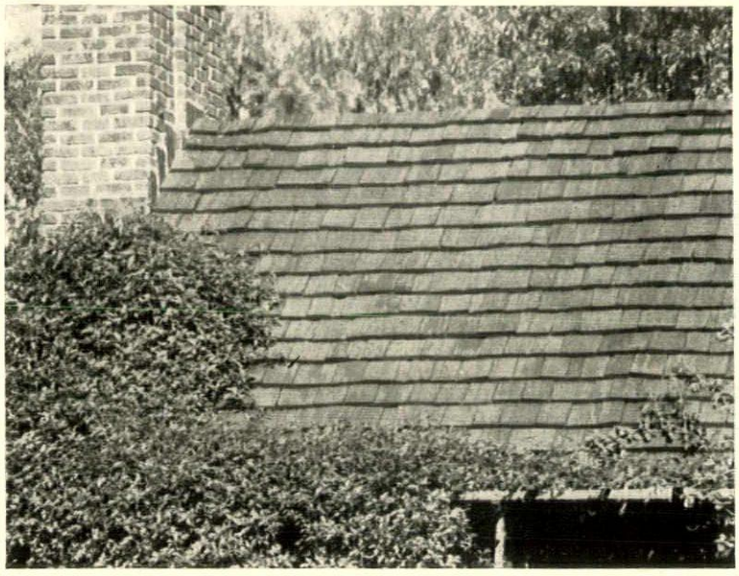

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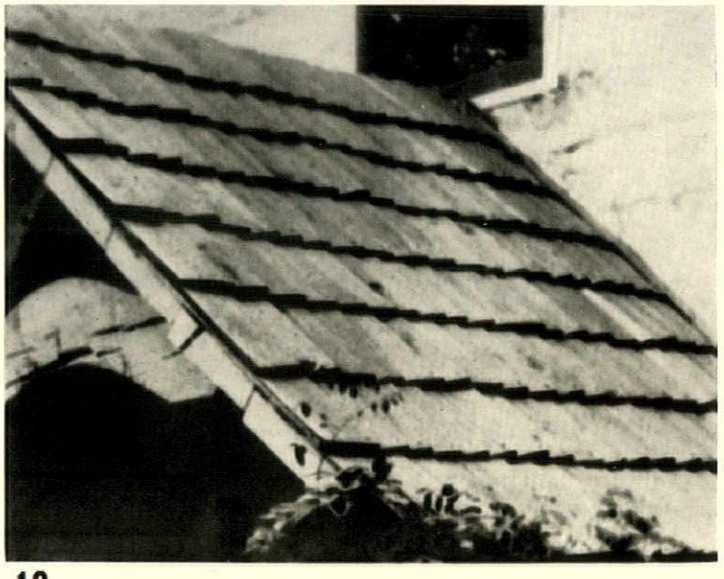


13

9. House in Beverly Hills, Calif., Paul R. Williams

10. Garden House, New Canaan, Conn., Cameron Clark

11. House in Detroit, Mich., J. Ivan Dise

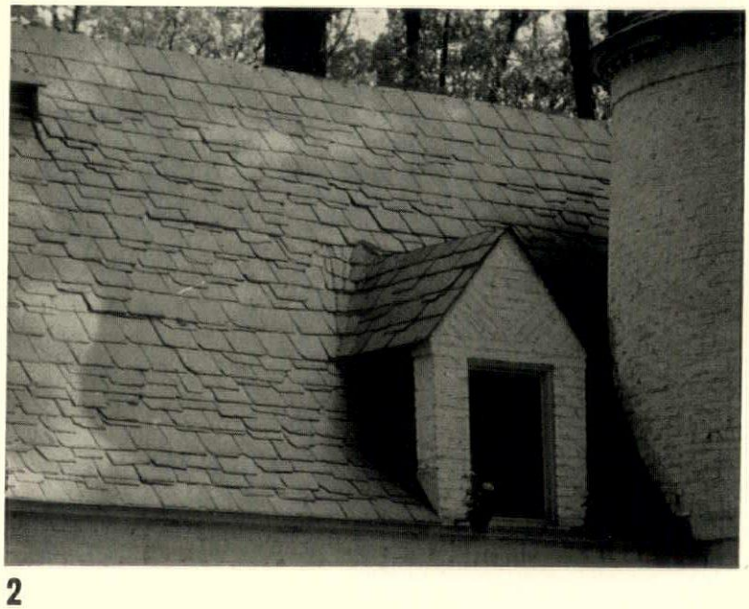
12. House in Winter Park, Fla., James Gamble Rogers II

13. House in Cabin John, Md., Roscoe L. Wood

SLATE

Slate is a sort of one hundred per cent he-man among roofing materials. Paradoxically enough, it also seems to bring out the most romantic architectural affectations. An interestingly textured, durable and easily handled material, available in a variety of subtle colors, it is readily adaptable to a number of stylistically opposite treatments. In the hands of a sensitive designer it contributes exactly the right note.

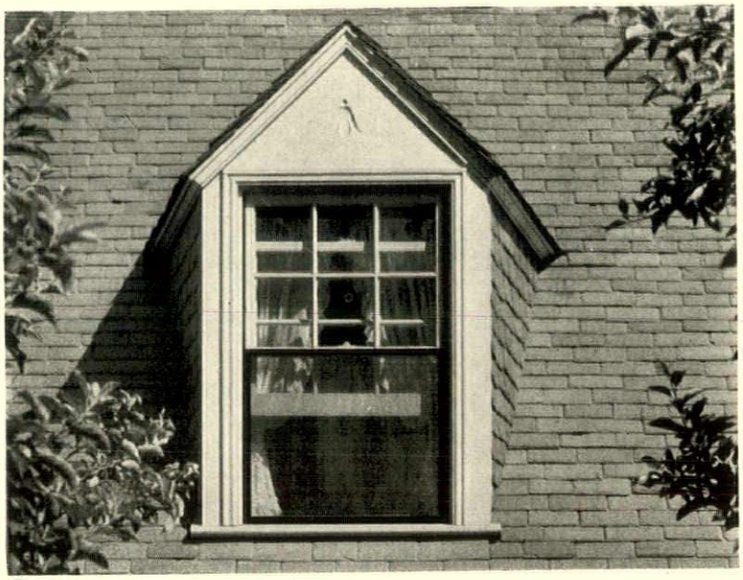
1



2

1. Heavy stone roofs peasant cottages in Alberollo, Italy

2. House in Atlanta, Ga., Hentz, Adler & Shutze



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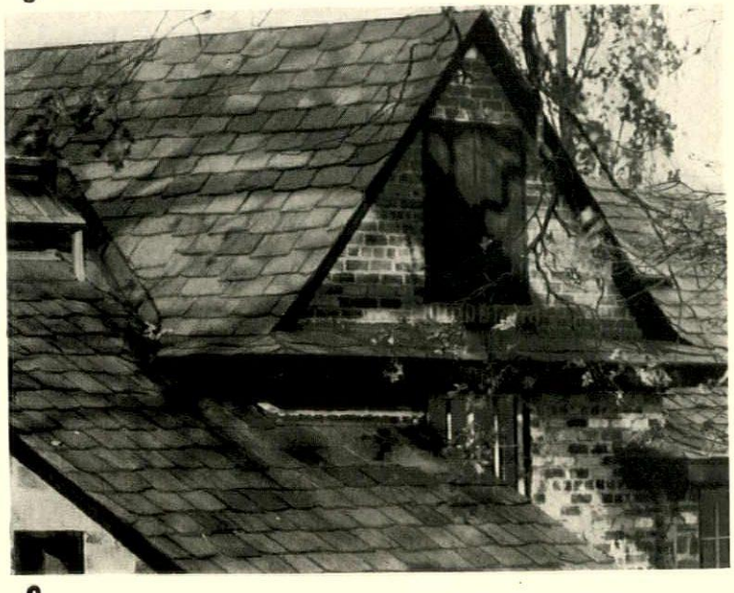


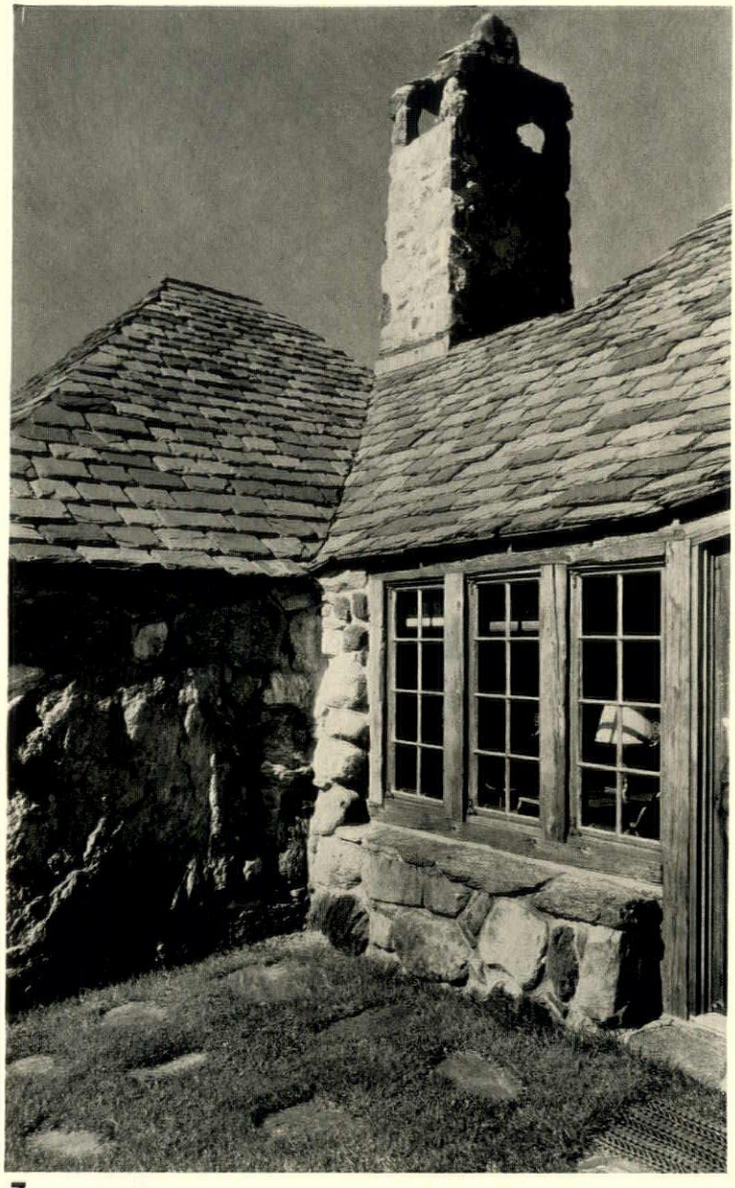
6

3. House in Knoxville, Tenn., Barber & McMurry

4. House in Hackensack, N. J., Wesley S. Bessell

5. House in Syosset, N. Y., Roger H. Bullard

6. House in Washington, D. C., Victor Mindeleff



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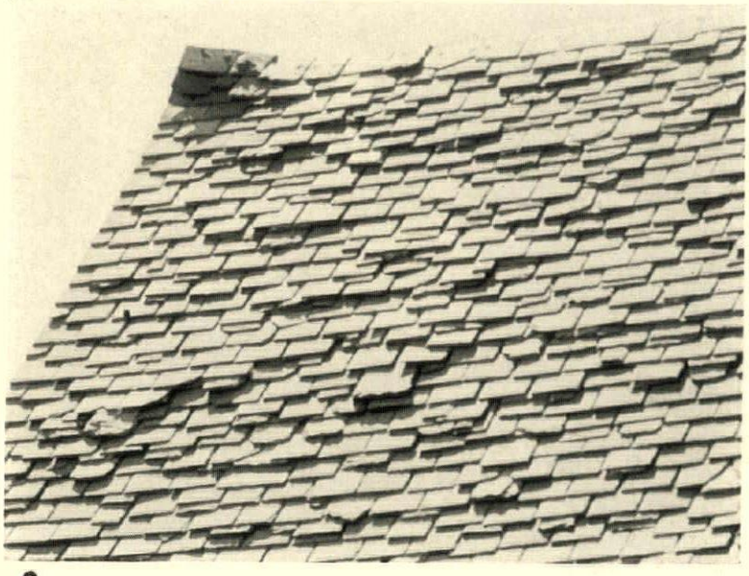

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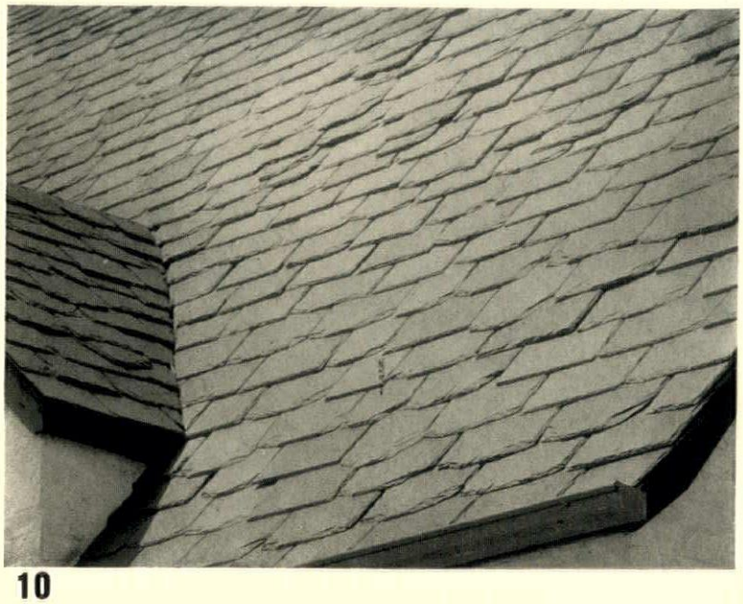


10

8

7. House in Norfolk, Conn., Taylor & Levi

8. House in Dayton, O., Peabody, Wilson & Brown

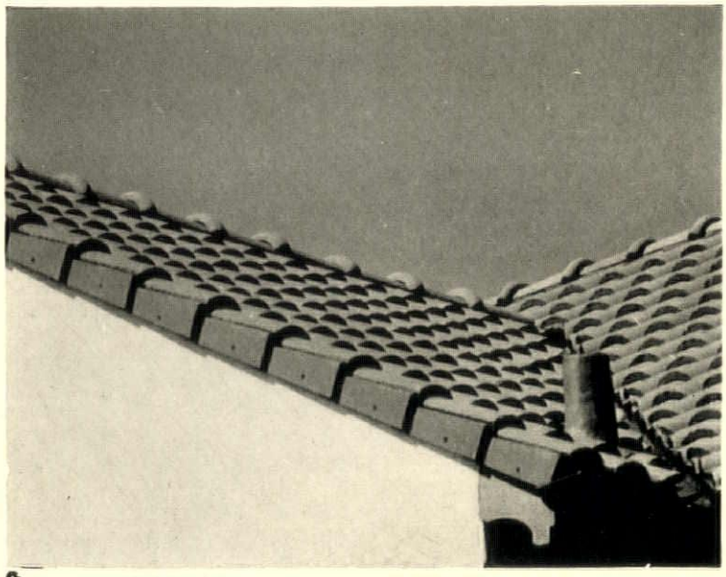
9. House in Scarsdale, N. Y., Lucian Beardsley

10. House in Glen Head, N. Y., Frederick Soldwedel

1

TILE

It is unfortunate that tile as a roofing material is associated in this country with practically only two types of architecture, Spanish Colonial and the so-called French manor house styles. In Europe quite the reverse of this is true. Tile, because it is made of fired clay, is an extremely flexible material that can be made in a wide variety of shapes and sizes ranging from the flat, the half round to the S shaped, and so on. Naturally with this range European architects are constantly using it on buildings of contemporary design.



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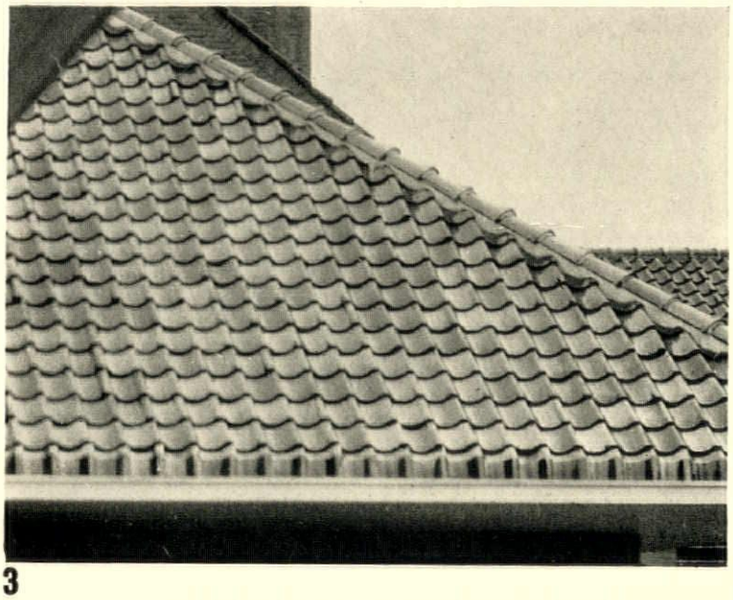

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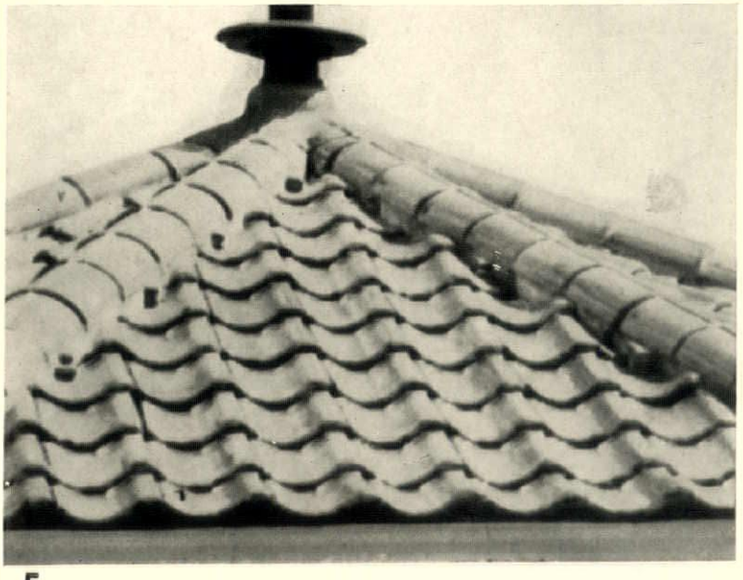
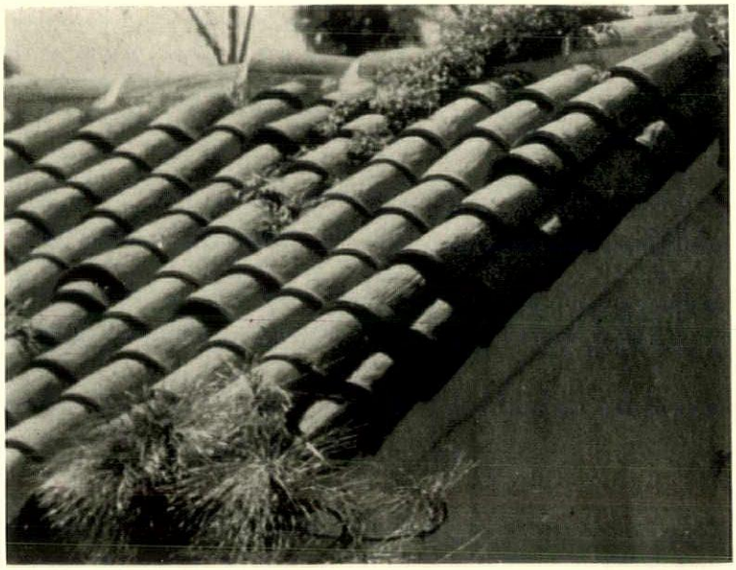


5

1. Outbuilding of an old French farmhouse
2. House in Hewlett's Manor, N. Y., John C. Greenleaf
3. School in Helversin, Holland, W. M. Dudock
4. House in Hillsborough, Calif., Willis Polk & Co.
5. Modern tile roofing in England



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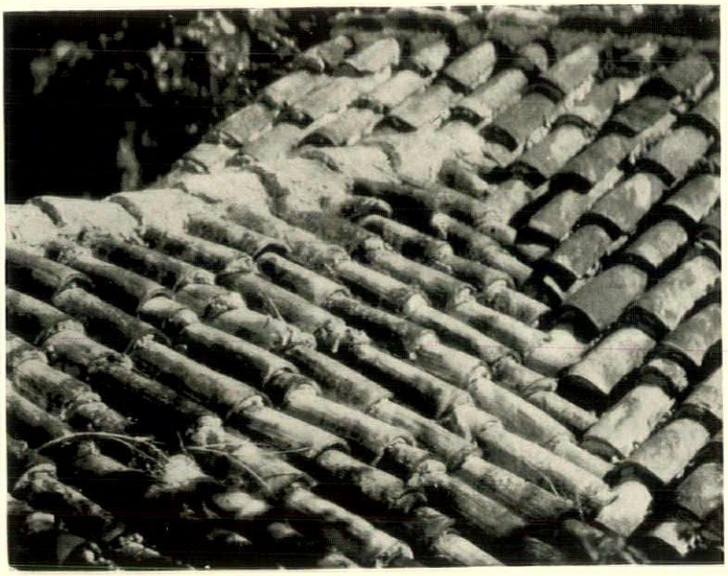

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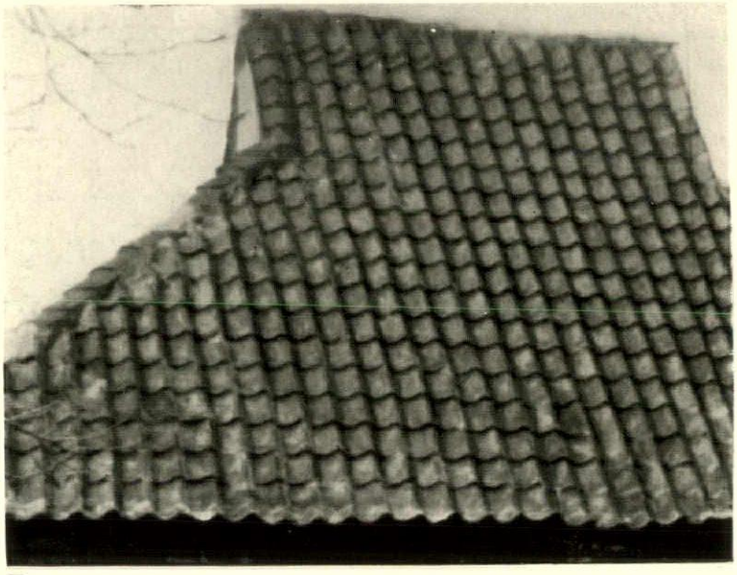

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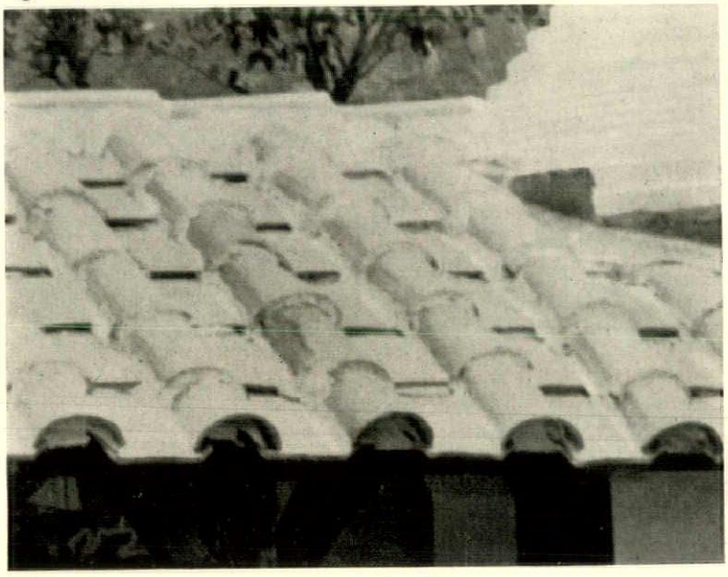

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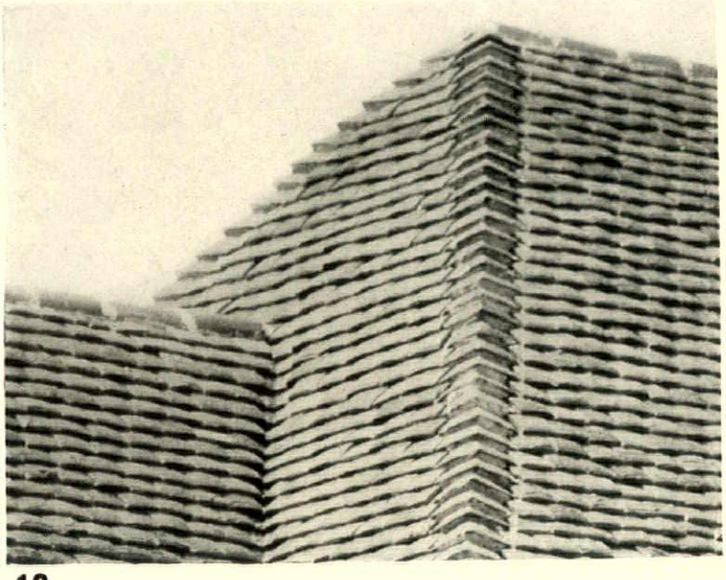

10

6. House in Santa Monica, Calif., John Byers

7. Old house in Charleston, S. C.

8. House in Winter Park, Fla., James Gamble Rogers II

9. House in Miami Beach, Fla., John N. Bullen

10. House in Philadelphia, Pa., Edmund B. Gilchrist

METAL

By no means a new roofing material, metal, in both sheet and shingle form, is becoming increasingly popular for this purpose. There are several reasons for this, not least of which is that it is sometimes the only medium for a solution of certain difficult roofing problems. Although copper is still the most popular form, other metals are also frequently used.

1. Dome of planetarium in Chicago, Ill., Ernest A. Grunsfeld
2. House in Newton, Mass., C. C. Crowell
3. House in Bethesda, Md., John J. Whelan
4. "Bacon's Castle," Surry Co., Va.
5. House on Long Island, N. Y., James W. O'Connor

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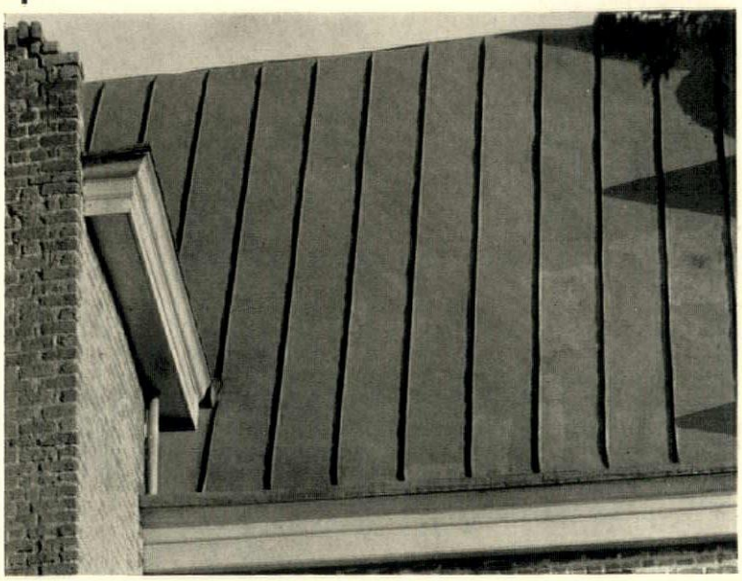

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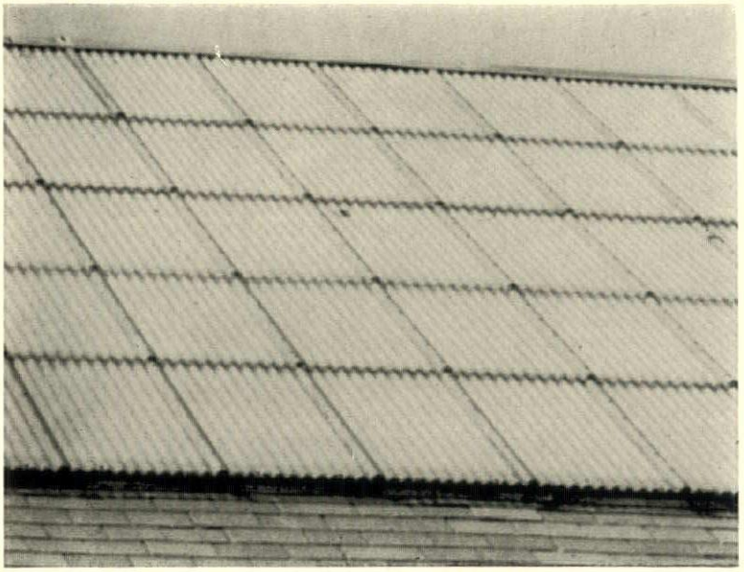

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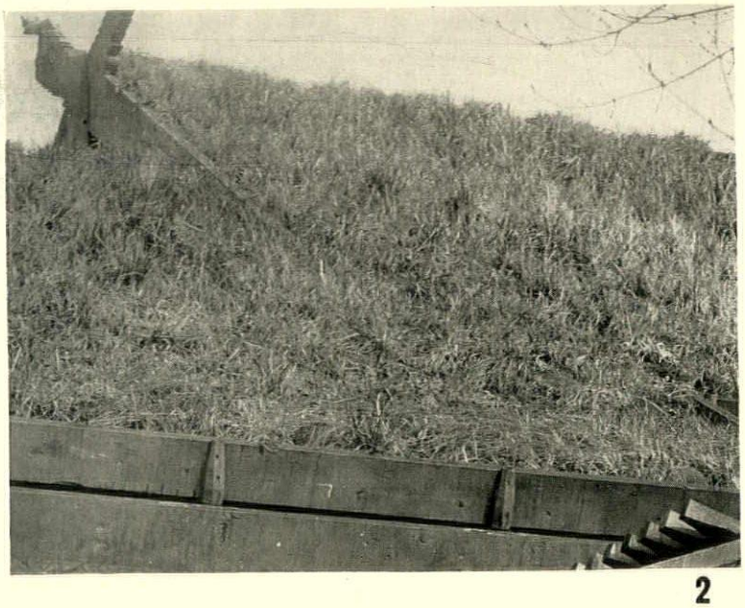

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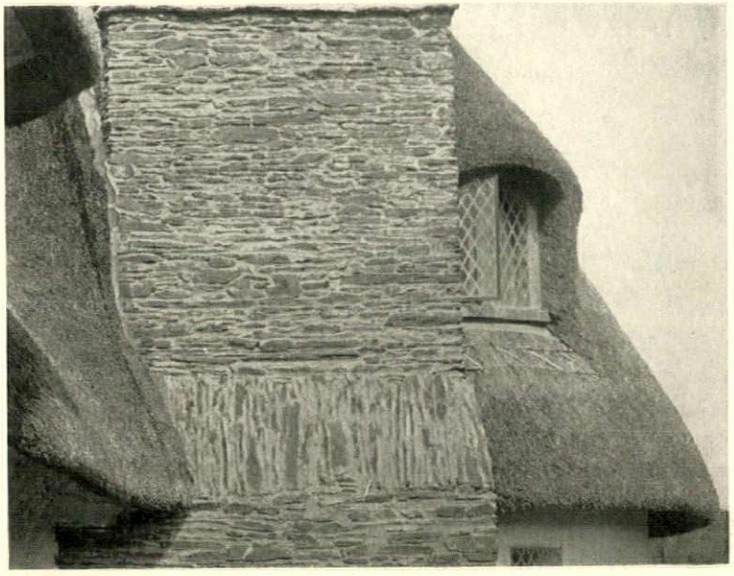

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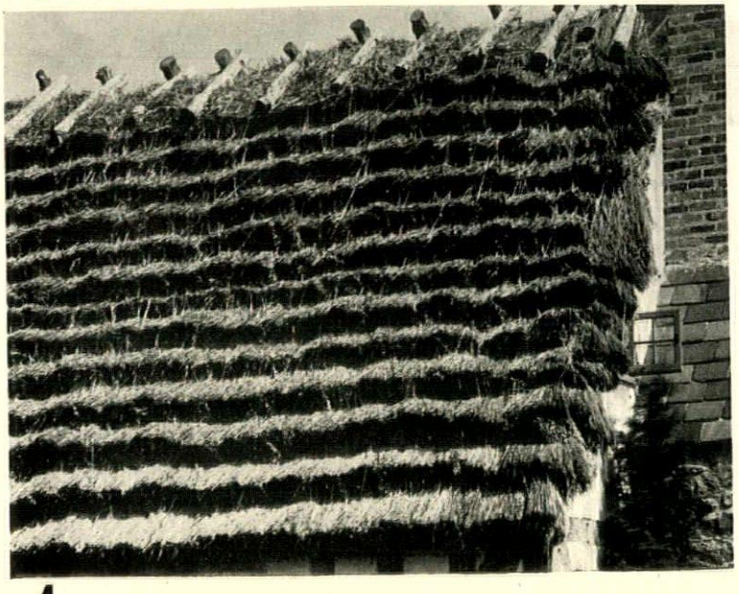

4

1. Thatch on an old French farmhouse
2. Live grass on a house in Rye, N. Y., Lennart Palme
3. Thatch on a house in Devonshire, England, Oliver Hill
4. Thatch on a studio in Darien, Conn., Daniel David Merrill

THATCH & GRASS

These materials unquestionably add charm to the European countryside but their use in America makes about as much practical sense as a transcontinental trip on horseback. Both bring on the same nostalgic air but nostalgia is scarcely architecture

DESIGN DETAILS:

SHELVING

TO the existing complexity confronting architects in the use of abundant newly-developed materials and equipment is being added further concern in the design of interior details. Modern living and occupation demand many specially designed devices, some of which warrant volume fabrication, and others that, due to particular conditions, must be individually designed or assembled. The problem of shelving occurs in homes, stores, schools and offices. Solutions are many and depend on both the architect's own designs and the use of various patented equipment.

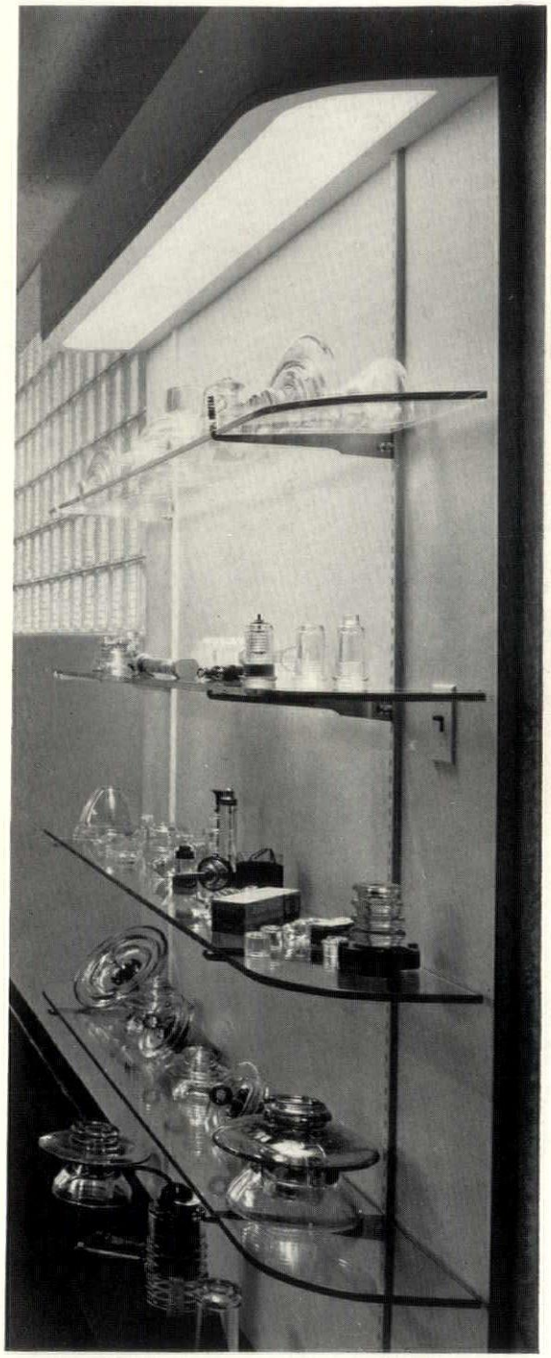

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PHOTO: GOTTSCHO

1. Corning Glass Building, New York
William & Geoffrey Platt, Architects
John M. Gates, Associate

2. Apartment, New York

PHOTOS: SCHNALL

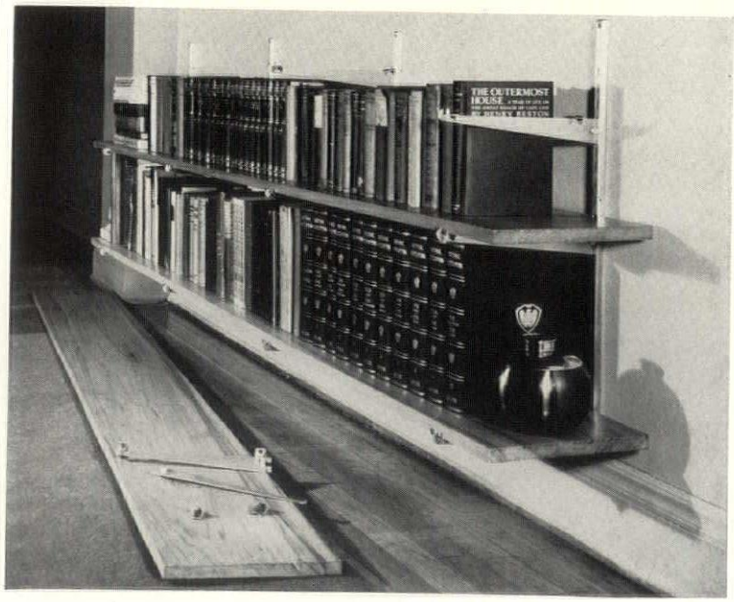

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PHOTO: BONNEY

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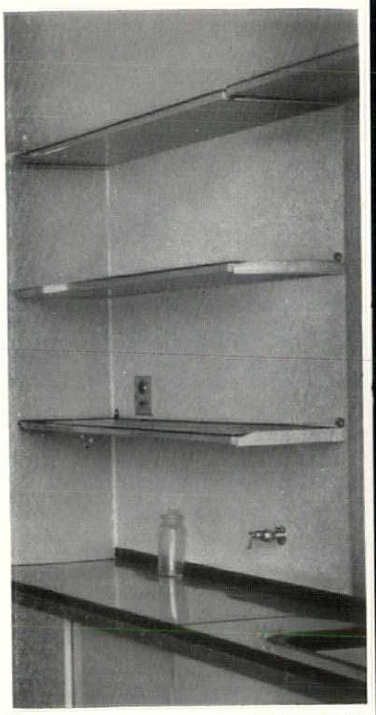

PHOTO: HAIGT

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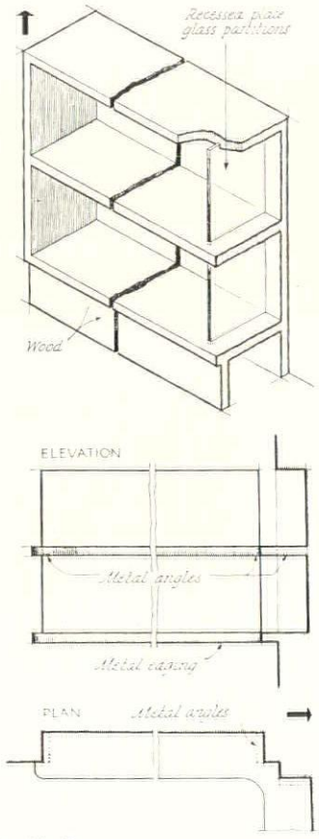

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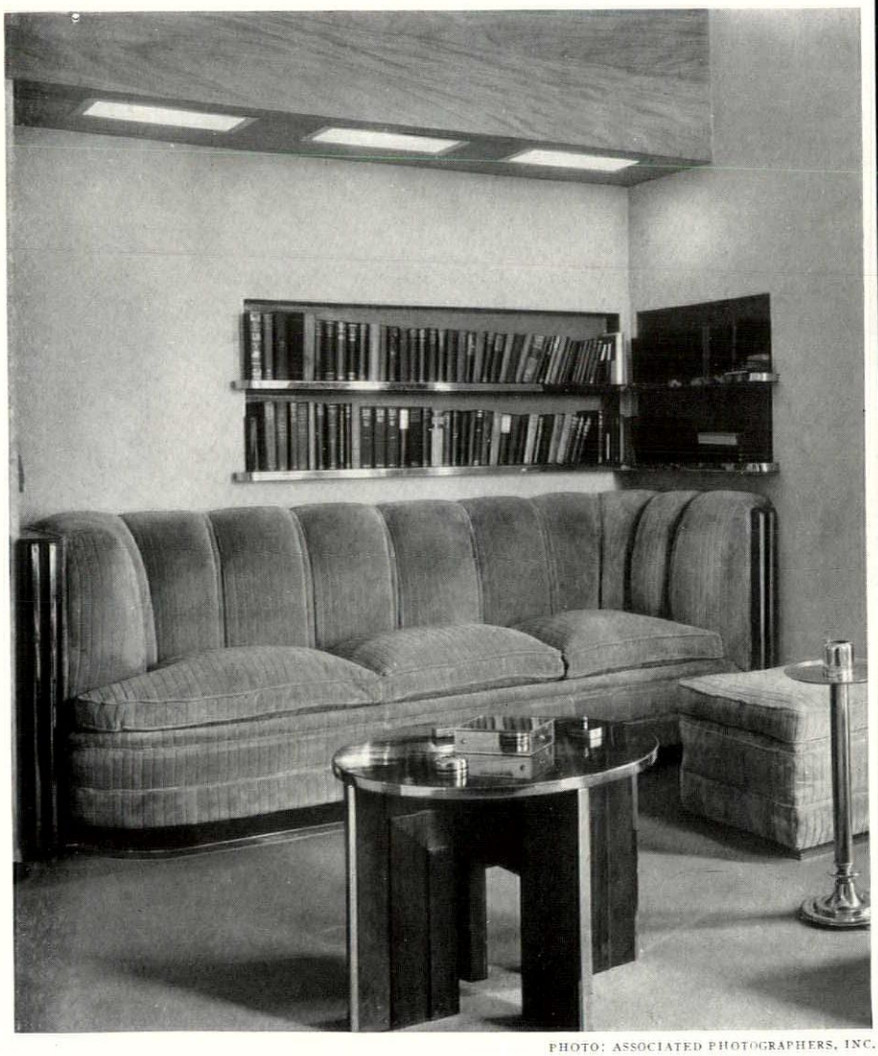
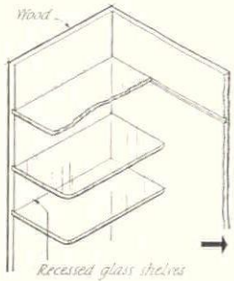


PHOTO: ASSOCIATED PHOTOGRAPHERS, INC.

1. **Photographer's Office, Paris**
   Wolfgang Ewert, Decorator

2. **Polytechnic High School, Long Beach, Calif.**
   Hugh R. Davies, Architect

3. **Apartment, Hollywood, Calif.**
   Herbert Ketelle & Joseph Babolnay, Designers



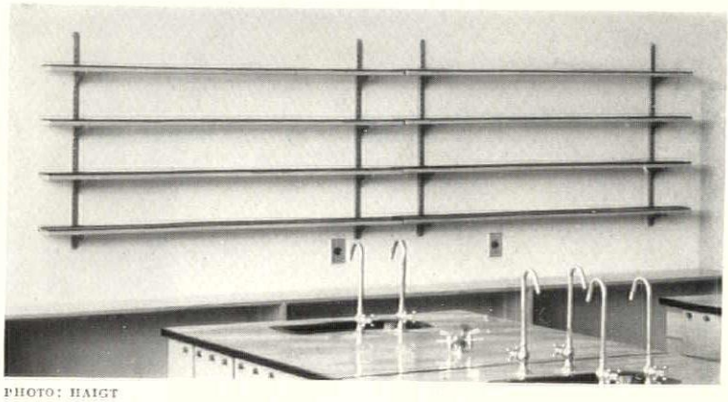


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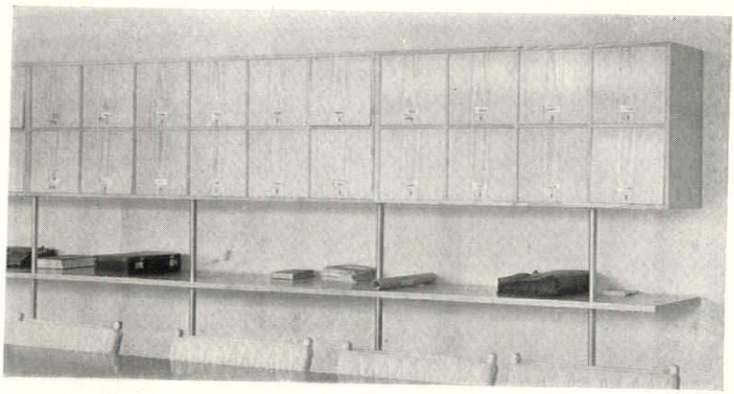
PHOTO: HAIGT



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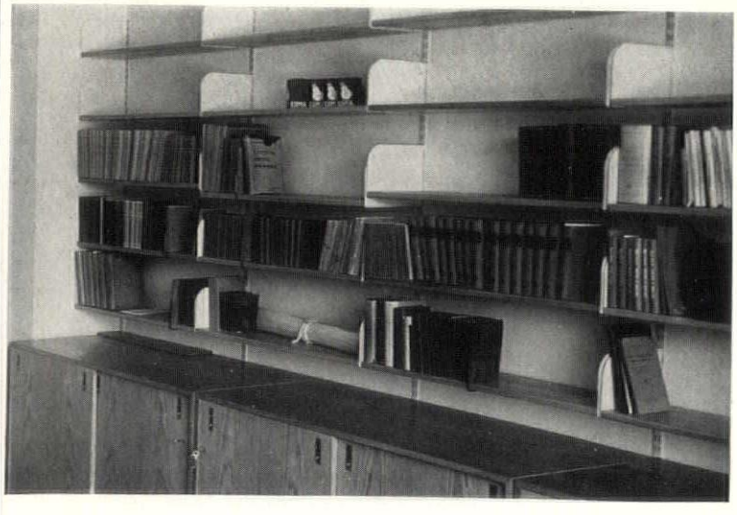

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PHOTO: NYHOLM

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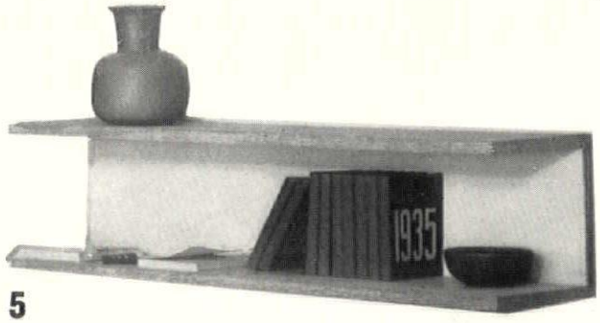


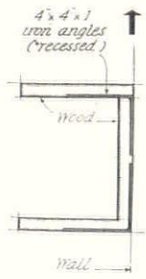
5

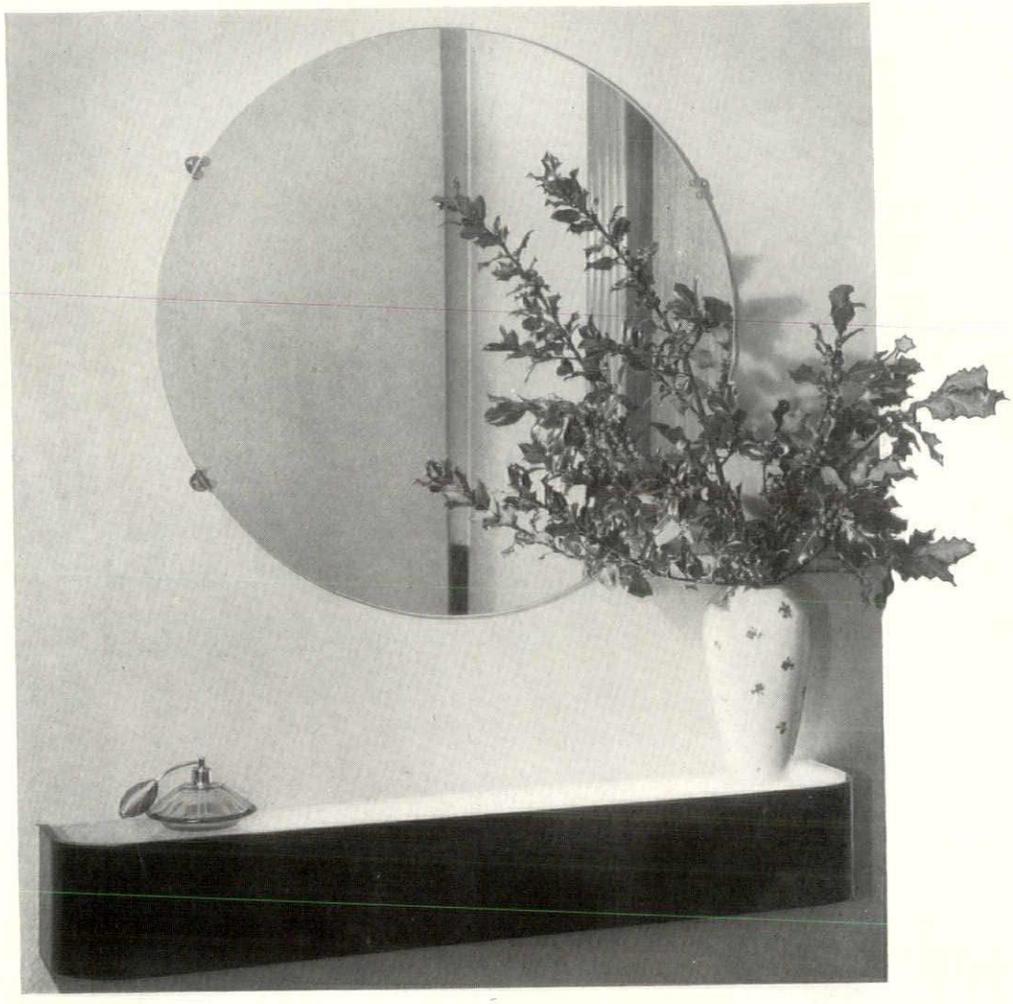
1. Polytechnic High School, Long Beach, Calif.
   Hugh R. Davies, Architect

2. & 3. Secondary School, Stockholm
   Ahrbom and Zimdahl, Architects

4. Helena Rubinstein Shop, New York
   Harold Sterner, Architect

5. Apartment, Milan
   Gio. Ponti, Architect





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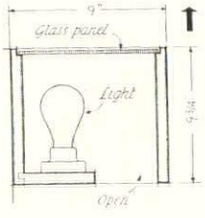

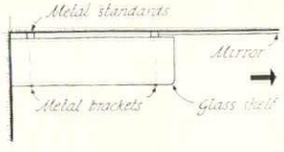

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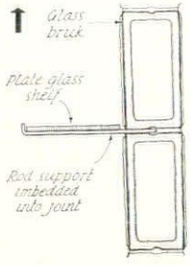
PHOTO: DUNCAN



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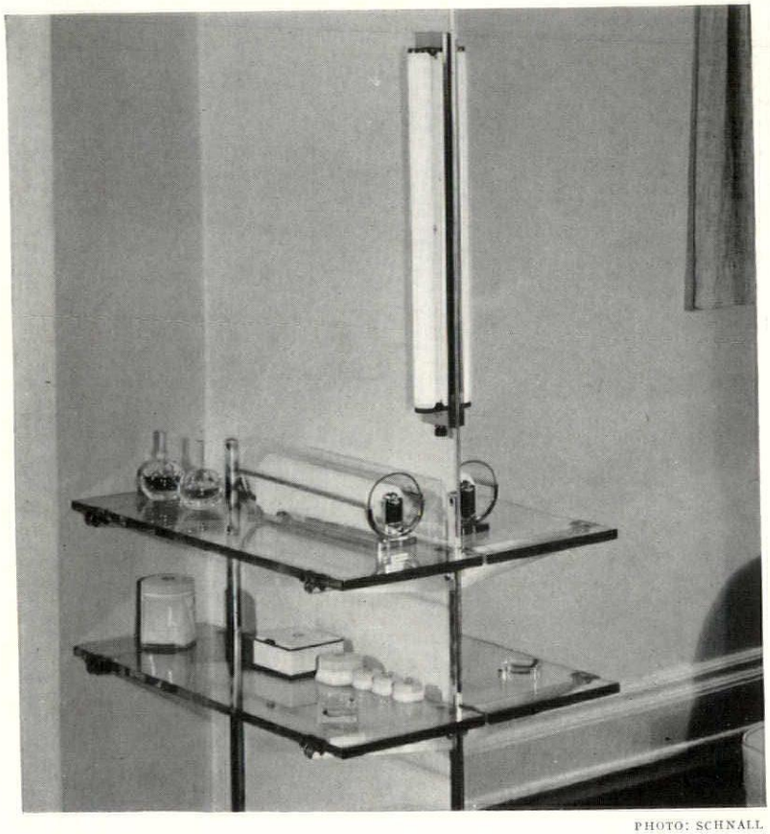
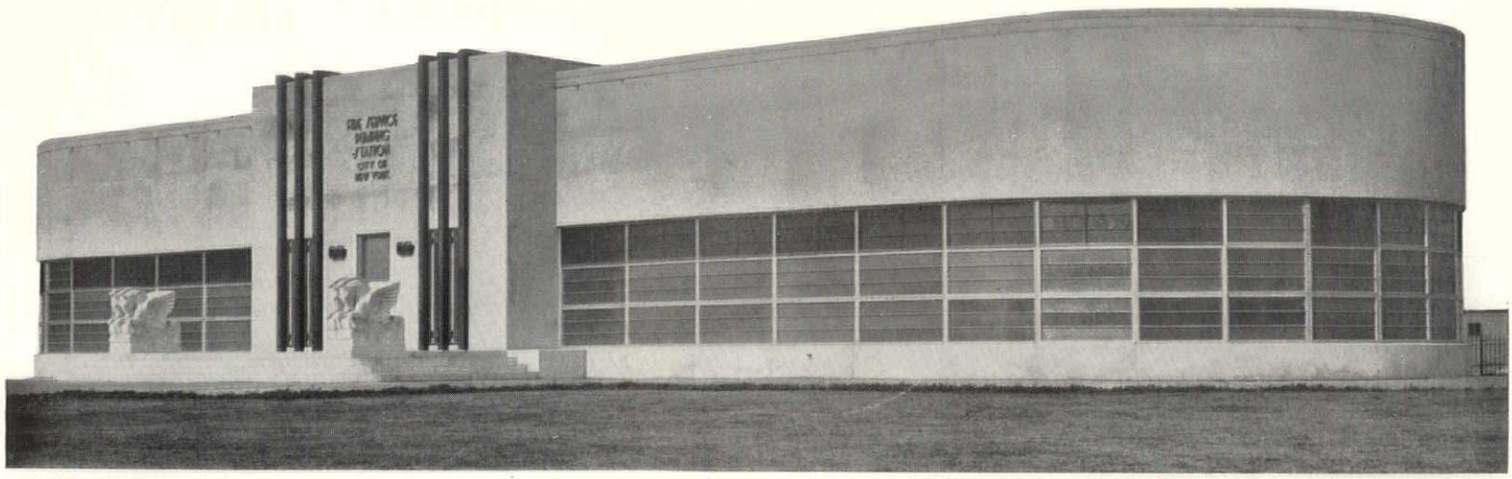


PHOTO: SCHNALL

1. Apartment, New York
   Paul Bry and Joachim Hoffmann, Designer

2. Apartment, New York

3. Residence, Benton Harbor, Mich.
   Pasquale Iannelli, Architect



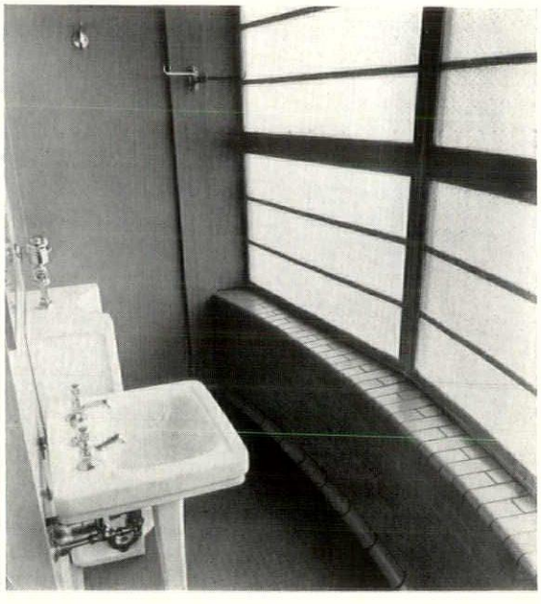
PHOTOS: SCHNALL

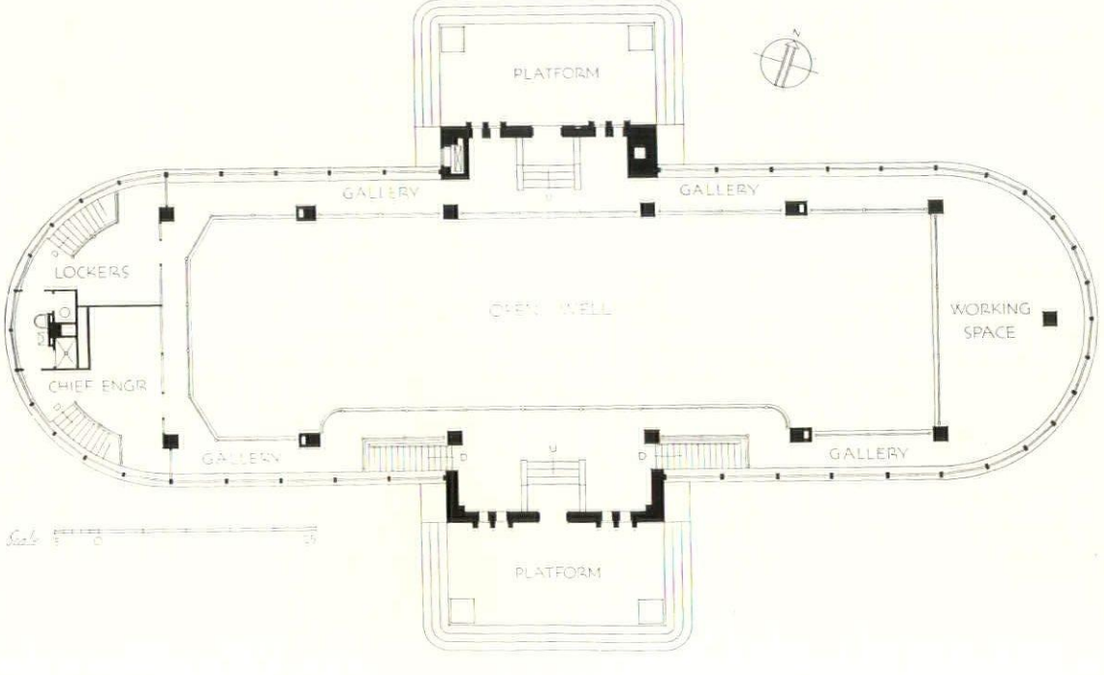
PUMPING STATION, NEW YORK CITY

IRWIN S. CHANIN, ARCHITECT

This high-pressure water pumping station was planned to maintain constant pressure for a portion of Coney Island. Designed for the City of New York, the comparison, architecturally, of this structure with the usual municipal plant is indeed marked, although the sculptures seem a bit affected and contribute little to the appearance of the building. The unusually deep band of masonry above the windows was dictated by the utilitarian nature of the building and shelters massive overhead beams built to support cranes capable of supporting and moving entire pumping units

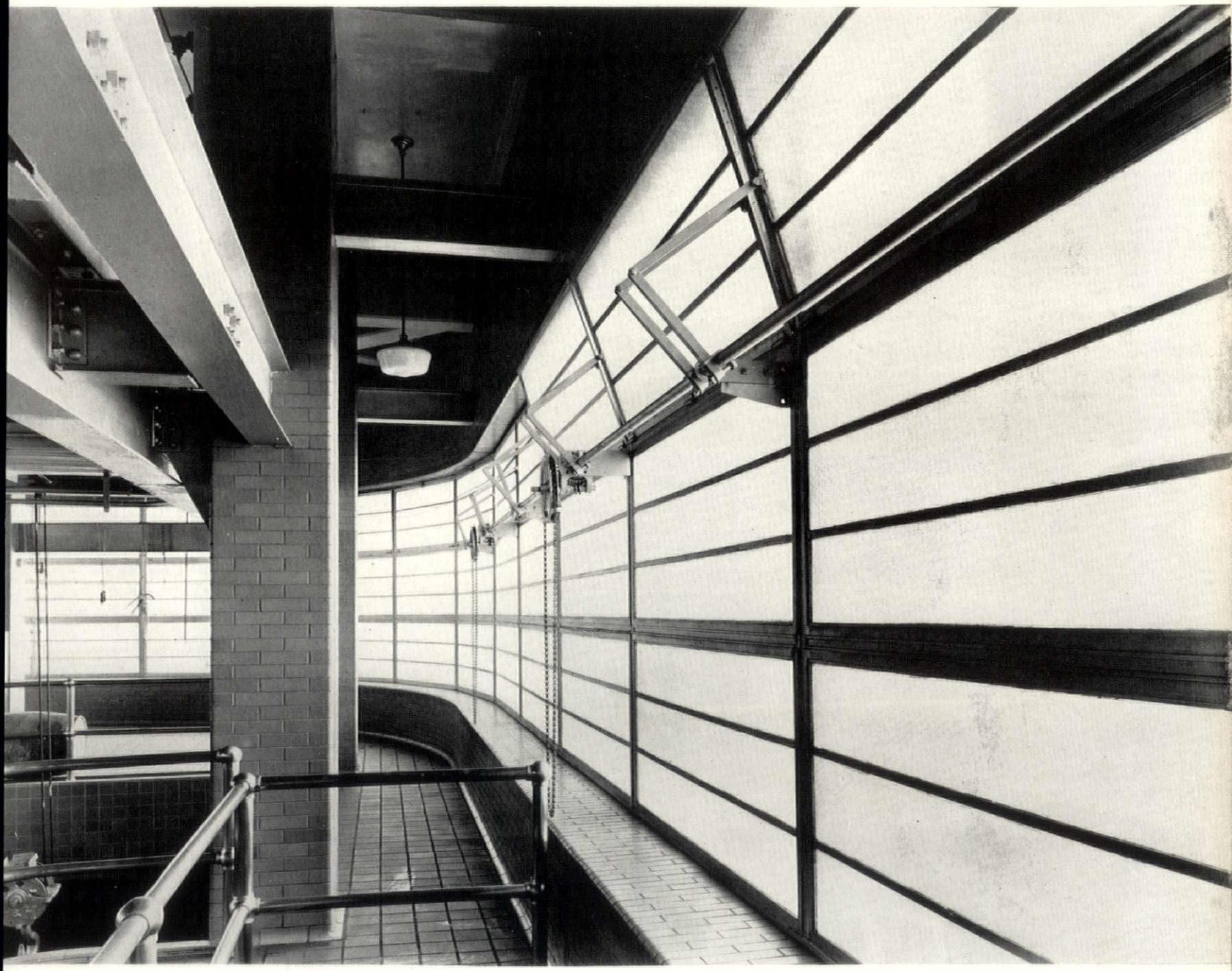
PUMPING STATION, NEW YORK
IRWIN S. CHANIN, ARCHITECT

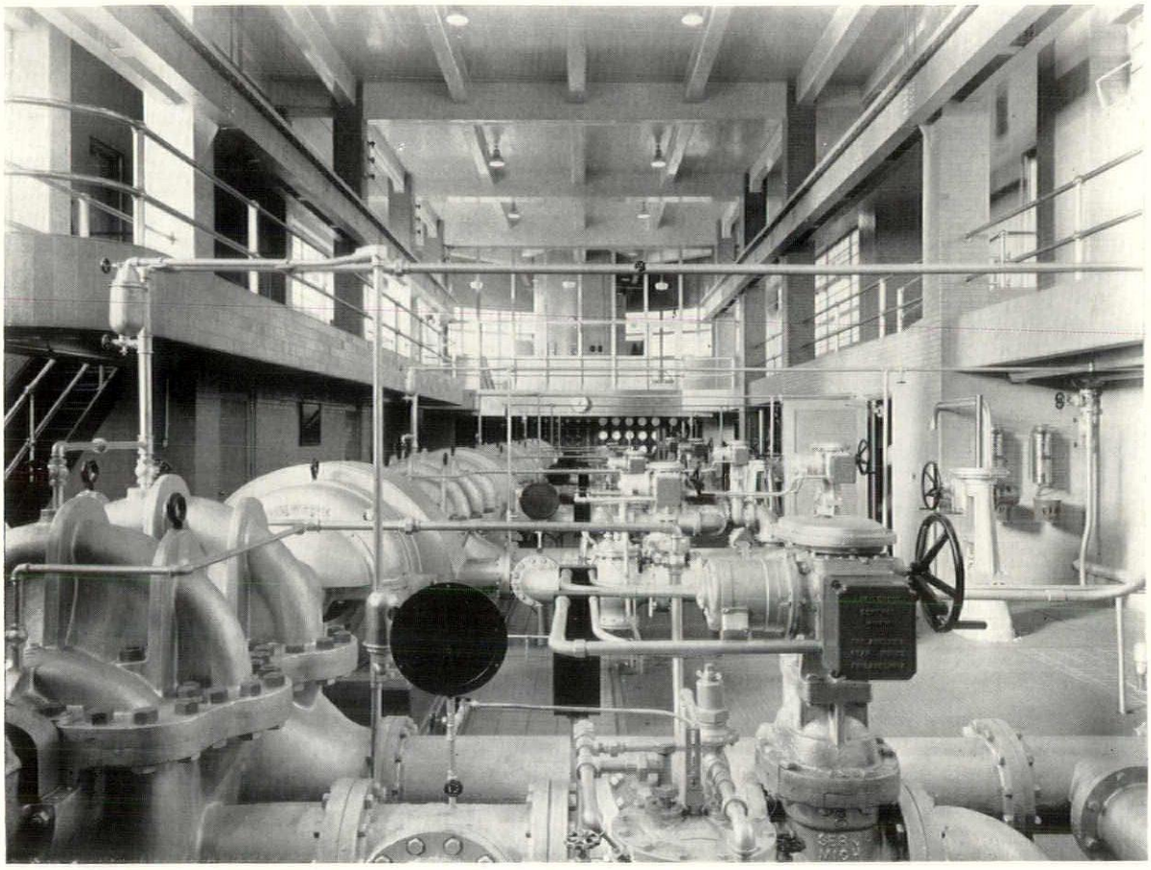


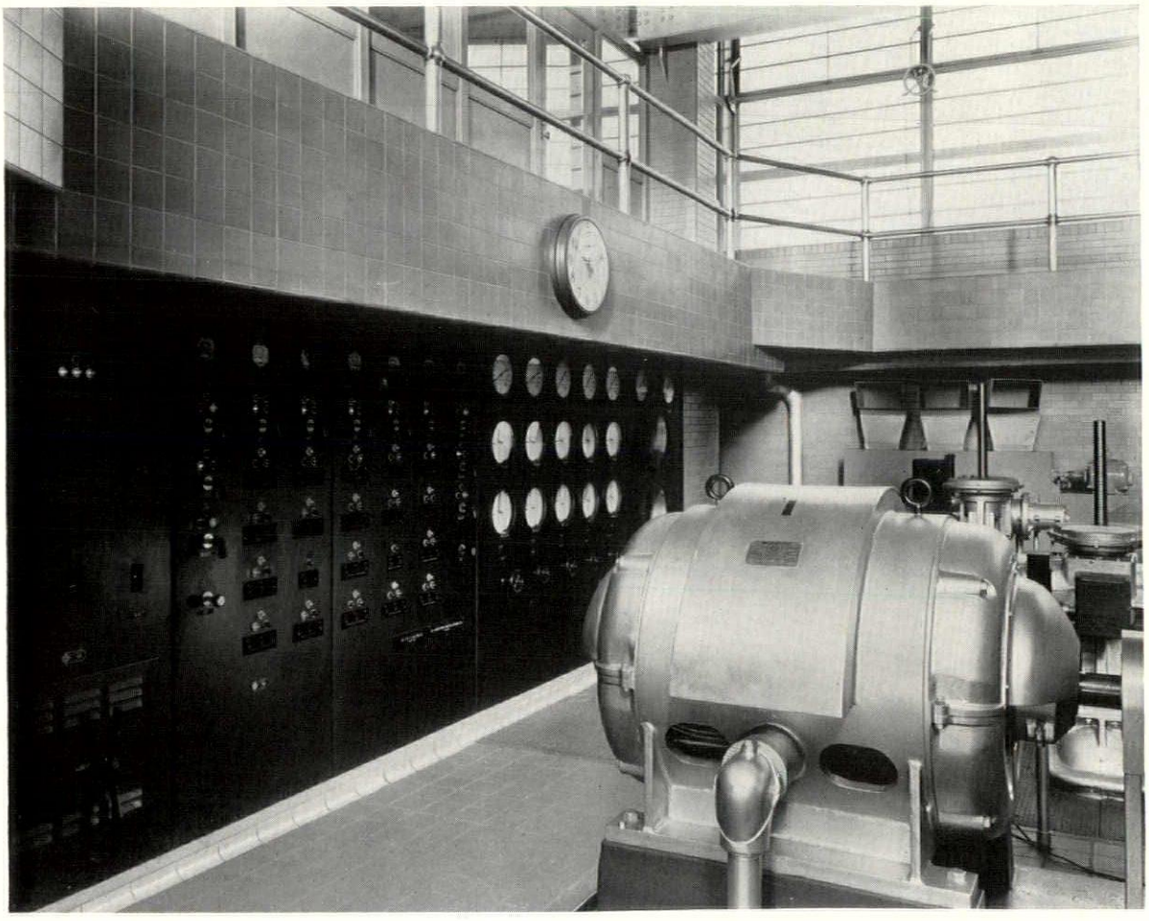


The ends of the building were purposely made semi-circular to aid in the diffusion of natural light. The fact that the resulting lines add to the general interest of the building is entirely incidental. Most interior finish is of warm colored glazed brick and tile

One of the most important problems of the architects was to provide the greatest possible amount of natural light for a pumping floor situated about 12 feet below ground level, at the same time maintaining daylight on a mezzanine floor located approximately at grade. Prismatic glass employed in the entire perimeter of the building was chosen for this function. Only the top unit of the steel windows can be opened; the lower two being fixed







Above is a general view of the pump space showing the continuous girder tracks that support the overhead crane; below is the control gauge board

PUMPING STATION
IRWIN S. CHANIN
ARCHITECT

EWING GALLOWAY

AUTOMATIC HEATING AND AIR CONDITIONING

By GRAHAM FORD

I SYSTEMS.

II EQUIPMENT.

III DESIGN.

AUTOMATIC HEATING AND AIR CONDITIONING

CONSTANT progress in the improvement of automatic heating and air conditioning equipment and systems for buildings makes it important for every architect, contractor and building owner to review periodically the changes that have taken place. Only by such surveys and comparative study can the modern designer keep step with the improvements commercially available for new buildings and the modernization of existing equipment.

This study combines, condenses and brings down to date a series of articles which have appeared in AMERICAN ARCHITECT AND ARCHITECTURE during the last five years. New information has been introduced, obsolete data eliminated and the whole subject re-appraised in the light of present practices. The task of condensing so vast a field of knowledge into a workable and useful reference manual has compelled the division of the subject into three major parts, with occasional disregard for the fact that decisions relating to matters discussed in one part may vitally affect the consideration of details analyzed in other sections of the article.

PART I—SYSTEMS— discusses broadly the design objectives of automatic heating and air conditioning installations, and describes the five basic types of installation from which a choice must be made at the start of a project. It then describes the individual types of heating systems, considering first, those that use boilers, radiation and piping; and second, those that use air as the medium for distributing heat.

PART II—EQUIPMENT— deals primarily with automatic heating and air conditioning elements, including boilers, furnaces, fuels, piping, valves, radiation, and the many forms of equipment available to the designer's choice.

PART III—DESIGN— shows how to calculate heating and air conditioning loads for any specific project, so that the designer can determine the capacities required of the equipment and thus crystallize his earlier general decisions into definite specifications of manufactured products.

PART I

AUTOMATIC HEATING AND AIR CONDITIONING SYSTEMS

The selection of heating and air conditioning systems and equipment would be a comparatively simple matter if there were not so many different ways of accomplishing the desired results. Each basic type of equipment has advantages and limitations. No one type is universally adaptable to all climatic conditions.

Choice is determined by the range of functions the installation must perform. Shall it involve heating only, winter air conditioning, or partial or complete summer air conditioning as well? And shall it meet accepted standards of performance or must special conditions be provided?

STANDARD COMFORT CONDITIONS

Conditions to be attained for maximum human comfort under normal circumstances, and the range of variation sometimes encountered are expressed in the following "design" standards:

Heating Equipment should be capable of maintaining an indoor temperature of 72°F in all ordinary living quarters, offices and rooms where occupants are sedentary, regardless of outdoor temperatures. Variations from this temperature level may be made upward or downward for special rooms or special occupancies.

Humidifying Equipment should be capable of maintaining a relative humidity of 40% indoors during the heating season but must also be subject to control so that the relative humidity may be lowered sufficiently to prevent excessive condensation on windows or cold surfaces in excessively cold weather.

Air Motion should be maintained in winter at a rate that will assure uniform distribution of heat (within .75°F temperature difference per foot of height) at all times. In the summer air motion requirements depend upon related comfort

conditions but may be broadly expressed as equalling 3 to 10 air changes per hour, except when used for night cooling when blowers should be capable of changing the air 30 to 35 times per hour. To meet these standards, either in summer or winter, forced circulation is generally essential; but in winter heating alone, gravity circulation, stimulated by properly placed radiation or duct work, may suffice.

Air Cleaning Equipment should be able to remove from air circulated by fans or blowers substantially all dust, pollen, soot and grit. It also is desirable that the equipment be able to absorb most smoke and perceptible odors.

Cooling Equipment should at least be capable of removing latent heat released by condensation in dehumidifying equipment plus the sensible heat added indoors by human activities and mechanical equipment, so that indoor temperatures do not exceed outdoor temperatures. From this minimum the capacity may be increased to reduce air temperatures indoors to a maximum of 15°F below the prevailing outdoor temperature. It should be observed that cooling alone may not produce comfort; temperature, humidity and air motion together determine summer comfort conditions.

Dehumidification Equipment must be related to cooling equipment and air motion to maintain an effective temperature of approximately 71° E. T. in summer or 66° E. T. in winter. There is a marked tendency among advanced designers to depend as much upon air motion and dehumidification as upon temperature reduction for summer comfort in the northern and humid sections of the United States, and to consider cooling alone without adequate dehumidification as causing discomfort in these areas.

Automatic Control of heating, cooling and air conditioning is a prime essential of comfort. No system can be manually operated to maintain the required balance of temperature, humidity and air motion without constant and expert supervision. Hence, the degree to which automatic control equipment is employed in modern installations governs, as much as any other one factor, the maintenance of desirable comfort conditions.

DESIGN OBJECTIVES

Regardless of the completeness of the system—whether designed for heating alone or for complete air conditioning—there are four primary objectives which should govern the selection of systems and equipment:

(1) Uniformity of indoor conditions, regardless of daily and seasonal weather variations. This uniformity applies to temperature alone if heating only is to be accomplished; or to temperature, humidity and air motion, if complete air conditioning is planned.

In detail this means that the system should produce uniform comfort within rooms and between rooms; counteract sun effect, wind exposure and the vertical variation experienced in tall buildings, known as chimney effect; and be responsive to changes in outdoor conditions at all seasons.

(2) Convenience of operation and control, which requires that desired uniformity be maintained automatically at predetermined standards, while permitting manual variation whenever it is desired temporarily to modify these standards.

(3) Minimum operating costs which involve maintaining uniform conditions with the least possible fuel, minimum consumption of power or water by accessories, and low overhead, repair and replacement costs.

(4) Minimum initial cost consistent with the foregoing objectives.

No one system fully meets these requirements under all conditions of service; else there would be only one type in common use. But practically any type of system can be made to perform satisfactorily and to meet the first three essentials of uniformity, convenience and operating economy if the fourth—initial cost—is not considered.

Selection therefore depends upon balancing the ideal objectives against budget limitations and other project requirements.

TYPES OF SYSTEMS

Consideration must be given early to the choice between a recirculating air distribution system employing ducts; a steam, vapor or hot water system employing pipes; or a combination system using both. In many cases, however, no final decision can be made as to which type or combination is best for a given project until the probable layouts are considered in the light of a completed installation.

For example, space limitations may govern the choice. If pipes or ducts must be concealed, the type of system may be influenced by the relative size of distribution lines for a given amount of heat carried. The following are approximations of the number of heat units (Btu) that may be transmitted per square inch of pipe or duct per hour: summer cooling, 80; gravity warm air heating, 150; forced warm air heating, 400; gravity hot water heating, 20,000; low pressure steam, 60,000; and forced circulation hot water, 120,000. Obviously, piped distribution systems require but a fraction of the space needed for the concealment of ducts; yet this advantage may be entirely offset by the floor space occupied in each room by free standing radiators, or by separate humidifiers, or air conditioning units if the piped system is to provide seasonal or all-year air-conditioning.

More important than space considerations are the relative performance characteristics of the various systems available today. Since heating is a requirement common to all normal buildings and air conditioning is not, these systems are classified according to the manner in which heat is generated and distributed. The five basic divisions are: 1, the Direct Fired (or full warm air) System; 2, the Indirect System; 3, the Split System; 4, the Auxiliary System; 6, the Unit System.

In making relative comparisons between these systems, the following considerations should be borne in mind: first, the extent to which the system will perform the functions initially desired (heating, winter air conditioning, cooling, etc.) and second, adaptability to all-year conditioning.

SIMPLE DEFINITIONS OF HEATING AND AIR CONDITIONING TERMS

GENERAL TERMS

Dry-Bulb Temperature is the temperature of air as indicated by a thermometer of standard type.

Wet-Bulb Temperature is the lowest temperature which a wetted body will attain when exposed to an air current. It is measured by a standard thermometer having its bulb wetted by water and exposed to vigorous air circulation.

Effective Temperature is an arbitrary composite index of the effect on the human body of a combination of temperature, humidity and movement of air. It has been experimentally determined and is used as an index to air conditions which affect human comfort.

Dew-Point Temperature is the temperature at which air would become fully saturated (100% relative humidity) with its present moisture content. Its importance in air conditioning lies in the fact that when air containing a certain amount of moisture is cooled below its dew-point temperature, part of its moisture content is condensed. This makes it possible to dehumidify air by refrigeration.

Relative Humidity is a measure of the quantity of water vapor in a given body of air expressed as a percentage of the total amount of water vapor the same air would contain at the same temperature if fully saturated. It should be noted that the amount of water vapor in saturated air varies with the temperature of the air.

Sensible Heat is heat that raises the temperature of a body which absorbs it. It is measured by a standard thermometer.

Latent Heat is heat that is absorbed or given off by a substance when changing its state from solid to liquid or gas, or vice versa without changing its temperature. It is important in air conditioning as the heat required to evaporate water for humidification purposes and the heat released by water vapor when condensed in the dehumidifying process.

British Thermal Unit is substantially the quantity of heat required to raise 1 lb. of water one degree F. (from 63 to 64 F.). It is expressed as Btu and is the measure of quantity of heat as distinguished from pressure of heat, which is temperature.

Degree-Day is a unit representing a difference of one-degree Fahrenheit existing for one day between the average indoor and outdoor temperatures. The standard degree-day is based on an average indoor temperature of 65 F. Degree-day tables are based on Weather Bureau records and reflect both the number of days in a heating season and the number of degrees Fahrenheit through which a building must be warmed during that season.

HEATING TERMS

Equivalent Direct Radiation is that amount of heating surface which will give off 240 Btu per hour. It is used for measuring the capacity of radiators, convectors, and boilers as an alternate for their output in Btu. By definition equivalent direct radiation applies to steam temperatures, but custom employs an equivalent direct radiation for hot water radiation equal to 150 Btu per hour. Unless hot water radiation is specified, E. D. R. always refers to steam heating equipment.

Mains—the principal pipes through which the heating medium is carried and to which branches and connections are made.

Risers—vertical pipes throughout a building including the vertical connections to radiators.

Branches—pipes connecting the mains with the base of risers.

Warm Air Heating, using ducts for the distribution of heat from a central source, is readily adaptable to winter, summer and all-year air conditioning because its prerequisite is the circulation of air from the heated or conditioned space through the central plant where it can be treated as required.

The use of warm air heating is limited by the resistance developed in excessively long ducts and by the space required to house large ducts or plenums required to transport the air any considerable distance. Warm air heating is therefore primarily adapted to dwellings and to other relatively small buildings. It should be noted, however, that ventilating systems, frequently installed in schools, churches and auditoriums and theatres, are adaptable to warm air heating and complete air conditioning.

Piped Distribution Systems, employing steam, vapor or hot water as the heating medium, have a number of advantages for heating purposes, but less readily adapted to air conditioning. The advantages of piped distribution systems are that heat may be transported long distances from a central plant, sections of the building may be zoned or subjected to localized control, the space

Runouts or Radiator Runouts—pipes connecting the base of the vertical connection for radiators with the risers or mains.

Dry Returns—return mains or branches run above the water line of a boiler, receiver or seal to which they connect.

Wet Returns—return mains or branches run below the water line of a boiler, receiver or seal to which they connect.

Drips—connections for draining the condensate from mains, base of risers, etc.

Equalizer—a pipe for equalizing the pressure between two points in a system.

Equalizer Drip—a drip without trap or other obstruction for draining the condensate from one point to another and for equalizing the pressures between these two points.

Hartford Connection or Underwriters' Loop—an arrangement of piping used on low pressure steam boilers to prevent water being backed out of the boiler into the returns when the pressure in the boiler exceeds that in the returns. The wet return is brought up to the level of the water line of the boiler where it meets an equalizer pipe connecting to the supply header before dropping again to the return inlet.

Alternating Return Trap or Alternating Return Trap and Receiver—returns water to a boiler and alternately permits the condensate to flow into the receiver and from the receiver to the boiler, and prevents water from backing from the boiler into the receiver and from the returns being backed out of the receiver into the return system.

AIR CONDITIONING TERMS

Adsorption designates the property of certain substances to condense water vapor without themselves being changed either physically or chemically. Silica-gel, activated alumina and some other materials will take up and condense considerable quantities of water vapor from surrounding air at normal temperatures and will then release it again by evaporation when heated.

Absorption connotes the property of substances to dehydrate air, accompanied by some definite physical or chemical change, usually forming a solution of the absorbing material. The application of this term in air conditioning normally refers to dehumidifiers employing sprays of lithium or calcium chloride. It also applies to refrigeration equipment where the cycle is operated by direct application of heat as in domestic gas refrigerators.

Register—is a grille with a built-in damper or shutter, for installation at air inlets and outlets.

Grille—is a perforated covering for an air inlet or outlet usually made of wire screen, pressed steel, cast iron or other decorative materials.

Damper—is a butterfly or shutter device for shutting off or regulating the air flow in ducts, etc.

Deflector—is a plate or partition in ducts for deflecting or directing the flow of air.

Diffusers or Splitters—are plates or partitions in ducts for directing or properly diffusing the air over the area of the duct.

Velocity Head—denotes the pressure—usually measured in inches of water—necessary to create a corresponding air velocity without considering the effects of friction.

Static Pressure or Head—denotes the pressure—usually measured in inches of water—exerted by the air in a duct or fan at right angles to the direction of flow, or the pressure which is exerted in all directions in an enclosure independent of velocity pressure.

Static Friction or Resistance Head, or Friction Loss—is the static pressure necessary to overcome friction.

required for distribution lines is relatively small, and uniformity of heating effect is readily assured by good design of the installation.

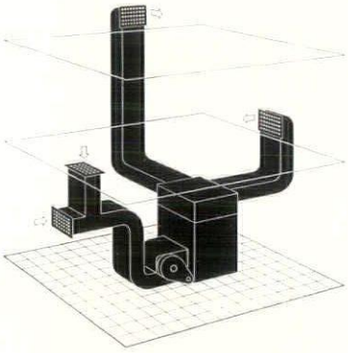
The adaptation of these systems to either winter air conditioning, summer air conditioning, or all-year conditioning is made somewhat difficult by the fact that radiators and convectors are not normally equipped to provide air motion, air cleaning or proper humidification. Therefore, piped distribution systems usually require the installation of unit blowers, humidifiers and air cleaners in each space or zone that is to be completly conditioned in winter. Summer air conditioning requires the use of unit coolers with their own fans and air cleaners.

Buildings having piped distribution systems require multiplicity of units if the entire structure is to have all-year air conditioning; but individual spaces may be readily conditioned by the use of such units without any major modification of the central heating plant.

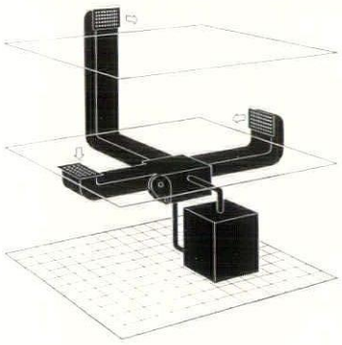
THE DIRECT FIRED SYSTEM

Simplest of all in conception, the direct fired system consists of a furnace directly connected to supply and return ducts with such supplementary

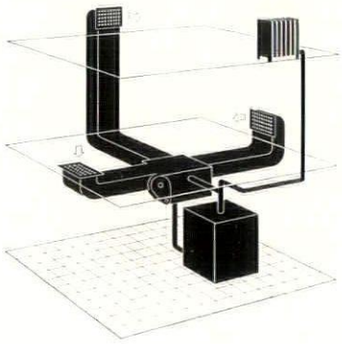
AUTOMATIC HEATING AND AIR CONDITIONING



DIRECT FIRED SYSTEM



INDIRECT SYSTEM



SPLIT SYSTEM

conditioning devices as the project may require. A blower, air cleaner and humidifier, all connected to duct system, and automatically controlled, provide winter air conditioning; cooling and dehumidifying units may be added for all-year air conditioning.

Advantages are: low initial cost and, usually, low operating cost, chiefly because there is only a single heat transfer in this system with correspondingly high thermal efficiency. Automatic control is simple, though confined to on-and-off operation of the whole system. Since no water is used, winter shut-downs, when the building is not occupied, do not require drainage of the system. All other advantages of duct-type distribution, as described later, apply to direct-fired installations.

Limitations include: On-and-off operation of the central heating plant demands sensitive automatic control to maintain uniformity throughout the system. Solid fuels, automatically fired or controlled, have a high-low heating characteristic that tends to minimize these fluctuations. Furnace bonnet temperatures must govern blower operation to prevent overheating of the air. Undesirable noises may be "telephoned" through the ducts unless sound absorbing lining material is installed in suitable sections of the supply and return mains.

A fundamental limitation of direct fired systems is their inability to provide a domestic hot water supply without a separate hot water heater. This is not necessarily a disadvantage, for there are many cases where a source of hot water independent of the heating system is desirable or necessary. Modern auxiliary hot water heaters will be discussed in detail in Part II.

THE INDIRECT SYSTEM

Midway between the Direct Fired and the Split Systems stands the Indirect System. It employs a steam or hot water boiler instead of a furnace as the means of generating heat, and suitable heat transfer coils in the main duct system (or at secondary points throughout the building in large installations) instead of transferring heat directly from the outside surface of the combustion chamber to the air circulated around it. Otherwise the duct system and the use of conditioning apparatus is identical with that employed in either the Direct Fired or the Split System.

The only difference, in fact, between an Indirect and a Split System is that in the former all of the heat generated is transferred to air within ducts prior to distribution to the rooms, while in the latter some rooms may be heated by radiators or convectors.

Advantages include: Complete elimination of any tendency to telephone combustion noises through the duct system, (although some sound absorbing lining is always desirable in the main ducts to quiet the sound of blowers or other equipment). Greater uniformity in heat supply with on-and-off firing mechanisms, particularly when hot water is the heating medium. Somewhat superior control by automatic devices is possible, as the quantity of heat may be modified, and fan operation may be independent of firing. Domestic Hot Water may be generated in the boiler, summer and winter.

Limitations are: higher initial cost, slightly lower thermal efficiency than Direct Fired Systems; less adaptability to varied room and plan requirements than Split Systems.

THE SPLIT SYSTEM

This system provides, as its name indicates, a combination of two major elements: a boiler for steam or hot water which will supply direct radiation in certain parts of the house (usually kitchens, bathrooms, service quarters and garages) and also the steam or hot water to a heat exchanger —which may be regarded as a wholesale radiator. This latter element, in conjunction with a blower, filter, humidifying or other conditioning equipment, furnishes conditioned air to the remainder of the house through a system of ducts, registers and grilles, such as is used in both the Direct Fired and the Indirect Systems.

Advantages of the Split System include those stated for the Indirect System, and these additional ones: It is seldom desirable to return air from kitchens, bathrooms or garage, and it is not always essential to provide conditioned air in servants' quarters, or service areas. With the Split System these parts may be heated by radiation.

Another advantage is its adaptability to a house formerly heated by radiators and in process of being remodeled. In such a case it is usually the practice to continue the use of radiation for all space above the first floor, removing it from the first-story living rooms and replacing it by air conditioning ducts and grilles as required. This saves running ducts through existing partitions or furring for them through the first story, since all air ducts reach the lower part of the house through the first floor.

There are occasional conditions under which the designer will almost of necessity choose the Split System: houses of long narrow plan, and houses in which too few partitions carry through both stories, making a workable duct system impracticable.

Limitations center around these considerations: In order to maintain comfortable air conditions in some parts of the house by one means, and in other parts of the house by a different means, a more extensive system of automatic controls becomes necessary.

It is apparent that all four of the essential functions of winter air conditioning are not performed by this system to the full extent. Those rooms which are heated by direct radiation do not have a positive circulation of air, nor air cleansing. Humidification is achieved to a larger extent than either of these other functions, because water vapor disperses more rapidly than heat. The initial investment in a Split System is higher, generally speaking, assuming equal quality, than the Direct Fired System.

Within these limits, this system provides for circulation of air all the year around, and also permits a future installation, without radical structural changes, for summer air conditioning. It

should be noted that summer functions are performed by the Split system only to the extent to which the system provides for direct air conditioning in winter. Rooms that are heated by radiators cannot be fully air conditioned either in summer or winter. In the Split system, the rooms from which odors are to be exhausted rather than recirculated may be clarified by local vents or other exhaust methods. It is good practice in all duct-type systems to maintain a slight air pressure in the conditioned space to deter air in untreated rooms from flowing into treated areas.

THE AUXILIARY SYSTEM

The fourth system might be called by any one of a number of names, and it is new enough to have as yet no generally accepted label. It includes a central boiler for steam or hot water, supplying heat directly to all rooms by means of radiators of any type. An auxiliary unit consisting of a blower, filter, and humidifying element, supplies air (filtered and humidified, and it may be tempered or heated) to certain rooms through the necessary ducts, registers and grilles. The heating of the house is done independently by direct radiation, while the other essential operations in winter air conditioning are supplied by this auxiliary recirculating system. This auxiliary system can be elaborate, extending ducts to each room, or simple, comprising one or two duct lines.

There is one point in connection with this system that should be kept in mind; in order to achieve humidification without cooling the circulated air, it is necessary to temper, with a steam or hot water coil, either the water to be evaporated or the air which is passed through the humidifying unit.

Advantages and limitations are fairly obvious: The auxiliary system was developed primarily for modernizing houses already supplied with radiation-type heating. For such conditions it is economical and satisfactory. For new projects one of the other types would normally be a more logical choice.

THE UNIT SYSTEM

The fifth type of automatic heating and air conditioning system employs any steam vapor or hot water heating installation supplemented by unit air conditioners in each room or space where conditioned air is wanted. These units replace the standing radiation in most instances. They are manufactured in a wide range of types, offering ventilation and air motion alone, winter air conditioning, summer air conditioning or a combination of all functions for all-year operation. The units themselves will be discussed in Part II.

Advantages and limitations are chiefly these: Unit systems are particularly suited to rented space, such as apartments, offices, stores, shops and restaurants, where individual occupants have varied requirements and a central system is too costly or unnecessary. Obviously if an entire building, or any major part of a large building were to be conditioned, some central system would be less costly to install and operate than a multiplicity of self-contained units.

HEATING WITH RADIATORS OR CONVECTORS

It now becomes necessary to divide the consideration of automatic heating and air conditioning systems, and to consider the more specific types available to the designer. Since heating is an element common to all installations it will be treated first; and, since there are far more types of systems to be considered that use pipes and radiators or convectors than systems that use ducts and registers, first place will be given to radiation-type heating.

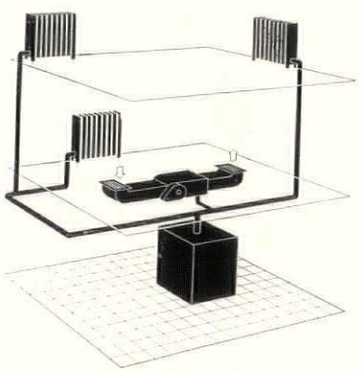
Each of the following systems has many possible minor variations resulting from the development of patented accessories or combinations of parts. To recognize each proprietary feature adequately and fairly would require far more space than can be afforded here. Therefore, only basic types of installation are presented, without prejudice to the many devices offered by manufacturers for modifying and improving the characteristics of each system.

ONE-PIPE STEAM SYSTEMS

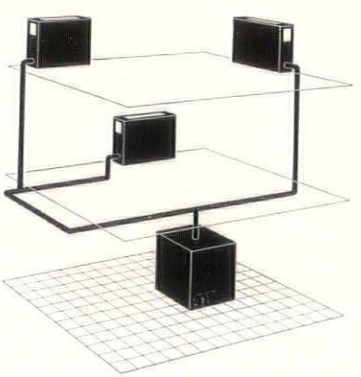
Elements of one-pipe steam systems are: a steam boiler, steam-type radiators or convectors in each room, one or more steam mains normally forming loops pitched from a high point above the boiler outlet to a low point at the boiler return, and single branch pipes connecting each radiator or convector with one or another of the mains. The branches are pitched sharply from radiators to mains so that condensation will drain back to the loop *against* the steam flow. Each radiator must be equipped with an air vent valve which will permit the steam to drive out any air in the system without letting steam or water escape. See diagrams on page 76.

Steam mains may be located on ceiling of basement (up-feed system) with risers to radiators or in a pipe loft or attic above the highest radiator (down-feed system) with risers dropping down past radiators and continuing to a return loop near the floor of the basement. Note that the down-feed system requires somewhat more pipe than the up-feed system, that steam and condensate flow in the *same direction* except directly at the radiator connection, that this system eliminates piping from the ceilings of basement space, and that risers may be of smaller size. Up-feed and down-feed systems may be combined, if desired. See diagrams on page 78.

Characteristics are: Lowest initial cost of all piped distribution systems because single runs of pipes carry both steam and condensate; radiator valves may be low-cost, angle type; air vent valves on radiators and high points of piping are inexpensive; and no thermostatic return traps or other accessories are employed. Simplicity of design and installation, coupled with the requirement that both



AUXILIARY SYSTEM



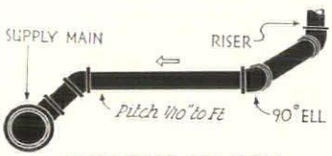
UNIT SYSTEM

design and installation be correct in every detail to assure reliable operation. Suited to zoned or combination systems only when constant heat delivery is maintained at boiler, and separate sections are dripped independently of each other. Usually intermittent in operation; individual radiators must be fully on or entirely off; humidifiers and other conditioners similarly intermittent in operation, as system is hot only when steam is being delivered and cools quickly when the supply stops.

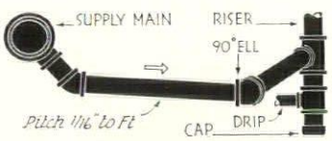
Performance characteristics are: There is a lag in heating up while air vents are discharging air and a rapid cooling following cessation of steam delivery. Unless mains and branches are skillfully balanced to distribute the pressure drop correctly, radiators nearest to the boiler receive heat first and stay warm longest; those which are remote heat last and cool first.

These disadvantages have been overcome in a large measure by the application of automatic heating devices. Controls can be installed to maintain the boiler water at a few degrees under the boiling point. Air valves with adjustable venting orifices have been developed which tend to retard the rate at which radiators heat depending upon their distance from the boiler.

In terms of the four design objectives, the performance of one-pipe steam systems may be rated: *Uniformity*, poor or difficult to achieve, except as noted above. *Convenience*, limited to on and off control of individual radiators or thermostatic control on boiler or firing mechanism. *Operating cost*, variable due to lack of precise control, but usually moderate because of low overhead and low maintenance. *Initial cost*, lowest of all piped distribution systems.

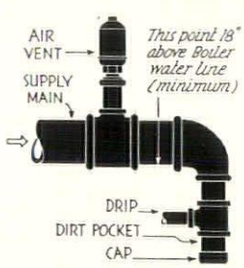


UNDRIPPED BRANCH CONNECTION

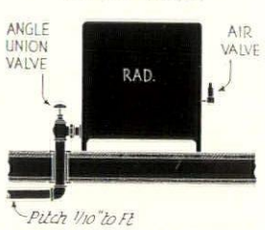


DRIPPED BRANCH CONNECTION

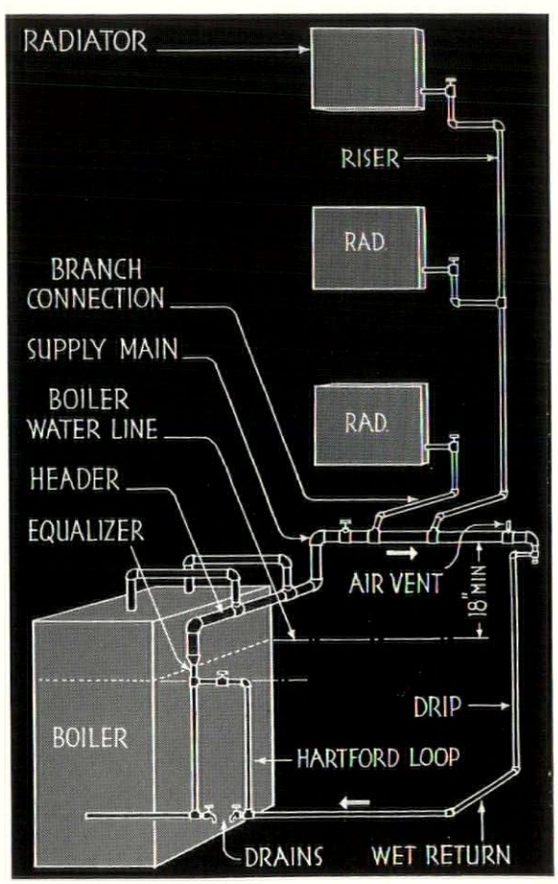
ECCENTRIC REDUCING COUPLING IN SUPPLY MAIN



DRIP AT END OF SUPPLY MAIN



RADIATOR CONNECTION



(Right) ONE-PIPE STEAM HEATING SYSTEM

ONE-PIPE VAPOR SYSTEMS

Elements are identical with one-pipe steam systems, except that vacuum-type air vent valves are used on all radiators and at high points in the return lines. These valves permit air to be discharged by steam, but prevent or retard its re-entry into the system for several hours.

Bellows-type vacuum valves are preferable to the disc-type vacuum valve because of the former's ability to vent at atmospheric pressure and their freedom from sticking. The adjustable venting orifice feature is also obtainable on all popular makes of vacuum air valves. This adjustment enables the installer to balance the system after completion so that all radiators will heat up uniformly.

Action of these valves develops a vacuum condition within the system, amounting to about 15 inches of mercury shortly after the fire is checked. Under this vacuum, generation of steam continues for a period, but at lower temperature than steam at or above atmospheric pressure. It is essential that the system be tight at all joints and connections and that radiator valves be of the packless type or else made air tight by very heavy packing. Piping may be up-feed or down-feed as in one-pipe steam systems. See pages 78 and 79.

Characteristics are: All the mechanical advantages of one-pipe steam systems. Limitations are the same as for one-pipe steam systems except that there is much greater uniformity in heating effect.

Performance characteristics are: radiators must be on or off, but intermittency of heating effect is far less than with one-pipe steam systems because radiators do not cool as rapidly. Rating is therefore:
Uniformity, fair. *Convenience*, limited by on or off control. *Operating cost*, lower than one-pipe steam. *Initial cost*, lower than any two-pipe systems; higher than one-pipe steam, because of higher cost of vacuum air valves.

TWO-PIPE VAPOR SYSTEMS

This is the modern type of two-pipe system often erroneously confused with ordinary two-pipe "steam" systems. Two-pipe air vented systems, similar to one-pipe systems previously described and also called two-pipe steam systems, are still sometimes used; they are not described here because they have largely been superseded by improved types.

Elements include boiler; hot water type radiation; a system of steam mains and branches serving radiators, a separate system of smaller dry returns (above water line of boiler) carrying air and condensate back to the boiler independently of supply lines; usually a set of wet returns for dripping the mains; radiator control valves of shut-off or modulating types at tops of radiators (preferably equipped with orifices); thermostatic

traps on the return end of each radiator or convector that will pass condensate and air but close against steam; thermostatic air traps on the ends of mains. Air in dry returns is vented to atmosphere by automatic, non-return air trap near the boiler. Condensate from dry return is returned to boiler by an automatic trap or pump; system must be airtight throughout, hence packless radiator valves are generally used.

System operates at very low pressures ranging from 8 oz. steam pressure to 15 inches of vacuum; therefore a sensitive steam pressure control is required for operating dampers or automatic coal, gas or oil burners. Piping may be arranged for either up-feed or down-feed.

Characteristics include: a fair degree of simplicity; double the length of piping as compared to one-pipe systems; normal steam size radiation; thermostatic traps required on each radiator; control valves may be any type, including modulating, automatic, etc., as condensate does not flow against the steam. Air is usually vented from system in basement or out of doors rather than into rooms, as air is removed with the condensate; no radiator vents are needed.

This type of system operates mostly above atmospheric pressure in severe weather, but below atmospheric pressure for several hours at a time in milder weather. Pressures above atmosphere must be developed often enough to purge system of air.

Radiator valves may be partly closed, limiting the supply of steam and thus governing heat delivery.

Performance and responsiveness depend largely upon the degree of control exercised by automatic devices. Uniformity of distribution depends upon design and operation of the system. Ability to operate through a considerable range of steam and vapor temperatures enhances the responsiveness of the system to variation in outdoor conditions, particularly in periods of mild weather.

In small installations variations in pressure and temperature are usually controlled at the boiler only. Under this condition, secondary equipment, such as humidifiers, unit heaters and winter air conditioners, can only be operated at temperatures demanded by the average radiation load. Or, a constant head of steam may be carried on the boiler: in which case, humidifiers, unit heaters, unit ventilators or separate air conditioning units, used in combination systems, may be operated continuously where necessary; some rooms may receive more or less heat than others, individual thermostatic control may be used on radiators and in general much greater flexibility and adaptability is possible than with one-pipe systems. Rating therefore, must be generalized according to equipment employed, as follows:

Uniformity: good if system is balanced and orificed; excellent if provided with local automatic controls; only fair if control is centered on operation of boiler in large installations. *Convenience:* wholly dependent upon controls employed plus simple manual adjustment of individual radiators as required. *Operating cost:* lower than for one-pipe steam; about equal to or slightly lower than one-pipe vapor systems according to nature of controls; and slightly higher than hot water systems. *Initial cost:* higher than one-pipe systems; less than hot water or two-pipe vacuum systems.

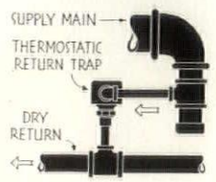
TWO-PIPE FREE VENTED SYSTEMS

Here again, trade terminology is confused by lack of standard usage. Sometimes called "modulating," "partially filled" or "atmospheric" steam systems, the free vented system should not be confused with either vapor or the nearly obsolete two-pipe air vented systems.

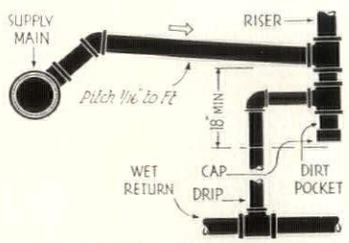
Elements: Similar to two-pipe vapor systems except that dry returns are freely vented (without vent valves) to the atmosphere so that air may be expelled from or taken into system as the steam supply is varied. Radiators may be kept partly filled with steam and partly with air in any desired proportion, thereby varying the heat output in accordance with weather requirements. Return traps are optional on returns from radiators; if orifices are used to limit the steam supply to the maximum each radiator can condense, traps may be replaced with ordinary return ells. This system is adaptable to all kinds of local and zone control in large buildings. One particular advantage is that a continuous but controlled supply of steam can be maintained in the whole system or in any part to meet weather requirements without allowing radiators to get entirely cold at any time. Condensate is returned to boiler by automatic trap or return pump. Drips from mains under pressure are connected through float-type drip traps or seals, into the same system of dry returns to which radiators are connected; hence only one set of returns is used. Venting of supply mains is through radiator connections directly into dry returns, but may be augmented by air vents equipped with thermostatic traps connected into dry returns. Supply and return piping may be located without reference to the water line of boiler but should drain by gravity to the receiver.

Characteristics are: Simplicity. Lower first cost than two-pipe vapor or vacuum systems, since orificing may replace return traps on radiators and no specialties are required at the boiler except an automatic return trap or pump and a

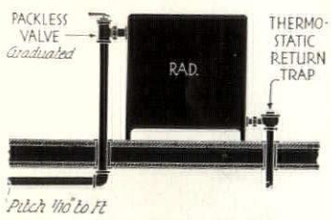
DRIP AT REDUCTION IN SUPPLY MAIN



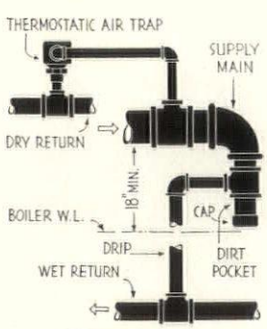
SUPPLY MAIN CONNECTED TO DRY RETURN



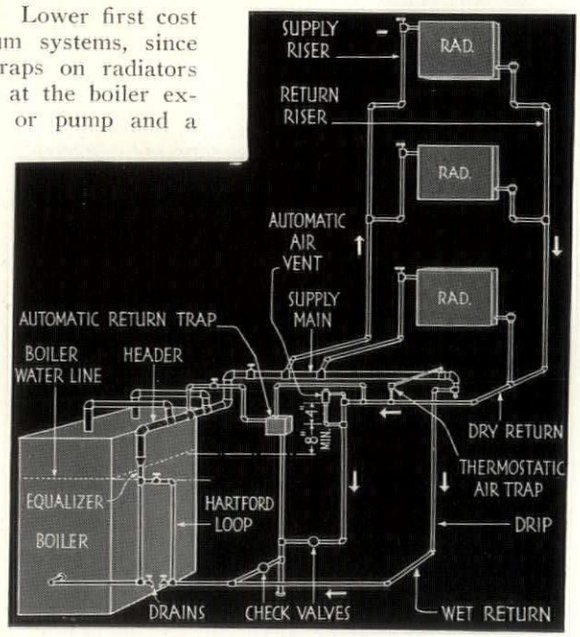
BRANCH CONNECTION DRIPPED TO WET RETURN



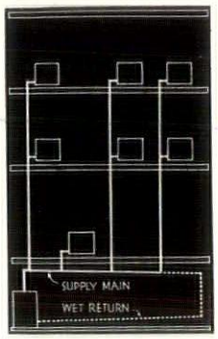
RADIATOR CONNECTION



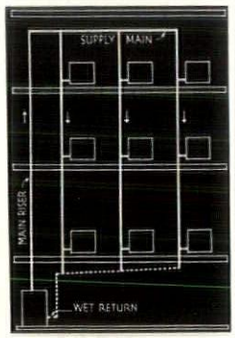
SUPPLY MAIN CONNECTED TO WET RETURN



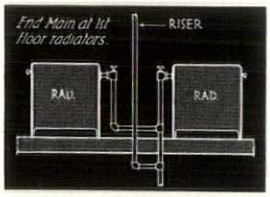
(Right) TWO-PIPE VAPOR HEATING SYSTEM



ONE-PIPE UP-FEED



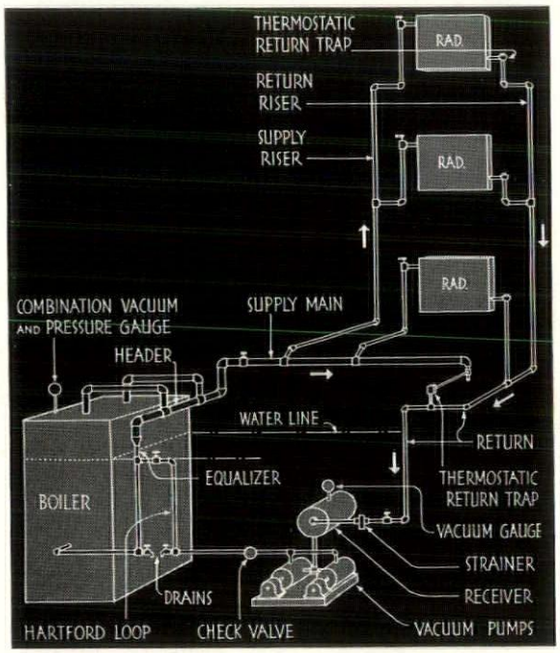
ONE-PIPE DOWN-FEED



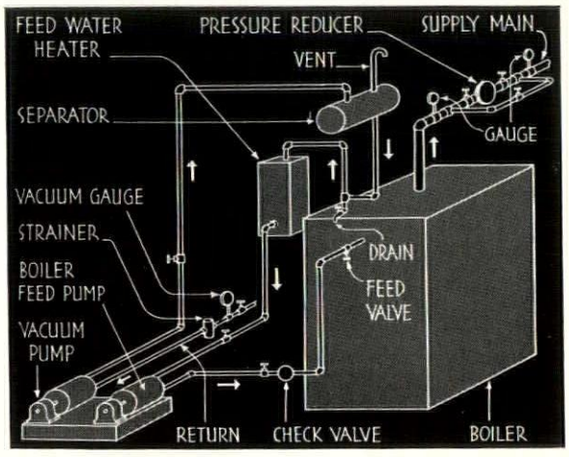
RADIATOR CONNECTION

sensitive steam pressure regulator. Has all advantages of vapor systems as to application of controls with greater range of heat output of individual radiators. Adaptable to all kinds of zone control systems. Heat output is controlled by partially filled radiation; hence any amount of variation is possible from zero to 100%. Constant steam pressure can be carried on boiler for operating auxiliary equipment.

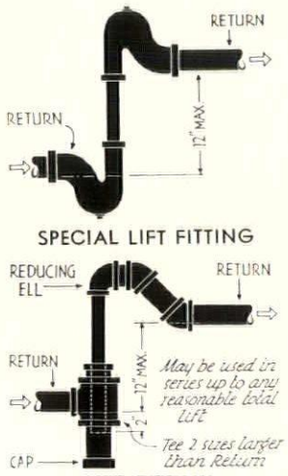
Performance is similar to that of vapor systems except that a constant steam pressure may be maintained when desired and heat output regulated throughout a wide range. Rating must be generalized according to the equipment employed, as follows: *Uniformity:* excellent if system is balanced, zone, orificed and/or subjected to local or regional automatic controls; only fair if control is centered on operation of boiler. *Convenience:* wholly dependent upon controls employed plus simple manual adjustment of individual radiators as required. *Operating cost:* lower than two-pipe vapor. *Initial cost:* usually less than other two-pipe systems.



VACUUM HEATING SYSTEM



HIGH PRESSURE BOILER CONNECTION



LIFT FITTING

TWO-PIPE VACUUM SYSTEMS

This term is used to denote installations in which condensate and air are continuously removed by a pump at pressures lower than those on the supply end. The pump may be required at times to maintain sub-atmospheric pressures as low as 26 inches of vacuum.

Elements are similar to two-pipe vapor systems except that condensate and air are handled by one return system back to a vacuum pump; all drips connect through thermostatic traps to this single return system; air is separated at pump or receiver and discharged to atmosphere; condensate is discharged directly to boiler by vacuum pump or to a feed water heater or receiver and thence to the boiler by a separate pump. Sensitive steam pressure control is required with low pressure boilers; a pressure reducing valve is required with high pressure boilers.

Characteristics are the same as those of vapor system except air and condensate are handled under continuous vacuum. Entire system may be operated under any pressure above or below atmosphere down to 26 inches of vacuum. Adapted to all kinds of controls and zoning and may carry constant pressure on boiler for operation of auxiliaries.

The elevation of supply mains or returns is in no way related to or limited by the water line of the boiler, but all piping should drain to receiver or to vacuum pump direct. It is possible in this system to lift condensate and air from low radiators, drips, etc., into return mains and thence to the vacuum pump or receiver, but this should be avoided if possible. Lifts must be accomplished with lift fittings.

Performance may be rated thus. *Uniformity* and *convenience:* excellent in properly designed systems. *Operating cost:* may be higher than vapor systems because of the added first cost, but when properly zoned and controlled either as sub-atmospheric or partially filled systems the operating costs may be much lower. *Initial cost:* usually highest of all two-pipe systems.

TWO-PIPE GRAVITY HOT WATER SYSTEMS

Hot water radiation systems are classed as open or closed systems. A system is open when the expansion tank is open to the atmosphere. It is closed when the expansion tank is closed and carries a head of air under pressure, or when in place of an expansion tank there is a pressure reducing valve connected between the water supply and the heating system and a relief valve taking care of expansion and contraction in such manner as to hold a constant pressure on the system.

Elements include a hot water boiler; hot water type radiation; a system of supply mains and risers with branches to individual radiators; a system of return mains with risers and branches from each

radiator; a supply valve on each radiator to control the flow of water; a key type air vent valve on each radiator to permit manual release of entrapped air when system is filled; and a means of keeping the system full of water while allowing for its expansion and contraction with variations in water temperature.

Characteristics are: Maximum water temperatures at the boiler range from 180°F in open systems to 240°F in closed systems; hence radiation must be about 50% larger for open systems than for steam temperatures. Closed systems may be designed for the same radiator output as steam systems, but because of their sluggishness slightly more radiation is generally used. Domestic hot water may be supplied by an indirect heater if automatic valves are placed in the mains to check the circulation of hot water to radiators when the boiler water temperature is higher than that desired for heating purposes. Though difficult to design for correct balance in all parts, these systems are simple to operate and control; they are somewhat limited to use in buildings (or zones of a building) of not too great a height, owing to the static pressure of the water; and the water in the system is liable to freeze if left unattended in cold weather. They may cost more to install than two-pipe steam systems because the larger radiation and pipes may more than offset the cost of traps and other specialties used on steam and vapor systems.

Performance characteristics are: uniformity of heating effect coupled with (and because of) slow heating and slow cooling. This sluggishness is characteristic of gravity hot water systems; it is desirable for its steadiness and sometime undesirable for its slowness in response to rapidly changing conditions. Seasonal variations are met by changing the water temperature over a wide range. These systems are adaptable to local and zone control. Rating against standard requirements may therefore be expressed as: *Uniformity*, excellent but with slow response to changes; *Convenience*, excellent; *Operation cost*, minimum, except as investment may increase overhead; *Initial cost* may be high.

FORCED CIRCULATION HOT WATER SYSTEMS—OPEN TYPE

Elements are the same as for gravity circulation except that a power driven circulating pump is used in the return line to stimulate or maintain circulation through the system. In some cases these pumps operate as a "booster" only when quick response is necessary. Gravity circulation is relied upon under normal conditions. In others, the pumps operate whenever there is a call for heat. In this case the pump may be provided with valves which prevent circulation except when the pumps are operating; then the combination serves as a summer-winter control device as well as a circulating device, permitting the development of high boiler temperatures for generating domestic hot water without heating the radiators.

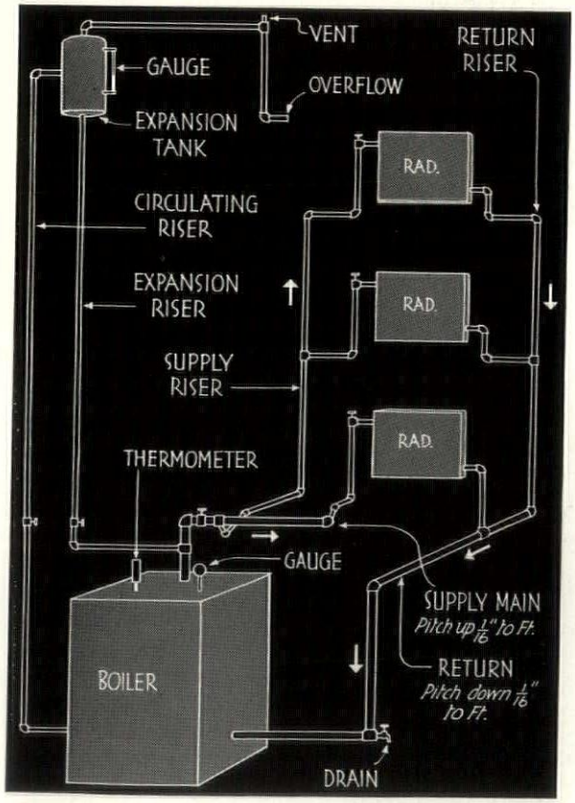
Characteristics include: Quick response to call for heat because of rapid circulation. Pipe sizes may be 25% to 50% smaller than for gravity system, though increased frictional resistance of smaller pipes must be offset by greater power applied to the pump. Boiler temperature may be unrelated to heating load where pumps completely control circulation, so that a reserve of heat is ready for quick response.

Performance characteristics are: *Uniformity*, excellent; *responsiveness*, excellent. *Convenience*, maximum. *Operating costs*, low except for overhead and small power load. *Initial cost*, somewhat higher than gravity hot water systems. It should be noted that gravity systems may be converted and their performance improved by merely adding circulating pumps and valves as described.

FORCED CIRCULATION HOT WATER SYSTEMS—CLOSED TYPE

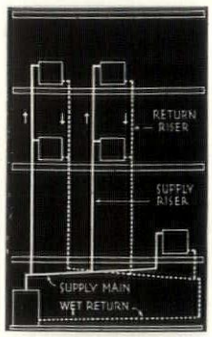
Elements are the same as for open forced circulation systems except that the expansion tanks are closed or replaced with water pressure control valves. The entire system is made tight and is operated under pressure with a pressure relief valve set for 10 to 15 lbs. maximum. Radiators may be sized as for steam.

Relatively recent is the revival of the one pipe hot water system for forced circulation consisting of a main to which are connected supply and return runouts from each radiator. Patented fittings on the mains are frequently used to assure positive circulation with a minimum drop in pressure.

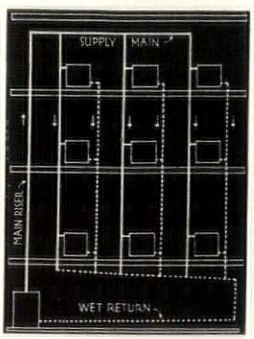


TWO-PIPE GRAVITY HOT WATER HEATING SYSTEM

(Right) RISER DETAIL

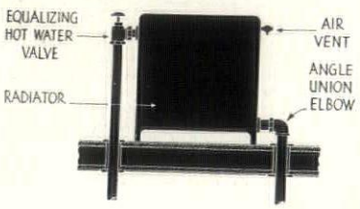


TWO-PIPE UP-FEED



TWO-PIPE DOWN-FEED

BRANCH CONNECTIONS

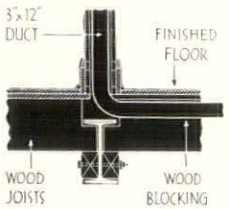


Radiators below the main are easily heated with this type of system.

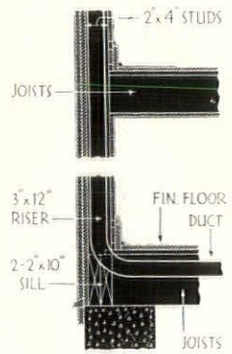
Characteristics are: water in the system may be carried at any temperature to about 240°F without generating steam, as water will not boil under pressure at as low a temperature as in normal atmosphere. Hence a wide range of temperatures may be delivered at the radiators as in some vacuum systems.

Performance characteristics are: *Uniformity* and *responsiveness*, excellent. *Convenience*, maximum. *Operating costs*, low to moderate. *Initial costs*, less than open systems because of steam-size radiation and small pipes; about equal to vapor systems.

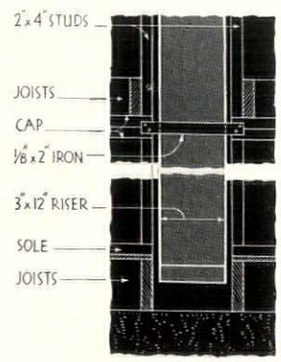
HEATING WITH CONDITIONED AIR



FRAMING SCHEME IN COMBINATION WITH A STEEL BEAM THAT TURNS UP A RISER WITHOUT CUTTING



VARIATION OF THE SILL, INTRODUCING A RISER WITHOUT SERIOUS CUTTING



USE OF REINFORCING IRON PLATE WHERE A DUCT CUTS THROUGH A PARTITION CAP

When ducts are used to convey warmed air to any or all parts of a building, the opportunity of combining air conditioning with heating immediately presents itself. Progress and popular demand for air conditioning both require the designer to consider the future, if not immediate, installation of conditioning equipment, and to design his system accordingly.

The choice of a suitable furnace, if a Direct Fired system is wanted, or of a suitable boiler for any of the other types of installations, is left for consideration in Part II. Problems relating to duct work and air conditioning apparatus related thereto are treated here.

There are two basic types of duct systems: (1) Individual mains from the furnace or conditioner bonnet to each room or to each outlet, with individual return ducts. This is the simplest system to design and balance. (2) Main ducts with branches, the main ducts being reduced in size at each branch to balance the flow of air proportionately throughout the system. Recirculating ducts or returns are similar. This is the system used on large work and for residences where basement space is used for living or recreational purposes. It requires better design and should be entrusted to, or checked by, a competent engineer.

PLANNING DUCTWORK

Ducts may be round or rectangular. For a given sectional area a round duct will carry more air than a rectangular duct. In no case should a rectangular duct have a width over four times its depth. Plenums, or air passages formed by construction surfaces, are seldom used as their resistances cannot be determined accurately or their behavior anticipated. Ducts are usually made of 22 to 24 gauge (heavier in large work) galvanized iron or copper-bearing alloys. There are also types made of moulded materials such as asbestos cement for special applications where iron would corrode rapidly.

Heat losses from ducts may be reduced: (1) by the use of permanently bright surfaces having low emissivity, and (2) by considerable thicknesses of duct insulation of hair felt, cellular asbestos, mineral wool, etc. Inflammable materials must not be used on heating ducts and moisture-proof covering should be used on cooling ducts. A single thickness of asbestos paper applied over a metal duct increases its losses above those of the bright metal surface alone.

Duct fittings increase the resistance to the flow of air more than straight runs, hence their number should be kept to a minimum and all elbows or bends should be of the largest radius space limitations will permit. The radius to the center of the duct should not be less than one to one and one-half times the duct diameter. Special fittings are available to minimize loss of head at bends. These may be of the venturi or streamlined type or may be angle bends fitted with curved vanes or dividers as shown on page 81. See manufacturers' data for their use.

A damper should be placed in each main duct and branch to assist in balancing the system. Branches should be taken off main ducts with easy bends and should be fitted with adjustable deflectors for final adjustment of air flow.

REGISTERS AND GRILLES

Registers and grilles are of two basic types; those which function primarily to decorate and partly to conceal the discharge or intake ends of ducts, and those which are designed to control direction, velocity, or other characteristics of the air stream.

Decorative or plain register faces are measured by their "daylight" size multiplied by the percentage of their face area which is devoted to clear openings. Thus a grille or register face 48" x 24" has a superficial area of 8 square feet. If the pattern provides 50% clear opening the net free area is 4 square feet; if 65% it is 5.2 sq. ft., etc. Since duct velocities are usually greater than is desired at outlets, the duct connection is usually enlarged and a grille face chosen that has a free area corresponding to the desired velocity. Note that "daylight" size is measured to the limits of the opening; overall size includes the frame or border.

Directional control is often advantageous as it may permit the use of outlet locations other than those theoretically ideal. The air is then caused to flow or diffuse into the desired zone by the shape of the vanes forming the grille face. See diagrams on the opposite page.

In general the shape of a register is governed by the flue size and construction limitations. But if a choice of shape can be made, place the longest dimension of outlet faces horizontally to secure wide diffusion, and keep the shape of return air faces approximately the same as that of the ducts they serve. Outlet registers should not have a length over four times their width.

LOCATION OF REGISTERS

Most important in the design of a satisfactory Forced Air Heating or Cooling System is the proper location of supply registers and return air intakes in each room. The objective is to force the warm or cooled air to be widely diffused throughout the room without creating drafts before it is drawn into the return face for recirculation.

Because it is desirable to keep the length of supply ducts at a minimum and to group them as closely as possible to the furnace or tempering cabinet, it is customary to place supply risers in partitions and to avoid locating them on cold outside walls. To effect adequate diffusion and circulation the return air faces are usually placed as far across the room as possible and ordinarily beneath windows or where there is a maximum amount of cold air.

Warm Air Supply Registers may be located in the baseboard. They may also be located beneath window sills or in cabinets forming window sills if their operation at this height in the wall cannot be blocked by the placement of furniture against the register. They may also be placed high in side walls or in ceilings if return air faces are positioned to assure prompt removal of cold air at the floor.

Cold Air Supply Registers should be located high in the side walls and air should move through them with enough velocity to distribute it over the room but not in such a manner as to come in contact with the occupants before it has widely diffused. It is also possible to place cold air supplies in the ceiling with diffusing plates under them for directing the air horizontally over the entire ceiling.

Cooling requirements introduce limitations in the use of a common supply duct system for both summer cooling and winter heating. Cold air tends to fall rapidly to the floor forming a cold blanket that causes discomfort while warm air tends to rise and form a warm blanket at the ceiling. Furthermore, cold air must be projected at higher velocities than warm air to secure thorough diffusion but it causes perceptible drafts which may not be felt with warm air at the same velocity. It is, therefore, seldom good practice to use a baseboard or low, warm air register inlet with horizontal discharge for cooling.

All-Year Air Conditioning may nevertheless utilize a common system of supply ducts and a common system of returns for both heating and cooling.

In rooms having ceiling heights ten feet or less, both heating and cooling supplies may enter through common ceiling registers, properly located and equipped with diffusing plates.

Supply registers may be placed high in side walls for both heating and cooling.

Common supply registers may be placed in cabinets or window sills where air may be projected toward the ceiling without striking occupants.

Where the volume of air needed in summer varies widely from that wanted in winter in a given room, a separate duct may be brought from the furnace or conditioner to supplement the all-year duct. In this case the auxiliary duct must be shut off at the furnace or conditioner when not in operation.

AIR MOTION

The two elements of complete air conditioning which are common to both summer and winter air conditioning are air motion and air cleaning, and these in turn are intimately related because air cleaning cannot be accomplished without air motion. While air motion sufficient for heating purposes might be, and frequently is, secured by gravity, the velocities developed are inadequate to meet air conditioning standards. Therefore, it may be assumed that power driven fans or blowers are essential elements in most summer or winter air conditioning installations.

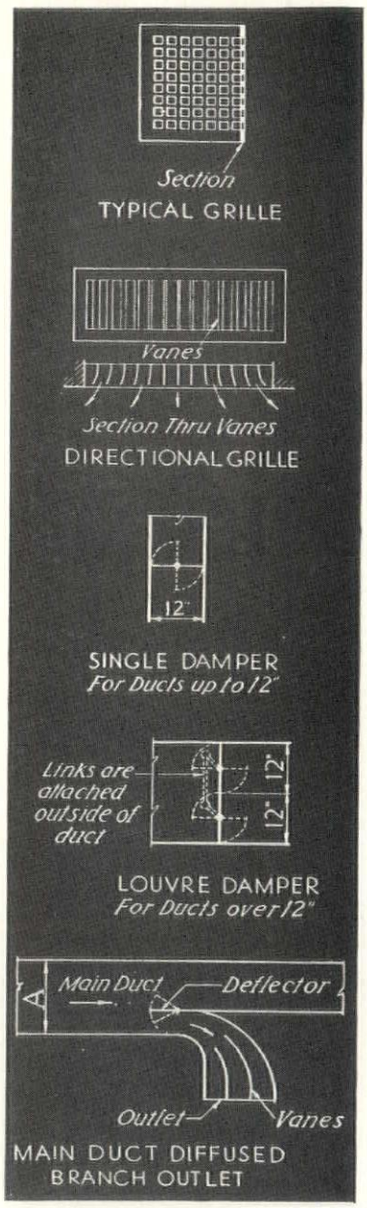
Constant vs. Intermittent Fan Operation is one of the moot questions of air conditioning. Theoretically the maintenance of ideal air conditioning standards requires constant air motion, although the quantity of air to be moved will be less in the winter than in the summer. Some types of air conditioning equipment are designed to keep the fans or blowers in constant operation so that the only variables remaining to be controlled are temperature and humidity. The majority of equipment, however, relates the operation of the fan to the demand for heating or cooling effect, and does not maintain air circulation—and its concomitants, air cleaning and prevention of air stratification—unless the thermostat calls for heat in the winter or starts the cooling apparatus in action in the summer. Against the obvious advantage of maintaining a constant circulation and cleaning of air must be balanced the power cost of continuous operation. In the opinion of some authorities the periods of idleness under intermittent operation are not great enough to develop uncomfortable air stratification or "cold 70" in winter, or stagnation of enclosed conditioned space in summer.

BLOWERS AND FANS

The temperature, velocity and method of introducing air must be such as to obviate drafts. Warm air should never exceed 150°F and preferably should not exceed 140°F. The difference in temperature between cooled air and the room temperature into which it is introduced should not exceed 5°F if it enters horizontally below the breathing zone, 10°F if above the breathing zone, or up to 20°F if wide diffusion can take place, as in theatres, before the cooled air reaches the occupants.

The choice between a blower* and a fan for circulating air is almost wholly dependent upon the frictional resistance which the air stream must overcome in passing through ducts, filters or other kinds of equipment. Fans, typified by the ordinary desk fan or airplane propeller, can move large volumes of air at very low cost provided there is no appreciable static head or frictional resistance to overcome. They are most commonly

* For convenience, the word blower is used in this article to denote a centrifugal housed fan and the word fan to denote a disc or propeller type fan.



WARM AIR HEATING AND AIR CONDITIONING DUCTS AND OUTLETS

used in free air. Blowers, operating on the centrifugal principle, can overcome very considerable static heads or frictional resistance, and are therefore used in most duct systems, and where filters, air washers, evaporative coolers or similar elements introduce a pressure or suction to be overcome by the blower.

In the selection of fans or blowers it is well to keep in mind that the volume of air to be moved and the velocity of air to be maintained for winter heating purposes may vary from that desired for summer comfort conditions. Where it is possible to use the same fan or blower for all-year air conditioning purposes, it is necessary to select blower equipment on the basis of maximum load, and to use variable speed motors or changeable pulley ratios so that the volume of air moved can be varied with seasonal requirements.

Another factor in selecting fans and blowers is quietness of operation. This involves the use of quiet-running motors (generally of special design adapted to meet these difficult conditions), and the operation of the fan or blower at relatively low tip speeds. Most of the noise from modern fans or blowers is caused by the air itself rather than the motor. A large blower operating at low speed will move as much air as a smaller blower at higher speed, but it will do so with less noise. Generally speaking, blowers are quieter than fans.

The use of blowers or exhaust fans for night air cooling is discussed elsewhere.

AIR CLEANING

The two common methods of cleaning air are filtering and air washing.

Air filters are of several basic types; (a) fabric filters, consisting of layers of cloth, porous paper, or other woven or felted fabrics, (b) fibrous filters, usually consisting of pads of loosely held mineral or invert vegetable fibres, and (c) viscous filters, consisting of relatively coarse mineral and metal fibres coated with a viscous material to which dust and bacteria adhere as the air passes through the interstices in the mat.

The first two types are called dry filters and are cleaned either by shaking out the dust, by discarding the dirty filter material and replacing it with a fresh unit, or, in the case of cloth fabrics, by washing or vacuum cleaning the filter. Viscous-type filters are renewed by washing the dirt-laden surface and recoating with fresh liquid which may be done periodically or as a continuous operation. It is a characteristic of most filters that their resistance to the passage of air increases as they accumulate dirt, but their efficiencies are high and their operating cost is relatively low.

Air washers remove dust, bacteria, little smoke and many air-borne odors by washing the air with fine sprays of water. Free water in the air is then removed by baffles or eliminator plates which are themselves wetted by the sprays. Dust or dirt not caught by the sprays themselves are caught by enforced impingement upon these wet surfaces.

The static head of an air washer is constant and it has the advantage over fibres of removing odors as well as much of the infinitely fine dust particles that might not be entrapped by a filter. Air washers may also perform other functions such as humidifiers, dehumidifiers and evaporative coolers. Their chief disadvantages are: (1) cost of water and power required to operate them—important only where rates are high or with non-recirculating washers or where restrictions may be imposed upon the use of water during droughts. (2) The tendency to shut them off for long periods. Frequently the advantages of both types are combined by installing an air filter ahead of an air washer.

Capacity of Air Cleaning Equipment is directly related in practice to the volume of air moved by fans or blowers and is seldom determined by the cleanliness or dirtiness of the entering air. The surface area of filters and the size of air washers should be such that they can handle the maximum volume of air moved by fan at a velocity not exceeding 800 ft. per minute at the filter face without introducing a static head over .25 in. water pressure.

HUMIDIFICATION

A characteristic of most man-made heating systems heretofore employed is that they do not provide for the maintenance of the proper amounts of moisture in the heated air. No heating system in common use, whether warm air, steam, vapor or hot water, meets this deficiency unless humidifying equipment is especially provided. The amount of moisture required to maintain satisfactory relative humidities indoors varies widely according to climatic conditions, but there is no section of the country where, at some time in the heating season, humidification is not essential to satisfactory air conditioning.

Methods of Humidification include: (a) evaporation of water in heated pans or while passing over heated surfaces; (b) exposing extensive water surfaces to large volumes of air in motion; (c) the mechanical atomization of water into a fine mist; and (d) forcing air to pass through sprays of water.

It should be understood that the evaporation of water by any method requires the absorption of heat, and this heat must either be introduced into the water or else it will be taken from the air by the evaporation process. There is, therefore, a heat load to be considered whenever humidification equipment is employed.

In selecting humidifying equipment consideration should be given to the character and cost of water. Evaporative-type humidifiers leave a sludge or hard sediment when the water supply contains mineral salts. This sediment, however, can usually be removed by periodic cleaning of trays or evaporating surfaces throughout the winter heating season. The atomization method is not usually affected by the content of the water, but where recirculating spray equipment is used there is danger of clogging the spray heads if sediment is not first filtered from the water, or if the orifices are not large enough to permit sediment to pass through. Where water is costly the

evaporative, atomizing and recirculating spray methods have the advantage as they do not waste water. The spray method as used in ordinary air washers also serves to clean the air. In some units the water is filtered and used over again but in others it is wasted to the sewer.

Dual Purpose Humidifiers offer some economy in equipment cost. Air washers are commonly employed for humidifying purposes; the necessary heat of evaporation being taken from the air unless warm water is used in the sprays. They are similarly used for cooling and dehumidifying purposes by employing refrigerated water. Evaporative coolers are actually humidifiers employed for summer cooling effect in climates where the outside relative humidity is below permissible summer standards; hence they may be used as a part of both winter and summer air conditioning equipment.

DEHUMIDIFICATION

There are two practical methods of dehumidifying air. One is to cool the air below the dew-point temperature. At this temperature the air is saturated: at any lower temperature moisture is condensed and leaves the air in the form of dew. The other method is to pass the air over substances or through liquids that have such an affinity for moisture as to mechanically or chemically remove a large percentage of the air-borne vapor.

Before discussing these methods in detail it is important to remember that when moisture is given up by air, heat is released. The amount of heat is the same that is absorbed when water is evaporated. Dehumidification, therefore, produces heat which must be removed by cooling equipment just as humidification requires heat which must be added to the load of the heating plant. This heat is called latent heat as distinguished from the heat we can feel, which is termed sensible heat.

It is also important at this point to recall the fact that summer comfort is dependent upon both dry-bulb temperature and relative humidity. Consequently, in producing summer comfort in a section where prevailing humidities are excessively high, the equipment must have greater dehumidifying capacity than is necessary in areas where outdoor relative humidities are low. These factors all have an important bearing on the selection of suitable equipment.

Dehumidification by Cooling is a method commonly employed where refrigerating equipment is available or where the local water supply does not exceed 45 or 50 F. Under this process the air is chilled below its dew-point temperature where its moisture content is reduced by condensation, and then is reheated to a temperature that may be introduced into the conditioned space. This reheating is accomplished in either of two ways: (a) by the actual application of heat through tempering coils, or (b) by mixing the cold air with unconditioned, recirculated air.

This method of dehumidification is applied in two principal ways. Where air washers are used as dehumidifiers the spray water is reduced in temperature below the dew-point temperature of the entering air. Normally, spray waters are maintained at around 45 F. The action of the spray is practically instantaneous in removing the excessive moisture content of the air, and the heat released is absorbed by the spray water rather than by the air, which leaves the washer at a temperature close to its dew point.

The other method is to pass air over refrigerated coils or heat exchangers. When this is done, moisture is condensed upon the cold surfaces and is carried off into the drain.

The Adsorption Method makes use of the property of certain substances, notably silica-gel and activated alumina, to mechanically withdraw water vapor from air. Latent heat released by this adsorption process is imparted to the air, thereby warming it so that the air passing through this type of dehumidifier must be cooled by some other means.

This cooling is usually accomplished by passing the air over coils through which cold water is circulated. In small installations, city water or well water may be used once and wasted. Where water costs are high, an indoor cooling tower may be employed to conserve water. If temperature reduction in the order of 10 to 15°F is required, refrigeration equipment may be needed.

A feature of this process is that the silica-gel or activated alumina must be freed of the water it withdraws from the air. This is done by passing the air alternately through one of two chambers, while heat is applied to revivify the adsorbent material in the other.

The Absorption Method has the same objectives as the adsorption method: the primary difference is that the reagent undergoes a physical or chemical change of state.

Chemicals having an affinity for moisture, such as calcium chloride or lithium chloride, are usually employed. Air is brought in contact with the absorption medium and moisture is absorbed by the chemical employed.

Normally an ordinary air washer or spray chamber is used, with the spray made of a solution of the absorbing chemical. This spray has the capacity of controlling the water vapor content of the passing air according to the concentration of the solution. For a given concentration, air discharged from the spray will have a corresponding relative humidity; that is, air may enter at 10% or 90% relative humidity and emerge with a fixed moisture content determined by the solution used.

Obviously it is only necessary to maintain the desired concentration in the sprays to control the relative humidity of the air. This is done by heat (gas, electric, or steam) in an evaporator under automatic control. The necessary cooling of the air to remove latent heat released in the absorption process is usually accomplished with water cooled coils as in the adsorption method.

Simplicity and economy of operation characterize this process, which is now entering the commercial development stage. Both adsorption and absorption methods of dehumidification are comparatively new but are very promising.

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RECREATION AREAS—1

Desirable standards for recreation facilities have been set up by the National Recreation Association and are generally recognized. Absolute standardization is impossible because of variable factors: climatic conditions; population or institutional needs, habits or preferences; and available land or money. Information in these sheets may be used in planning and space allocation.

Basic general standard for public areas is: one acre of open space per 100 of total population; of which 40% to 50% should be devoted to games or other active recreation. For institutions (churches, schools, colleges) no set formula has been established. Local conditions, such as extent of participation in organized athletics, available money, etc., should govern; however, playfields for elementary and grammar schools may follow schemes outlined below.

Game areas and layouts contained in the drawings are based on practice of the New York City Department of Parks. Where games are subject to official rules, consult publications of athletic organizations or other governing bodies.

Types of public recreational areas have been set up by the National Recreation Association, based on age groups and urban or suburban needs. *Playlots* and *Children's Playgrounds* are discussed in this sheet. *Neighborhood Playfields* are contained in T-S.S. "Recreational Areas—2" (Serial No. 98, January, 1938).

Surfacing of play areas influences utility, extent and cost of upkeep, and extent of playing season. Local materials, climate, soil, intensity of use and tradition influence choice of surfacing. In general all areas require effective surface or subsurface drainage or both.

THE PLAYLOT

Playlots are intended for children of pre-school age and are commonly provided in densely populated areas as a substitute for back yard play. They are also provided in interiors of large blocks in neighborhood or housing developments, often for nursery schools.

Size may vary from 6,000 to 10,000 sq. ft. for each 100 pre-school children.

Location should be centered among population served, and accessible without crossing traffic arteries. Interior of a block is ideal if one block only is served. If available space is limited, a corner of Children's Playground may be used.

Plan Elements include: (1) central grass plot; (2) areas with shade trees, in which apparatus and benches are set; (3) hard-surfaced walkway for kiddy cars, velocipedes, etc.; (4) surrounding low fence or hedge. Distribution of area may vary with topography, apparatus included and child population served. Minimum recommendations of National Recreation Association are given in Table I.

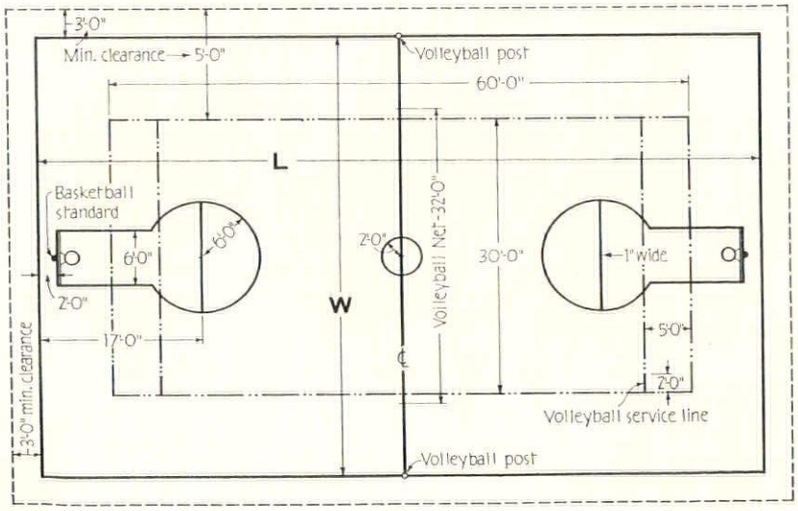
CHILDREN'S PLAYGROUNDS

These are intended for children 5 to 15 years old. A subdivision of this type, characterized by smaller area and fewer facilities, is called the *Junior* or *Primary Playground*, and is intended for children up to 10 or 11 years.

Size of Children's Playgrounds ranges from 3 acres (min.) to 7 acres. General recommendations is 1 acre per 1,000 total population. Two small playgrounds are usually more satisfactory than one of excessive size when population served requires a large acreage.

Location is usually in an area developed for this particular use, adjoining a grade school, in a neighborhood or large park, or a portion of a Neighborhood Playfield. Maximum radius of area to be served should preferably not exceed one-half mile; in areas of dense population or subject to heavy traffic, one-quarter mile.

Plan Elements may be subdivided into: apparatus section, specialized sports area, landscaping, and miscellaneous activities. Areas required are given in Table II. Selection and distribution of areas and equipment should be based on local preference, space and money available, and topography. Guides to selection of individual game areas or equipment are included in the footnotes to Table II where practicable.



BASKETBALL and VOLLEYBALL

Scale - 1" = 20'-0"

BASKETBALL COURT SIZES

	L	W
Elementary School	60'-0"	40'-0"
High School	75'-0"	48'-0"
College Age	84'-0"	48'-0"

Margin out of bounds 10'-0"; min. 3'-0" for Basketball

All lines 2" wide unless otherwise noted

Indication for Volleyball Court

AREAS & EQUIPMENT

I - Playlots

Type of Equipment or Area	Area per Unit (Sq. Ft.)	Capacity in Children	Suggested Number Included
Apparatus			
Junglegym, Jr.	180	10	1
Low Slide	170	6	1-2
Low Swing	150	1	4-8
Low See-saw	100	2	4-8
Miscellaneous			
Open Space	48-50 per child	Varies with pop. to be served	
Block Bldg. Platform	20 per child 150 per platform	7-8 per platform	1
Sand Box *	18-20 per child 300 per box	15	1-2
Benches & Tables	Optional	Varies	
Shelter for Baby Buggies	Optional	Varies	1
Flag Pole	In open area		1
Bird Bath			1
Drinking Fountain			1

*Sand boxes should be located so as to receive direct sunlight part of each day for reasons of sanitation.

II - Children's Playgrounds

Type of Equipment or Area	Area per Unit (Sq. Ft.)	Capacity in Children	Suggested Number Included
Apparatus			
Slide	450	6	1 (b)
Horizontal Bars	180	4	3 (b)
Horizontal Ladders	375	8	2 (b)
Traveling Rings	625	6	1
Giant Stride	1,225	6	1
Small Junglegym	180	10	1
Low Swing	150	1	4 (a)
High Swing	250	1	6 (a)
Balance Beam	100	4	1
See-saw	100	2	4
Medium Junglegym	500	20	1
Misc. Equip't & Areas			
Open Space for Games (Ages 6-10)	10,000	80	1 (a)
Wading Pool	3,000	40	1 (a)
Handcraft, Quiet Games	1,600	30	1 (a)
Outdoor Theater	2,000	30	1
Sand Box	300	15	2
Shelter House	2,500	30	1 (c)
Special Sports Areas			
Soccer Field	36,000	22	1
Playground Baseball	20,000	20	2
Volley Ball Court	2,800	20	1
Basketball Court	3,750	16	1
Jumping Pits	1,200	12	1
Paddle Tennis Courts	1,800	4	2 (d)
Handball Courts	1,050	4	2
Tether Tennis Courts	400	2	2 (d)
Horseshoe Courts	600	4	2
Tennis Courts	7,200	4	2 (d)
Straightaway Track	7,200	10	1 (d)
Landscaping	(a) 6,000		
Paths, Circulation, etc.	(a) 7,000		

(a) Minimum desirable.

(b) One or all of these units may be omitted if playground is not used in conjunction with a school.

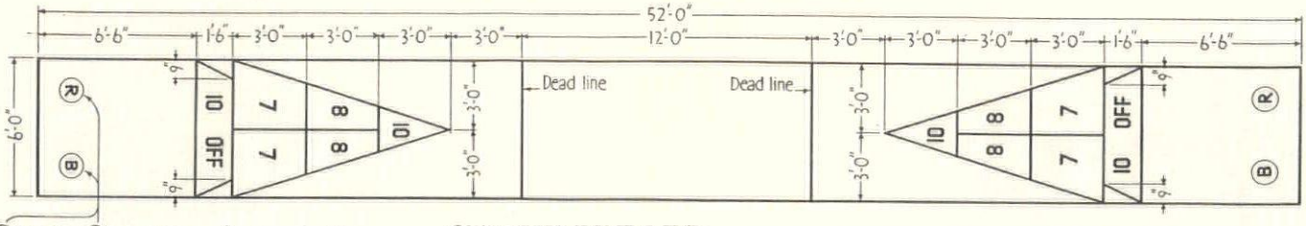
(c) May be omitted if sanitary facilities are supplied elsewhere.

(d) May be omitted if space is limited.

AMERICAN ARCHITECT
TIME-SAVER STANDARDS

Serial No. 97
JANUARY 1938

RECREATION AREAS—1

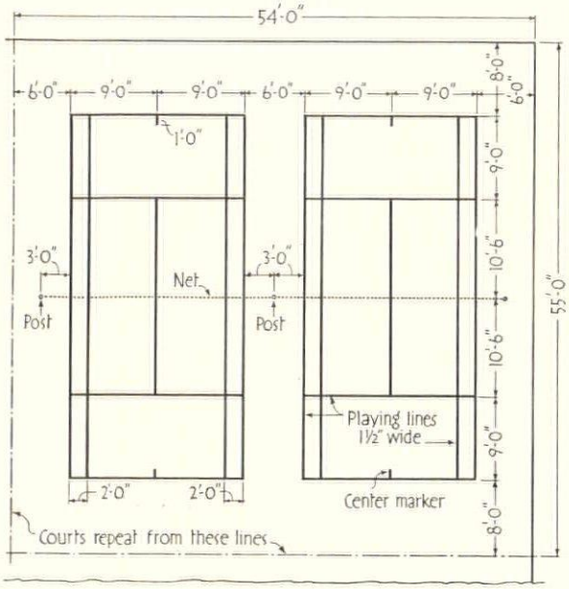


(B)LACK (R)ED *When playing doubles*

SHUFFLEBOARD

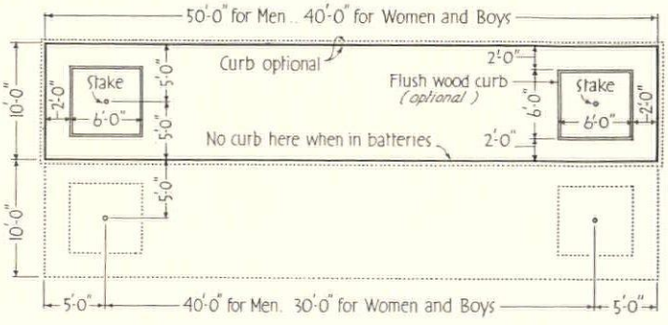
SCALE 1/8"=1'-0"

All lines are 3/4" wide. Dimensions of lines are from center to center except for border lines which are to outside of court. Lines to be black.



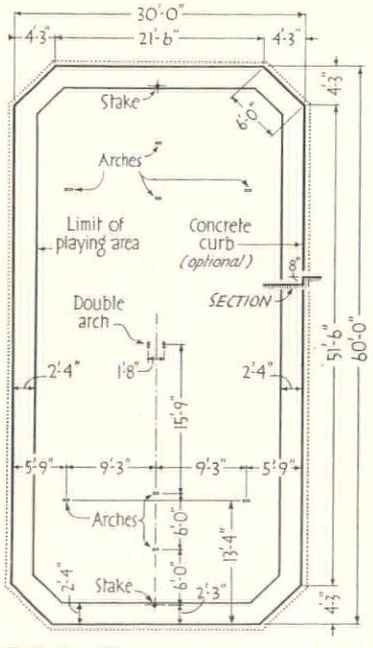
PADDLE TENNIS

SCALE 1"=20'-0"



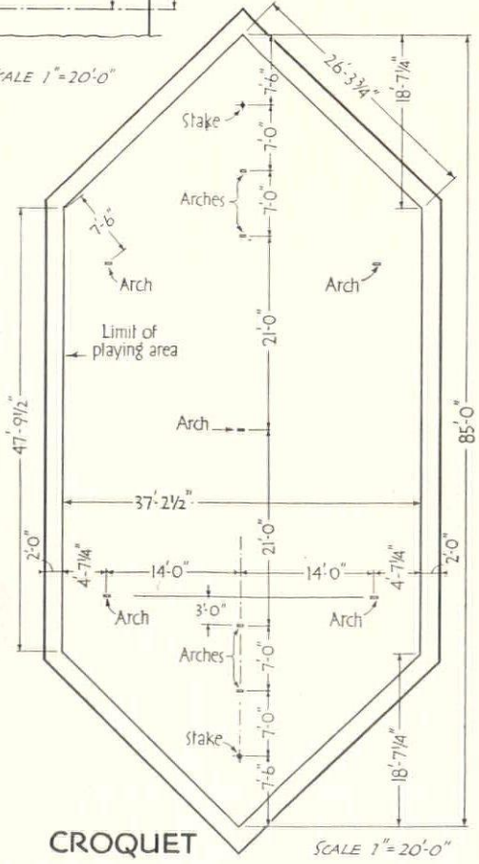
HORSESHOE PITCHING

SCALE 1/16"=1'-0"



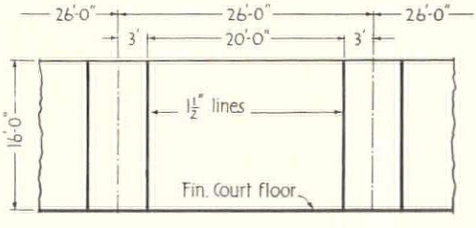
ROQUE

SCALE 1"=20'-0"

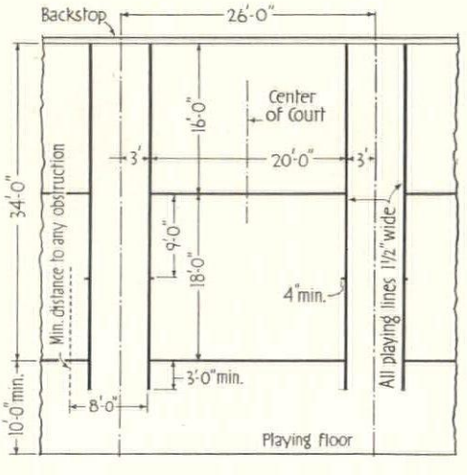


CROQUET

SCALE 1"=20'-0"



ELEVATION OF BACKSTOP



HANDBALL

SCALE 1"=20'-0"

AMERICAN ARCHITECT
TIME-SAVER STANDARDS

Serial No. 98

JANUARY 1938

RECREATION AREAS—2

In this sheet are data for recreation areas for older children and adults. Information on facilities for younger age groups are given in T-S.S. "Recreation Areas—1" (Serial No. 97, January 1938), which also includes data on surfacing play areas. Game layouts shown in the drawings are standards of the New York City Department of Parks, and should be checked with requirements of athletic or other governing bodies. Suggested standards may be modified to meet institutional requirements.

ATHLETIC FIELDS AND PLAYFIELDS

These are large areas for active recreation, intended for older children and adults. Areas of school or other institutional athletic fields depend upon type of sports included; data for calculating approximate areas are given in the table.

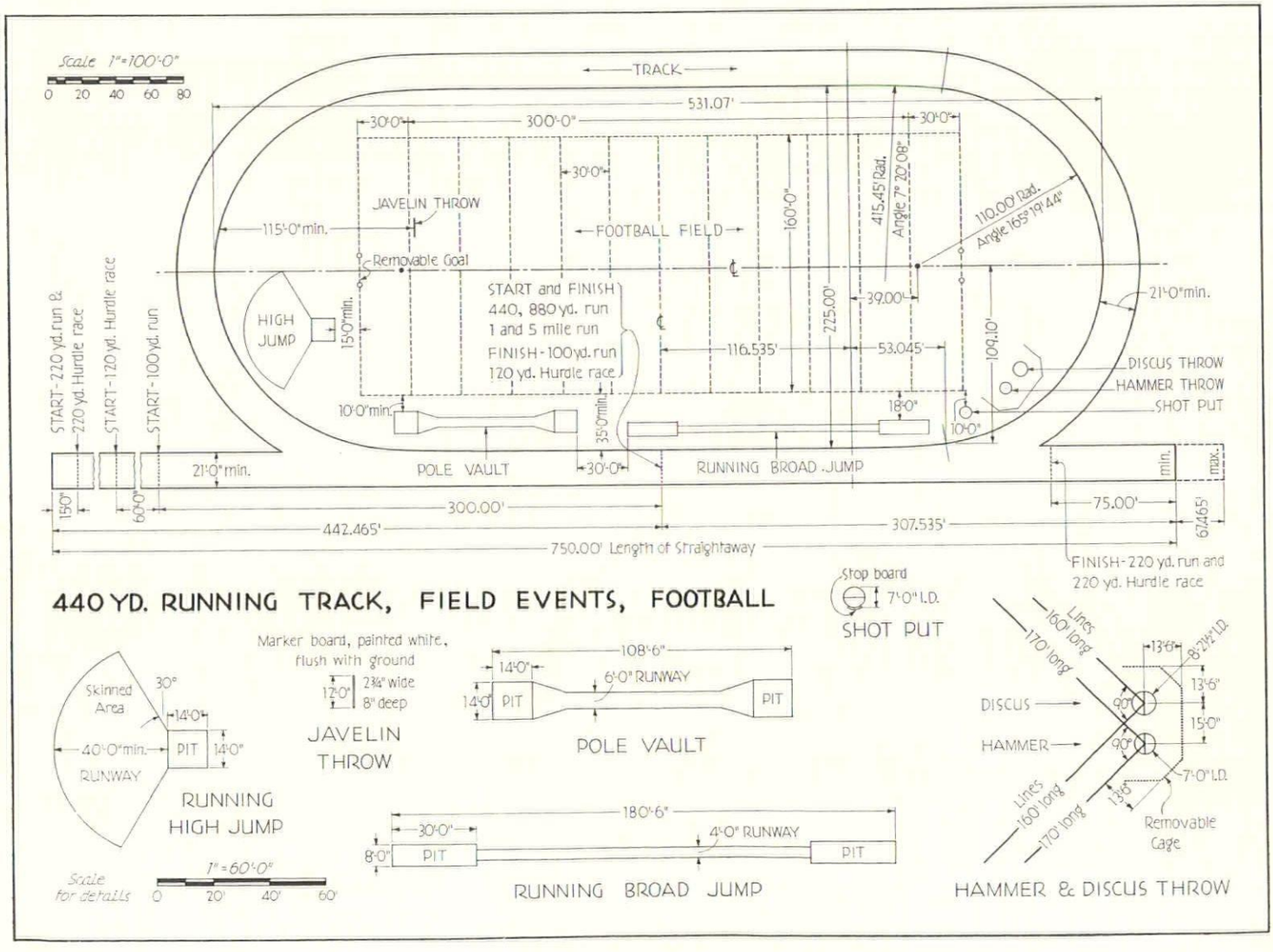
Size of public Playfields is 10 acres minimum, 20 desirable, and up to 50. One acre per 1000 total population is general.

Location of public Playfields is preferably not more than 1 mile from farthest dwelling served; when population density exceeds 20,000 per sq. mi., one Playfield per sq. mi. is desirable. Location contiguous to a high school is also favored.

Plan elements and *equipment* of public Playfields are given. Selection usually depends on local conditions, preferences, topography, etc. Equipment is usually similar to Children's Playground (see T-S.S. Serial No. 97) equipment, but in greater quantity and variety. Typical plans include areas for: (1) a children's playground; (2) specialized sports fields; (3) recreation and games, including a section for girls and women; (4) 440 yd. track and field events; (5) picnic grounds; (6) swimming pool; (7) field house or "club" house; (8) landscaping.

AREAS & EQUIPMENT - Athletic Fields

Type of Sports or Area	Area per Unit (Sq. Ft.)	Capacity in Players	Type of Sports or Area	Area per Unit (Sq. Ft.)	Capacity in Players
Baseball Diamond	97,500	18	Handball	2,000	2-4
Basketball Court	6,000	10	Hand Tennis	1,250	2-4
Basketball Court (women's)	5,000	12-18	Horseshoe Pitching	500	2-4
Boccie	2,100	2-4	Lacrosse	125,000	24
Bowling Alley	2,400	4-8	Paddle Tennis	1,800	2-4
Clock Golf	706	Any No.	Playground Ball	22,500	20
Cricket	138,545	22	Polo	576,000	8
Croquet	1,800	Any No	Quoits	2,000	2-4
Field Hockey	59,400	22	Roque	1,800	4
Football	75,600	22	Shuffleboard	750	2-4
			Soccer	75,600	22
			Tennis	7,200	4
			Tether Tennis	400	2
			Volley Ball	4,000	12-16



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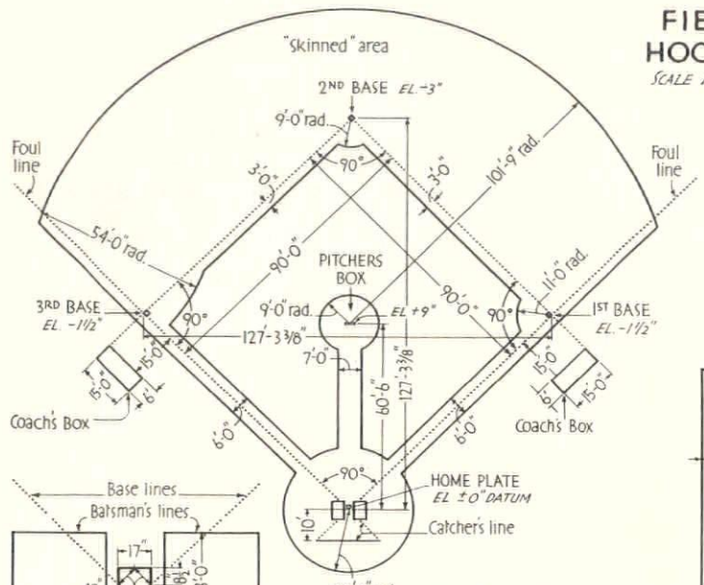
RECREATION AREAS—2



BASEBALL DIAMOND

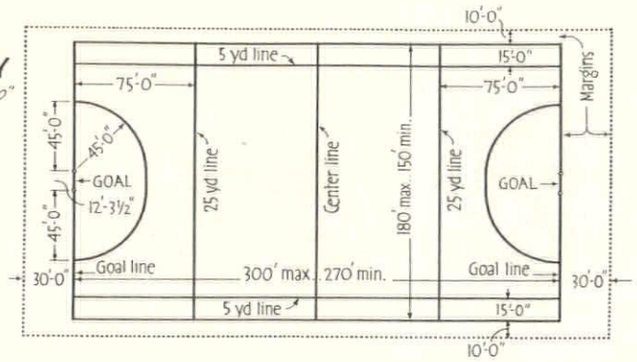
SCALE 1"=60'-0"

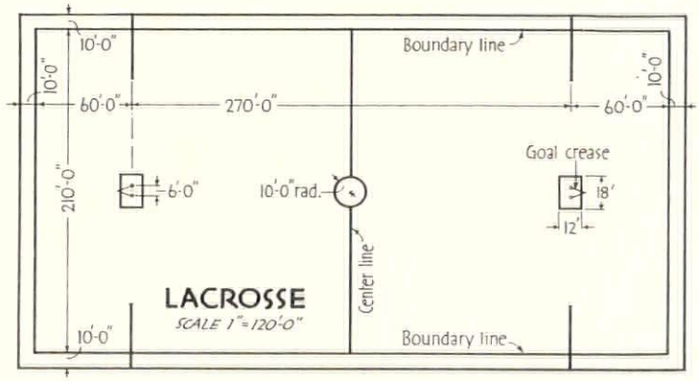
DETAIL of CATCHER'S BOX

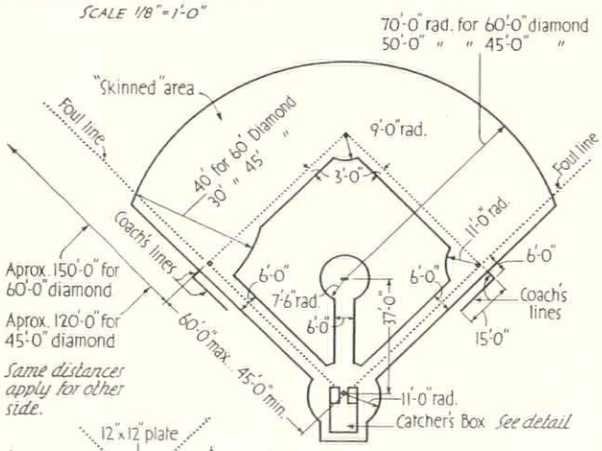
SCALE 1/8"=1'-0"

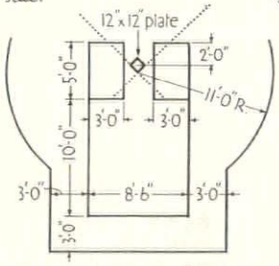
FIELD HOCKEY

SCALE 1"=120'-0"





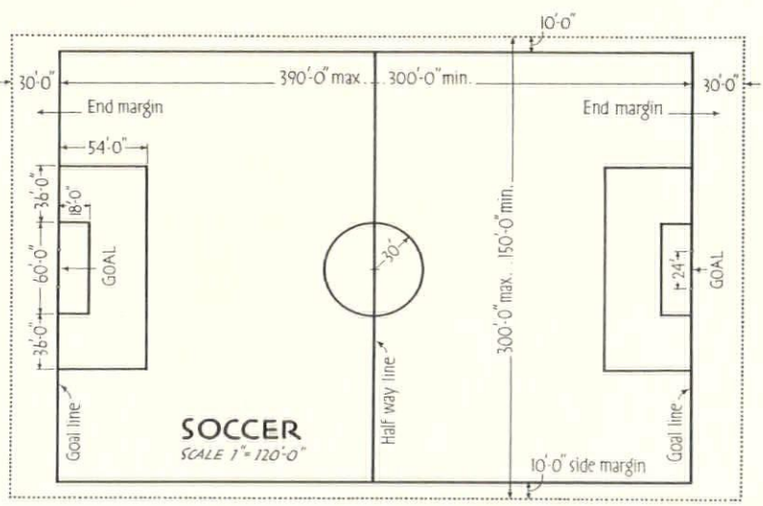




SOFTBALL DIAMOND

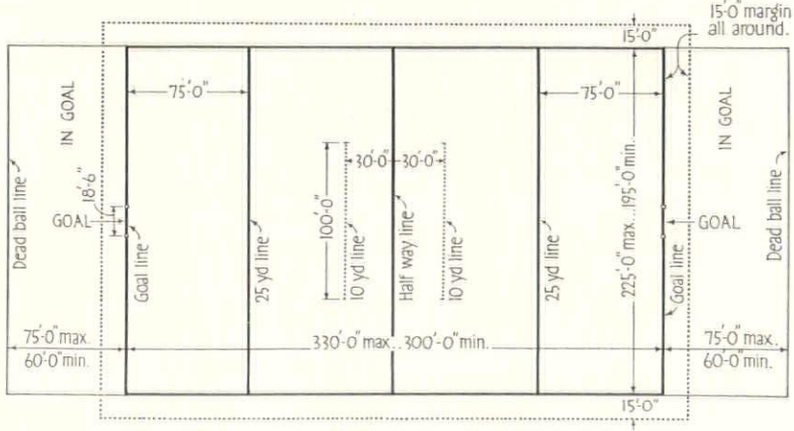
SCALE 1"=60'-0"

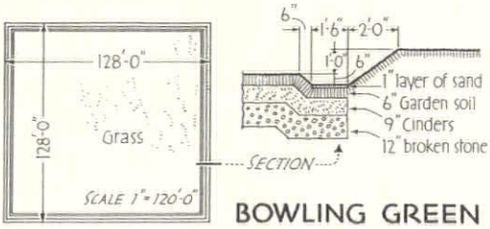
DETAIL of CATCHER'S BOX SCALE 1/16"=1'-0"



RUGBY

SCALE 1"=120'-0"





BOWLING GREEN

BOOKS

HEDENDAAGSCHE ARCHITECTUUR IN NEDERLAND (Dutch Architecture of Today). Published under the auspices of Bond van Nederlandsche Architecten: A. Eibink, W. J. Gerretsen, and J. P. L. Hendriks, committee. Introduction by J. P. Mieras. 156 pages, 8¼ by 11 inches. Illustrations from photographs and plans. Printed in Holland. Amsterdam: 1937: Kosmos. Obtainable in America from Van Riemsdyck Book Service, 15 West 45th Street, New York, N. Y.: $4.50.

It is always astonishing to American architects to find how many books recording current work abroad are published and apparently sold. One no sooner acquires a volume portraying what the Dutch are building, than another volume is at hand bringing the subject up to the minute. Here is the latest selection from Holland's contemporary work, and an interesting and stimulating one it is, particularly in the wide variety of kinds of buildings illustrated—warehouses, office buildings, country houses, sanitariums, newspaper offices, geographical institutes, and so on. The introduction and titles are in Dutch, French, German, and English

ARCHITECTONISCHE DETAILS: I, Ramen en Deuren (Windows and Doors). By Prof. Ir. J. G. Wattjes. 78 pages, 8¾ by 12 inches. Illustrations from photographs and drawings. Printed in Holland. Amsterdam: 1937: Kosmos. Obtainable in America from Van Riemsdyck Book Service. 15 West 45th Street, New York, N. Y. $5.

The Dutch are evidently lifting a leaf from our own Portfolio in bringing together an extensive collection of photographs and detail drawings illustrating various minor architectural features. The collection is not limited to Dutch work, for the compiler has drawn from many countries and many types of buildings. Text of introduction is in Dutch, French, German, and English.

BEYOND NEW ENGLAND THRESHOLDS. By Samuel Chamberlain. 96 pages, 9¼ by 12¼ inches. Illustrations from photographs. New York, 1937: Hastings House. $4.00.

ARCHITECTURAL HERITAGE OF THE PISCATAQUA: Houses and Gardens of the Portsmouth District of Maine and New Hampshire. By John Mead Howells. 217 pages, 9¼ by 12½ inches. Illustrations from photographs and line drawings. New York: 1937: Architectural Book Publishing Company. $10.00.

These two beautifully-made books present a remarkable contract in approach to essentially the same subject. Mr. Chamberlain's opus, a sort of candid camera record of the New England hearth, is third in a series designed for the appreciative lay reader as well as the architect. Mr. Howells, on the other hand, in concentrating on an extraordinarily complete record of an architecturally rich but geographically limited section of New England has produced a book for the expert.

The early settlers in the Portsmouth district of Maine and New Hampshire were a race apart from the rest of Colonial New England. They did not come there for reasons of religion, but for trade. The coast of Maine was a busy one. They prospered and with prosperity there came about a patrician, isolated life.

It was still fashionable during the 18th century for a gentleman to understand architecture (a fashion that it would be well to revive) and consequently there were built in this area many fine houses of unusually sophisticated design.

Portsmouth, in common with Newport, Annapolis and Charleston, developed early and then, since it was off the beaten path of trade routes and large manufacturing enterprises, settled down to an ordered existence. There was sufficient wealth and trade to keep up appearances, but none to require big city building. This is fortunate, for today we have a splendid relic of the 18th century town in much the same state as it then existed. All of the great houses, Wentworth, Pepperell, Peirce, Moffat-Ladd, Wentworth-Gardner, et al., are in this book. At the same time, Mr. Howells has been no architectural snob and all the lesser lights are here, including Sheafe's warehouse. There is also a fine text, bibliography and measured drawings.

Mr. Chamberlain, too, has included Portsmouth, but only incidentally, in his perambulations with a lens and a fine eye. He has chosen to record the development of the New England home from the earliest times to the beginning of the 19th century by means of splendid photographs and gently ironic captions. Bringing the etcher's patience to a new medium, his beautiful compositions are handsomer than the pictures in Mr. Howell's book.

Both these works should be in every architect's library, where they will certainly constitute a mild menace. Books such as these should fill architects with a determination to design as well for their time as Hopestil March of Dover, the mulatto builder, did for his. But, alas, they seldom do.

PARKWAYS AND LAND VALUES. By John Nolen and Henry V. Hubbard. 136 pages, 7 by 10 inches. Illustrations from photographs, plans, and drawings. Cambridge, Mass.: 1937: Harvard University Press. $1.50.

The Harvard City Planning Studies are continued, after the lapse of a year or more, with this eleventh volume. The authors explore, from the standpoints of design, economics, and social welfare, the why and wherefor of the comparatively new pleasure thoroughfare that we call a parkway. Questions discussed are: who benefits from these parkways, and who should pay for them?; how far can it be proved that the parkway justifies itself economically?

WASHINGTON CITY AND CAPITAL. By Federal Writers' Project, WPA. 1142 pages, 6 by 9 inches. Illustrated with photographs, drawings, old maps, and large folded maps of the District of Columbia and the Mid-city. Washington, D. C.: 1937: U. S. Government Printing Office. $3.

The American Guide Series, of which this is a part, originated, as did the Historic American Buildings Survey, in an emergency. It was desirable to keep trained writers and architects busy at useful work. The result in this volume is an amazingly comprehensive compilation of facts hitherto scattered and largely inaccessible, bearing upon the national Capital.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS GUIDE 1937. Preface by J. H. Walker. 1228 pages, 6 by 9 inches. Illustrations from graphs and other line drawings, with photographic illustrations in the catalog section. New York: 1937: American Society of Heating and Ventilating Engineers. $5.

The fifteenth edition of what has come to be the bible of the heating and ventilating industry. Its technical data section is, as usual, the last word on the many phases of this subject, and there is the usual manufacturers' catalog data section, and the roll of membership.

HEAT. A short, well-illustrated history of man's struggle to control heat. 48 pages, 6 by 9 inches. Illustrations from photographs, line drawings and charts. Pamphlet binding. New York: 1937: Johns-Manville.

CODE FOR PROTECTION AGAINST LIGHTNING. Parts I, II and III. National Bureau of Standards Handbook H 21 (supersedes M 92 and H 17). 96 pages, 5 by 7½ inches. Illustrated by two photographs and one line drawing. Pamphlet binding. U. S. Government Printing Office, Washington, D. C.: 1937: Superintendent of Documents, Washington, D. C. 15 cents.

PROBLEMS IN BUILDING ILLUMINATION. Circular No. 29. By John O. Kraehenbuehl. 28 pages, 6 by 9 inches. Pamphlet binding. Urbana, Ill.: 1937: University of Illinois. 35 cents.

FIRE RETARDANT ROOFING. Why the N. F. P. A. Favors It. By Percy Bugbee. 12 pages, 6 by 9 inches. Illustrations from photographs and diagrams. Boston: 1937: National Fire Protection Association. 10 cents.

HERSHEY CHOCOLATE COMPANY, HERSHEY, PA.

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Bigelow Carpets add beauty and quiet in Hershey's windowless office building

One of the country's most interesting office buildings is the windowless structure designed and constructed for the Hershey Chocolate Company by Hershey Lumber Products — D. Paul Witmer, Manager. In layout and construction, everything possible was done to promote efficient working conditions and emloyee comfort.

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TECHNICAL DIGEST

KEY TO PRESENTATION

Typical reference: 15 Ja'38:14-26 **gptv**
This indicates: Issue of January 15, 1938, pages 14 to 26 inclusive, presented according to the following key:

d—detail drawing **g**—graph **p**—plan
s—section **t**—text **v**—photo view

Accordingly, **gptv** means graph(s), plan(s), text and photographic view(s) in the article mentioned.

NOTE: Readers desiring to secure copies of any publications mentioned herein are advised to have their local bookseller obtain them, or to write to the periodical of origin, either directly or in care of AMERICAN ARCHITECT AND ARCHITECTURE.

ACOUSTICS

Soundproofing. (H. Bagenal). The Builder. (London). 5 N'37:845 **t**

Report of a lecture on soundproofing of residential structures. Practical data on planning and construction, including suggested wall and floor materials and thicknesses.

Sound absorption factors in theatre planning. (C. C. Potwin). The Master Builder. (London). O'37:335-336 **t**

The proper balance of sound absorption between low, middle and high frequencies can be obtained by calculating acoustic treatment to limit reverberation time at 64, 128 and 256 cycles per second to ¾, ½ and ¼, respectively, of the time for 512 cps. Similarly, the average reverberation time from 1024 to 8192 cps should not be less than ¾ of the time at 512 cps.

This article also gives data on the treatment of rear walls, balconies, glass standee rails and the ceiling.

Same: The Builder. (London). 22 O'37:751 **t**

CONSTRUCTION

The placing of construction materials. (Concrete). The Federal Architect. O'37:25-31, 42-45, 47 **t**

First chapter of a handbook of best practice now being compiled by the Public Buildings Branch of the Procurement Division.

Considers at length: materials, water-cement ratio (table), strengths (table), proportions, tests, mixing, transporting, placing, forms and formwork, architectural concrete, curing and construction joints.

Grouted reinforced clay masonry revives "dead" brick industry. Brick & Clay Record. O'37:195-196, 198, 200 **dtv**

Description of the Simons Groutlock Wall, an R.B.M. method, costing 25-30% less than reinforced concrete of same thickness. Detail sections show placing of reinforcement and the two special types of brick used. These brick have bevelled corners to permit larger areas of grout within the wall. No headers are used and this continuously grouted center joint allows easy placing of steel, makes a thinner wall, and requires less labor.

Clay slab and lightweight aggregate make new fabricated panel. Brick & Clay Record. O'37:190-191 **dtv**

Reinforced face-brick panels (50 faces) erected with reinforced concrete pilasters 42 in.o.c. The brick is cut into ½ in. slices which are used to face a light reinforced slab. Table vibration and steam drying are parts of the panel fabrication process.

A survey of modern building technique. (E. Gunn). Architect & Building News. (London). 22 O'37:100-102 **dt**

Bricklaying continued: Flemish bond, footings, cavity walls, provisions for blinds at window heads, clearing cavities, airbricks, ventilation of cavities, whitewashing.

29 O'37:142-143 **dt**

Bricklaying continued: projections, arches, damp-proof courses, beam filling.

5 N'37:182-184 **dt**

Continued: Chases, paving, fireplaces, flues, chimney tops.

12 N'37:208-210 **dt**

Continued; metal windows, partitions, quarry paving, copings, arches.

19 N'37:230-232 **dt**

Drainage, asphalt work.

The construction industry in the United States. (P. A. Stone). South African Builder. (Johannesburg). O'37:15, 17, 19, 21, 23 **dgtv**

Part VII. Construction methods. A review of job organization as practiced by larger contractors. Progress schedules, plant layout and diagrammatic steel erection schedule (for Chrysler Bldg.) are illustrated and discussed. There are also notes on contractors' conferences and on various parts of the work: excavation, foundations, framework and masonry.

Erection bolts in welding. (Van R. P. Saxe). Engineering News-Record. 4 N'37:738 **tv**

Letter-comment on article on Welding for N. Y. buildings. This consulting engineer recommends, from his own practice in constructing 26 welded steel frame buildings, the use of shop-welded erection seats on columns. These engage seat angles or clips shop-welded to beams, thus avoiding job or shop drilling and the use of erection bolts.

This practice has been found to equal in cost the use of riveted connections, and due to tonnage savings of welded design the jobs have been more economical than riveted work would have been.

Building in a box. Engineering News-Record. 28 O'37:710-711 **tv**

A two-story building (84x100) with exterior facing of glass tile was completed during winter weather by the use of a plywood enclosure with canvas roof, kept warm by city steam (unit heaters). The box frame consisted of two-post bents of 4x4's normal to the building line with inside post 2 ft. out. Posts were 5 ft. apart in each bent and bents were 8 ft. o.c. Horizontals were at 4 ft. elevations and the cross braces (6 ft. apart) projected to support the scaffolding used for work on the glass tile wall. The plywood panels were 4x8 ft. 5/8 in. thick and formed extremely rigid bracing for the bents.

DESIGN & PLANNING

Zoo at Dudley, Worcestershire. Architects' Journal. (London). 4 N'37:717-722 **ptv**

New shelters for animals by the Tecton group, designers of the famous double spiral concrete ramp for penguins. A restaurant of equally adventurous form and structure is included.

Same: Architectural Review. N'37:177-186 **pstv** Architect & Building News. 5 N'37:166-177 **pstv** and 12 N'37:201-207 **pstv**

The planning of schools. (H. W. Burchett). Journal, Royal Institute of British Architects. (London). 8 N'37:17-24 **pt**

Report of a recent lecture before the R.I.B.A. Open air, nursery and general schools for infants, juniors and seniors are all considered and illustrated. A question and answer section is appended.

This report gives a clear picture of the present state of school planning ideals in Great Britain.

Schools — Reference article. Architects' Journal. (London). 4 N'37:699-708 **ptv**

Part I. Illustrated introduction to a new series of articles on British schools, including mention of the systems of education, divisions by age (2-15 year limits), new policies and a forecast of the developments to be expected in the next ten years.

Part II. 11 N'37:753-758 **gptv**

Nursery-Infant Schools. Present position: aims, routine, sites, sizes and groups.

Part III. 18 N'37:795-800 **ptv**

Nursery-Infant Schools, continued. *Circulation. Outdoor space features* (grass play lawn, hard play space, sand

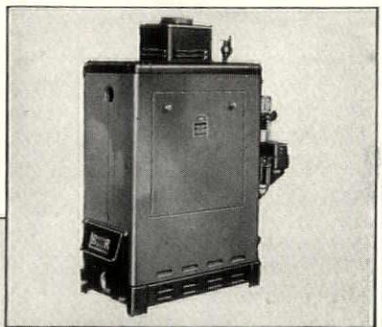
(*Continued on page* 96)

This family enjoys *CAREFREE WINTER COMFORT*

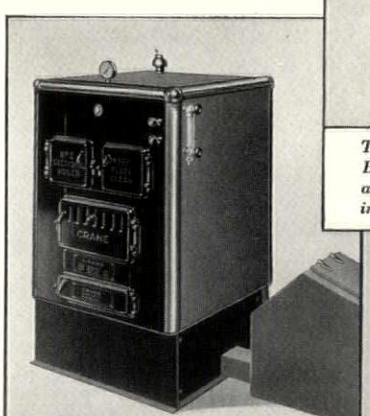
CRANE FIN-TYPE OIL-BURNING BOILER

THEIR ARCHITECT SPECIFIED CRANE AUTOMATIC HEAT

● New developments and improvements in automatic heating are available to your clients today. They are made possible by Crane leadership in providing automatic heating equipment that makes winter comfort more carefree, more convenient than ever before. The products described on this page constitute the latest news in the complete Crane line of heating equipment for coal, oil and gas—a line which includes Crane round and square boilers—Crane radiators—Crane new-type convectors. Make use of the valuable heating data contained in the Crane architects' catalog—and remember, Crane is always at your service with unbiased, valuable advice on heating problems.



The BASMOR GAS-FIRED BOILER is noted for its high efficiency and dependable operation. It's "tops" in automatic heating.



Frequent furnace tending is eliminated with a CRANE STOKER-FIRED BOILER. Built especially for stoker-firing to give maximum comfort with fuel economy.

CRANE SUSTAINED HEAT OIL BOILER-BURNER UNIT. Burner and boiler are designed for each other for more efficient combustion, greater absorption and more even distribution of heat.

CRANE

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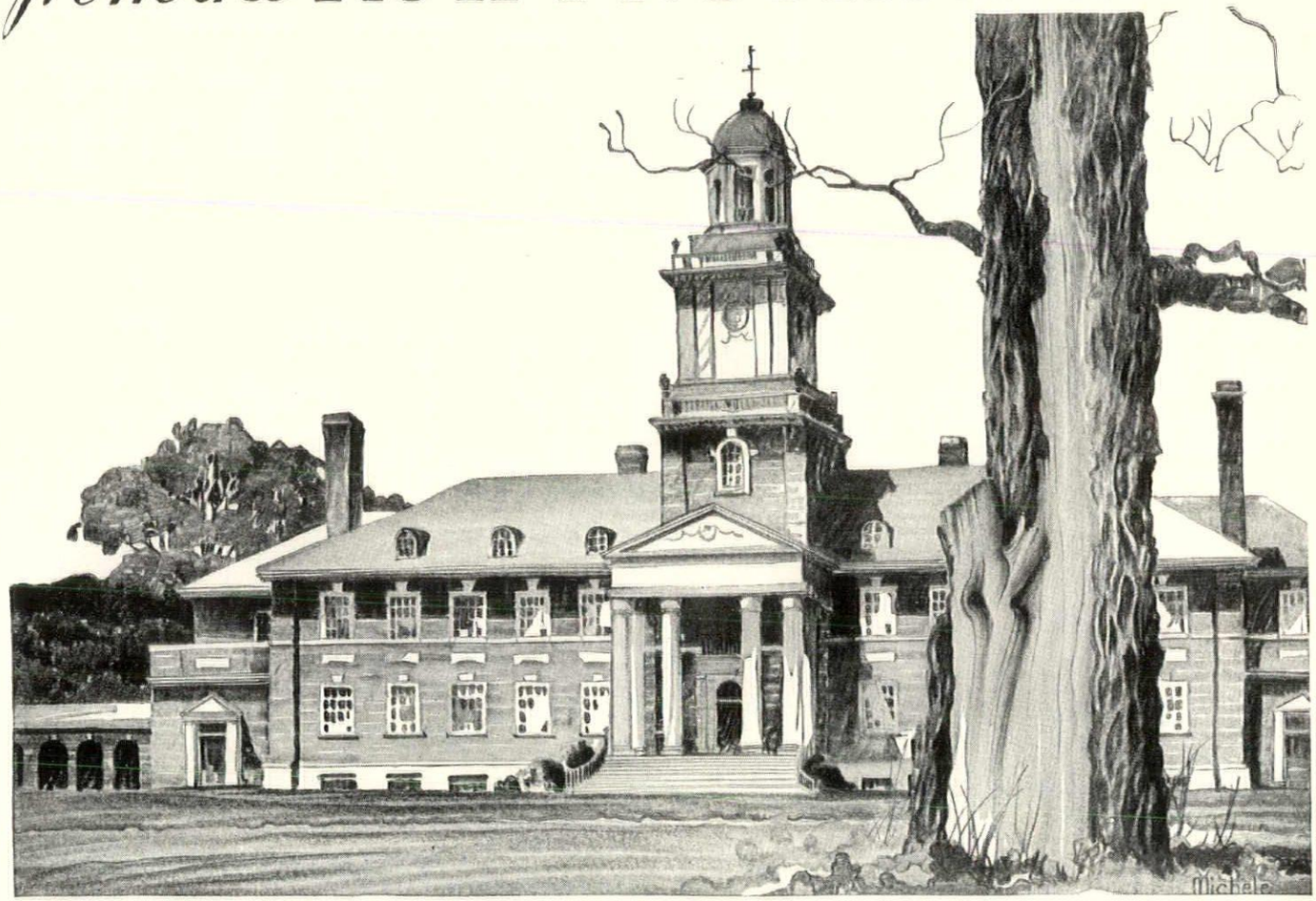
from the KOH-I-NOOR *Sketch Book*



Where do we go from here . . . .

After high school or college, most of us go to work, and in the hustle and bustle of this busy world, neglect the things that in our hearts we would like so much to do. Hobbies have a very definite place in the scheme of things, and if while in school we learned the fundamentals of freehand sketching, we find ourselves admirably equipped for a very worthwhile hobby which will take little of our time, effort or money, and yet largely fill our need for fun, self-expression and improvement.

The Koh-I-Noor Sketch Book is designed for average everyday fellows who like to draw for the fun of it, and incidentally, it is from these ranks that the most successful professionals rise. Its pages are meant to stimulate interest in various things about you that may be used as subjects, and to acquaint you with various suitable mediums which lend themselves to different types of drawings.

In commenting on methods used to produce the drawings of this series, my mere personal opinions are given, realizing that many teachers and students will heartily disagree with me and have many excellent examples to prove their case. This is as it should be, since drawing is a mode of self expression and far from standardization.

In the above drawing done with Koh-I-Noor Drawing pencils, my idea was built upon a school building. An architectural book provided a suitable subject, except that I thought a tree in the foreground would set the building more solidly in place. I made a rough but adequate sketch of an old nearby Locust and transposed it to my drawing. The finished result found the tree just about stealing the show, but I like it much better than my original idea. The finished picture is really a tree with a building behind it, and it is just such uncertainty of outcome that makes artistic endeavor so fascinating.

Thus, I wish my comments to convey nothing more than my personal method of achieving what I feel is a desirable effect. If you, too, like the effect, you'll have an idea of what you would like to do, and if you don't like it, you'll know what to avoid. In either case, if this series stimulates your desire to do a little sketching yourself, I will have accomplished my purpose.

Julian Michele

This is the first in a series of drawings by Mr. Julian Michele. Other drawings, with hints and suggestions on the various techniques will follow from time to time.

Koh-I-Noor Pencil Company Inc. 373 Fourth Avenue, New York

NEW CATALOGS...

Readers of AMERICAN ARCHITECT and ARCHITECTURE may secure without cost any or all of the manufacturers' catalogs described on this and the following page by mailing the prepaid post card printed below after writing the numbers of the catalogs wanted. Distribution of catalogs to draftsmen and students is optional with the manufacturers

Air Controls

435 . . . Instruments for the automatic control, indication, and recording of air conditions, including Humidistats, Windowstats, Room Thermostats, Comfortrols, Hytherstats, Microstats, Magnetic Gas Valves, Solenoid Water Valves, Electrical Relays, Humidity and Temperature Indicators, Psychrometers, and Anemometers, manufactured by Julien P. Friez & Sons (a subsidiary of the Bendix Aviation Corp.), Baltimore, Md., are described in Bulletin K, just released.

Air Conditioning

436 . . . The complete range of Sunbeam Air Conditioning equipment, capacity ratings and control equipment, are illustrated and described in a series of catalogs published by the Fox Furnace Co., Elyria, Ohio. Series 20, 80, and 5,500 are made for coal firing, hand or stoker, or oil firing. Series S is made for stoker firing only. Series 100, 200, 400, 600, and 720R are made for oil firing only.

Air Conditioner

437 . . . Announcement of a new, direct-fired air conditioner for oil, gas or stoker firing is made in an eight-page brochure released by the Fitzgibbons Boiler Co., New York. Output ratings, overall dimensions and specifications for four standard sizes ranging from 100,000 to 300,000 BTU are included. Filing size. A. I. A. file 30-C-1.

Air Conditioning

438 . . . "Radiant Living" is the title of a 12-page booklet published by the American Radiator Co., which contains a general description of the elements of air conditioning, and discusses the range of Arco products available to furnish complete air conditioning. File size. A. I. A. File 30-F.

Air Conditioner

439 . . . Performance characteristics, dimensional data, and specifications of the Weir Oil-Fired Air Conditioner are described in a four-page folder issued by the Meyer Furnace Co., Peoria, Ill.

A. S. T. M. Standards on Cement

440 . . . This 96-page compilation, published for the first time, gives in convenient form all the ASTM standard specifications and test methods pertaining to cement. Specifications cover portland cement, high-early-strength portland cement, natural cement and masonry cement. Methods of testing cover portland cement, chemical analysis, compressive strength of mortars, and fineness. Copies are available at $1.00 from ASTM Headquarters, 260 S. Broad St., Philadelphia.

Basement Utilization

441 . . . "Modern Basements with Up-to-Date Hand Firing," an address by Kenneth S. Hare, sales manager of the Koppers Co., Kearney, N. J., is a discussion of the utilization of basement space for recreation or lounge room without expensive change from existing hand-fired coal heating equipment. Methods of making hand-firing easier and adding automatic controls are suggested. Reprints are available.

Boilers

442 . . . The Series "O" Capital Oil Burning Boiler, described in an 8-page folder issued by the U. S. Radiator Corp., Detroit, Mich., is characterized by: extended rib type heating surface, front or rear firing, wet base construction, compact size. Capacity ratings, dimensions and connections are given for each size.

Centrifugal Water Vapor Refrigeration

443 . . . The development, perfection, and advantages of the centrifugal type of water vapor refrigeration are presented in a new 32-page booklet, 9144, issued by Ingersoll-Rand. Typical installations and standard dimensions are included.

Drawing Pencils

444 . . . Eagle Turquoise Drawing Pencils, made in seventeen uniform grades, and Eagle Verithin Pencils, made in thirty brilliant colors, are described in circulars issued by the Eagle Pencil Co., 703 East 13 Street, New York.

Electric Eye

445 . . . The first low-cost photo-electric cell control device, adaptable to residential use as a burglar alarm, is announced in a four-page folder published by Universal Control Devices, 201 N. Wells Street, Chicago, Ill.

Flexible Lighting

446 . . . No-Los Flexible lighting described in 8-page Bulletin No. 26 published by the Major Equipment Co., Chicago, Ill., combines in one fixture and one lamp the choice of direct light, indirect light, or combined direct and indirect light. Designed especially for showrooms, shops, drafting rooms, etc., No-Los fixtures are all metal, with the new Alzak electrolytic finish.

Grease Interceptors

447 . . . Josam Grease and Oil Interceptors—for intercepting and retaining grease, oil, fat, etc., and preventing them from entering waste pipes—are presented in two new 6-page folders published by the Josam Mfg. Co., Cleveland, Ohio.

Home Washing Machine

448 . . . The new Bendix Home Laundry, which washes, rinses and damp-dries clothes automatically, is described in a folder issued by Bendix Home Appliances, Inc., South Bend, Ind. The Home Laundry is completely enclosed in a rectangular, baked enamel cabinet, and occupies less than 4-square feet floor area.

NO POSTAGE REQUIRED ON THIS CARD

AMERICAN ARCHITECT and ARCHITECTURE January, 1938
New York, N. Y.

Please have the following catalogs reviewed in this issue sent to me.

Numbers .....

.....

• I also desire further information about the new products described in this month's "Techniques." . . .

Numbers .....

• I would like to have catalogs and information concerning the following products advertised in this issue. (Write page number or name.)

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☐ Check here for FREE copy of "WHEN YOU BUILD" booklet.

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Firm name .....

Address .....

City .....

Occupation .....

These NEW Catalogs may be obtained through AMERICAN ARCHITECT and ARCHITECTURE

Induction Motors
449 . . . Fairbanks-Morse vertical hollow and solid shaft polyphase, ball-bearing, squirrel-cage, induction motors, for turbine pump and all types of industrial application, are described in new Bulletin 1410, published by the Fairbanks-Morse Co., Chicago, Ill.

Insulation
450 . . . A simple, concise explanation of the theory of insulation and its application to everyday refrigeration and air-conditioning is contained in a new 44-page booklet "Fundamentals of Good Refrigerator Insulation," just published by the Dry-Zero Corp., Chicago, Ill. Four sections treat: (1) the manner in which insulating materials retard the passage of heat, and the behavior of various materials under practical conditions; (2) effect of moisture penetration on efficiency and methods of overcoming it; (3) test results obtained at U. S. Bureau of Standards, and (4) a forecast of future developments.

Motors
451 . . . Information concerning the electrical characteristics of fractional horsepower motors, methods of applying these characteristics most effectively to motor driven machinery and appliances, and types of fractional horsepower motors produced by the Century Electric Co., St. Louis, Mo., are contained in "About Motors," a 24-page pamphlet published by the Century Electric Co.

Oil Heaters
452 . . . Complete specifications for National Oil Heating Units, including dimensions, connections, ratings and fuel capacities, drawings and descriptive material, are included in a 16-page brochure issued by the National Radiator Corp.

Plastics
453 . . .Polystyrene, a new Bakelite product (number XMS—10023) possessing remarkable insulating properties, strength, and dimensional stability, and available in water white color, is announced in a four-page folder by the Bakelite Corp., 247 Park Avenue, New York. Samples are available upon request specifying type of application.

Plywood
454 . . . A 48-page section in the December issue of The American Builder is devoted to Douglas Fir Plywood, containing engineering data, architectural details, and specifications for application, working and finishing of fir plywood.

Plumbing Fixtures
455 . . . Improvements in design of plumbing fixtures and fittings introduced during 1937 by the Standard Sanitary Mfg. Co. are illustrated and described in a four-page folder issued by the Pittsburgh offices of the Standard Sanitary Mfg. Co.

Projection Heaters
456 . . .Complete description and data on capacities and dimensions of the Trane Multiple Projection Heater, a unit heater combining long range delivery, high capacity, light weight and moderate cost, are contained in Bulletin 284 and 294 of the Trane Co., La Crosse, Wis.

Rubber Flooring
457 . . . "Goodyear Rubber Flooring" contains approximately 100 illustrations of rubber floor installations of every type, ranging through all architectural styles and types of use, and is published by the Goodyear Tire and Rubber Co., Inc., Akron, Ohio.

Space Heater
458 . . . The Bryant Heater Co., Cleveland, Ohio, announce Model VB-8, a vertical forced air Gas Heater offering fully automatic, forced-circulation gas heat in a compact cabinet occupying 4 square feet of floor space, in a 2-page circular just released.

Stainless Steel Tubing
459 . . . Revised pages for Section 11, Bulletin A-11, pages 1 to 14, inclusive, covering complete stainless steel tube extras, are now available from the Allegheny Steel Co., Brackenridge, Pa.

Steam Traps
460 . . . "Steam Hookups" is a 30-page booklet published by the Sarco Co., 183 Madison Ave., New York, which gives data on the following: (1) required capacity of condensation removal equipment; (2) type of trap as determined by service and economy requirements; (3) capacity measurement; (4) pressures; (5) recommendations, and (6) location and hookup.

Stokers
461 . . . Automatic heat with fingertip control is explained in "How to have Automatic Heat with Coal," published by the Hershey Machine & Foundry Co., Manheim, Pa., manufacturers of "Motorstokor."

Unit Heaters
462 . . . The Trane Torridor, a blower type unit heater, for flexible, efficient and economical heat distribution over large areas is described in Bulletin 75 of the Trane Co., LaCrosse, Wisconsin. Floor, ceiling, and wall types are included, as well as data on selection, location, capacities, wiring, piping and roughing-in.

Vacuum Pumps
463 . . .The Hoffman Specialty Co.'s line of Vacuum Pumps for returning condensate to boilers and exhausting air from steam heating systems, or correcting undersized piping on existing systems, are described in Catalogs VVP-137, CP 736, and VP 736. Dimensions, capacities, ratings and method of selection are included. File size; A. I. A. File 30-C-5.

Wood Veneers
464 . . . A sixteen-page booklet published by the Algoma Plywood & Veneer Co., Algoma, Wisconsin, contains photographs and data on application of "Carstenite," a plywood surfacing material bonded to a hard non-warping fibre board back with resin adhesive, and manufactured in 4′ x 4′, 4′ x 6′, 4′ x 8′, and 4′ x 12′ sizes. File size; A. I. A. File 19-E-5.

Wrought Iron
465 . . ."101 Uses for Wrought Iron" is the title of an illustrated booklet published by the A. M. Byers Co., Pittsburgh, Pa. Illustrations include new construction and maintenance replacements, where to use wrought iron, where it will last longer and cost less to maintain.

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572 Madison Avenue
New York, N. Y.

pit, jungle-gym, paddling pool and shower, pets, flower beds, bird bath and house, vegetable plot, garden workshop, toy storage, tool shed, pram storage, and play "house"). *Indoor space features* include playrooms, windows, doors, artificial lighting, heating, ventilation, floor coverings, wall and ceiling finishes.

Current notes on planning. (Sports Pavilions. (E. & O. E.) Architect & Building News. (London). 29 O'37:135-136 **pt**

Part I. Plan and text analysis of sport buildings, pavilions attached to clubs or schools playing tennis, football, hockey, cricket, croquet, etc.

Part II. 5 N'37:178-179 **pt**

The large mixed club (home and visiting teams of both sexes). Orientation. Locker rooms.

Part III. 12 N'37:199-200 **pt**

Sanitary accommodations: lavatories, plunge, tub and shower baths.

Part IV. 19 N'37:226-227 **pt**

The club room, kitchen, verandas, store room. Golf clubhouses.

Air and road transport—Reference article. (F. E. Towndrow & B. E. Verstone). Design & Construction. (London). N'37:500-525 **pstv**

Technical article on airport design. Seven British, four foreign examples. One gliding club, several hangars, and five garages, filling stations, etc. Two-page bibliography of additional references.

Civic and Municipal buildings—Reference article. (F. E. Towndrow & B. E. Verstone). Design & Construction. (London). O'37:458-485 **ptv**

Two civic centers, nine town halls, one guildhall, seven municipal office buildings, four libraries and one firehouse are included. These examples are both illustrated and described in planning and construction outlines. All examples are British.

There is also a good bibliography.

Plan for a modern basement. (D. D. Corrough). American Builder and Building Age. N'37:62-63 **pt**

Short article with nine use-diagrams showing various relations of residential basement elements, (heater, laundry, stair, recreation, storage, work space, toilet and shower space) in rectangular, "T-" and "L-"shaped plans.

There are a number of practical notes on basement functions.

HEATING

Date heating season ends in a normal year. Heating & Ventilating. N'37:43-46 **map, t**

Full-page colored map and table giving dates for end of heating season in various parts of the United States. This is a companion sheet to that described last month and the same 100 cities are listed.

Low temperature heating. (G. P. Taylor). Design & Construction. (London). O'37:456 **t**

Brief article on the nature and action of infra-red rays. Invisible, off the red end of the spectrum, (40 to 45 millionths of an inch in length as compared to 32 millionths for the last visible red), these rays are in fact radiant heat. The human body is claimed to be "attuned and highly receptive to low-frequency radiation" of this kind, found in summer weather, and it is suggested, responsible for the amenity of that season.

This article suggests the reproduction of these conditions by means of low-temperature electric wiring built into a plaster ceiling. Natural humidity is maintained, air is clean, without convection currents, and the rooms are not encumbered by heating equipment.

Temperature of burning buildings. Heating and Ventilating. N'37:48 **t**

Brief note on the temperature reached in a building fire. This information was required for the design of a safety valve to discharge potentially explosive liquids. A manufacturer of fireproof safes finally provided a clue by revealing that when there is any brass in a building it is either not melted in a fire, or it is just on the verge of melting. The figure therefore is about the same as the melting point of brass. (1700°F.).

MATERIALS & FINISHES

Lumber in layers. (From Oil-Power). Science Digest. D'37:95-96 **t**

The average board has a transverse strength of only about 5-6% of its longitudinal strength. This short article describes the various types of veneer manufactured (rotary, sliced, sawn), and the fabrication of veneers into plywood to overcome this inherent weakness of wood. The seasoning and drying processes are discussed, including "breathing" of veneers in a steam-heated steel-plate press with intermittent pressure, which has been found to be one of the best ways of removing moisture. Various kinds of glue are used: cold casein, hot albumin or resin, or the new electric process employing sheets of phenolic resin. The latter gives superior strength and weather-resisting qualities. Compound plies of wood and metal, particularly in connection with bending and molding processes, have formed a large field of new uses.

Balancing costs in winter concreting. (D. S. McBride). Engineering News-Record. 11'N'37:795-797 **t**

A detailed estimating method to guide in providing sufficient heat for a sufficient length of time to protect concrete of various water-cement ratios in order to yield specific strengths.

The time during which heat protection is supplied also involves job overhead costs since each day the contractor is on the job may cost $25 to $100 or more.

The items of expense, then, include: cost of materials, fuel and labor cost for protecting concrete, cost of forms, and straight-time payroll and fixed charges. A typical example with specific figures for these items is worked out in the text. There are also tables of concrete costs at various time values for differing mixes at differing air temperatures, and a comparison of costs when one and two sets of forms are used.

It is stressed that heat protection is not a last-hour resort against freezing of concrete but a definite economic measure affecting job cost, and that it can be calculated in advance.

Truck mixer a refined mechanism. (C. F. Ball). Engineering News-Record. 11 N'37:786-788 **tv**

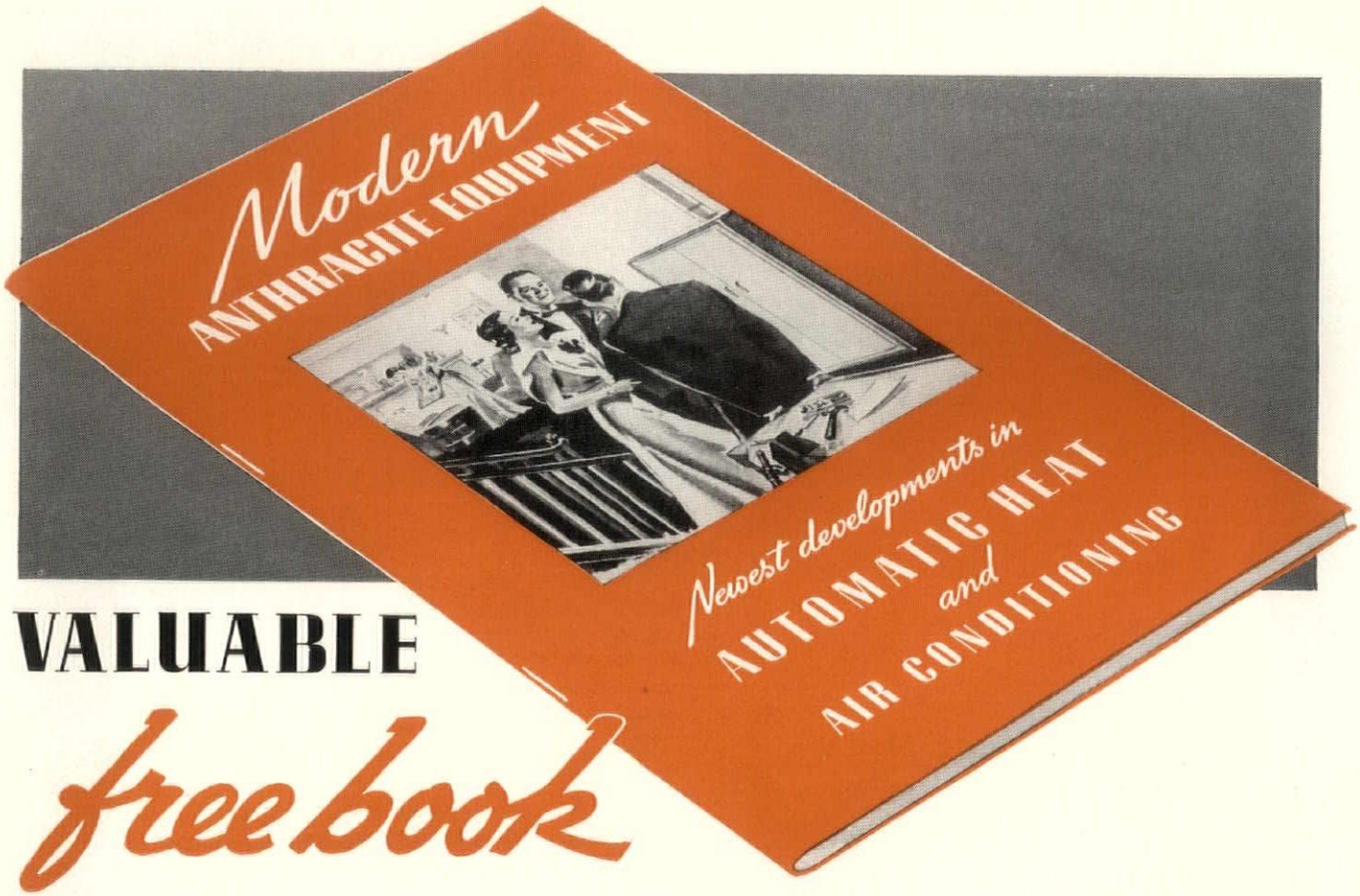
Description of equipment of and mechanical advances in the design of truck mixers and agitators for ready-mixed concrete delivery. All truck mixers can be used as agitators for hauling premixed concrete—capacity being 50% more for this use. It is usually not realized that less power is required to revolve the drum when it is more than half full. Offsetting this is the fact that there is less effective mixing action in the fuller drum. The standard sizes of truck mixers handle 1, 1½, 2, 3, 4 and 5 yards of concrete, the size to be used for any particular job depending on facilities for handling discharged concrete and the strength of the paving and roadway by which the truck must approach the job.

Charging and discharge are now rapid processes, the latter requiring only ½ to 1 minute if the load can be dumped into a large hopper. The rate of discharge is controllable either by the speed of drum rotation or by width of opening used. The drum has internal blades designed to mix the concrete and throw it away from the discharge opening when drum is revolving in mixing direction and to feed it toward the opening when reversed for discharge. The normal mixing period is 40 revolutions or more.

A new concrete building material. (From Compressed Air Magazine). Science Digest. D'37:28 **t**

Glaze-Raize, a new British made glazed concrete, is claimed to take mat, sand-blasted or luster finish in unlimited range of design and color. Sheets up to 6 ft. long are now practicable. This new surface is weatherproof, fireproof (tested to 2200°F), resistant to acid, crackproof and washable. It is suggested for all uses for which tile is now specified.

Manufacture on the job is not difficult or expensive as to plant. The time required to put the plant in readiness for operation (six weeks) seems the one present drawback.



VALUABLE *free book* FOR ARCHITECTS AND BUILDERS

Here is an interesting book you will find very helpful in planning heating for residential projects. It suggests the adaptability of Anthracite heat to budgets of any size. It shows how homes can be made most attractive to clients. It suggests new possibilities in basement planning, in new or old homes.

This book is the first of its kind. It stresses no manufacturer's product. Herein you find a complete review of all that is newest, most efficient, and most economical in modern Anthracite equipment. It tells how an inexpensive thermostat, and an Anthracite furnace or boiler, provide real automatic heat—and fueling periods as much as 12 hours apart. The book describes magazine-feed boilers that need no fueling attention from 24 to 48 hours—even days at a time. It describes modern automatic Anthracite burners that need no fueling attention all season long, and automatically remove ash to sealed containers.

Send for this time-saving book. Send for actual performance records of approved Anthracite equipment. Use the personal service of our trained field men, on Anthracite problems. Simply write to ANTHRACITE INDUSTRIES, INC., Chrysler Building, New York.

ANTHRACITE INDUSTRIES INCORPORATED approved

This Seal of Approval appears on Anthracite equipment only after it has passed the most rigid tests in the heating field.

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COAL

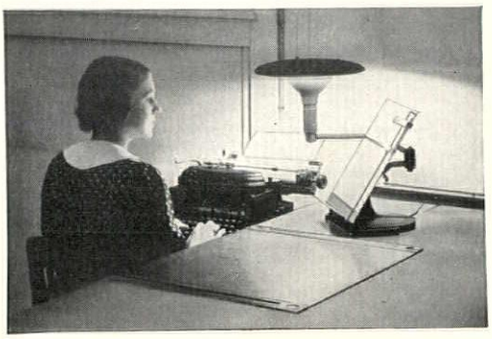
***THE* SOLID FUEL FOR SOLID COMFORT**

PRODUCTS

HEXCEL UNIVERSAL UNITS

The Hexcel Radiator Co., Racine, Wisconsin, announces the Hexcel Universal Unit for all-year use—heating in winter and cooling in summer. Low pressure steam or hot water is used for heating, and cold water for cooling. Built in two sizes in both pedestal and suspension types, the units are finished in brown crackle lacquer and chromium. Air directing louver is ebony black. An outstanding feature of the unit is the directional rotating louver, which can be set at any angle, directing hot or cold air to the exact location desired. Another Hexcel feature is the two speed motor which, by the flick of the switch, gives either high or medium air delivery. An all-copper core is used for the heat transfer surface with heavy seamless copper tubes and pure copper fins tightly bonded together for high efficiency. The tubes are brazed in heavy gauge brass header plates and the tanks are drawn out of sheet brass. Standard pipe size seamless brass tubes, brazed into the tanks, are used for inlet and outlet connections. Model "A" has a twelve-inch fan giving a maximum air delivery of 334 cubic feet per minute; heat output is 32,600 Btu per hour. For cooling, with ingoing water at 55 degrees and ingoing air at 95 degrees, the temperature of 334 cubic feet of air will be reduced to 71 degrees per minute. Model "AA" has a sixteen-inch fan giving a maximum air delivery of 610 cubic feet per minute; heat output is 54,200 Btu per hour. For cooling, with ingoing water at 55 degrees and ingoing air at 95 degrees, the temperature of 610 cubic feet of air will be reduced to 71 degrees per minute. The Hexcel Radiator Company will supply complete piping diagrams showing installation for both heating and cooling and for cooling only. **868M**

SPECIALIZED LIGHT SOURCES



The Sight Light plus Lamp illustrated is one of a number of specialized lamps for various working tasks in offices. It is a scientifically designed light source providing the proper quantity and quality of light on the working area, rather than directly below the lamp. Light is indirect, without glare, and provides proper light for any seeing task on the work areas. The SL 17 illustrated is equipped with swing arms so that the copy holder may be adequately lighted either from the right or left side. It is designed for use in typing contracts, notes, or specifications. Other Sight Light plus Lamps are designed for the executives desk, the drafting board, business machines and stenographers desks. Sight Light plus Lamps are made by the Sight Light Corp., Essex, Conn., and are patented in this and foreign countries. **869M**

Some London Hairdressing Shops Done with FORMICA!

Formica, as a good-looking, durable and modern wall covering, is appreciated in Great Britain as these cubicles and reception desk at Herrods and at P. H. Evans & Co. hairdressing shops indicate. The Formica wall sheet is installed with bright metal trim in the modern manner, and some of the tops are Formica veneered on plywood.

There are more than 70 colors, and decorations of one color may be inlaid on another. Metal inlays also are possible. The material is crack proof, and resists stains and has a smooth, hard and long lasting surface.

Let us send you our literature including many plates in full color suggesting possible designs.

THE FORMICA INSULATION COMPANY
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FORMICA

FOR BUILDING PURPOSES

SCHOOLS

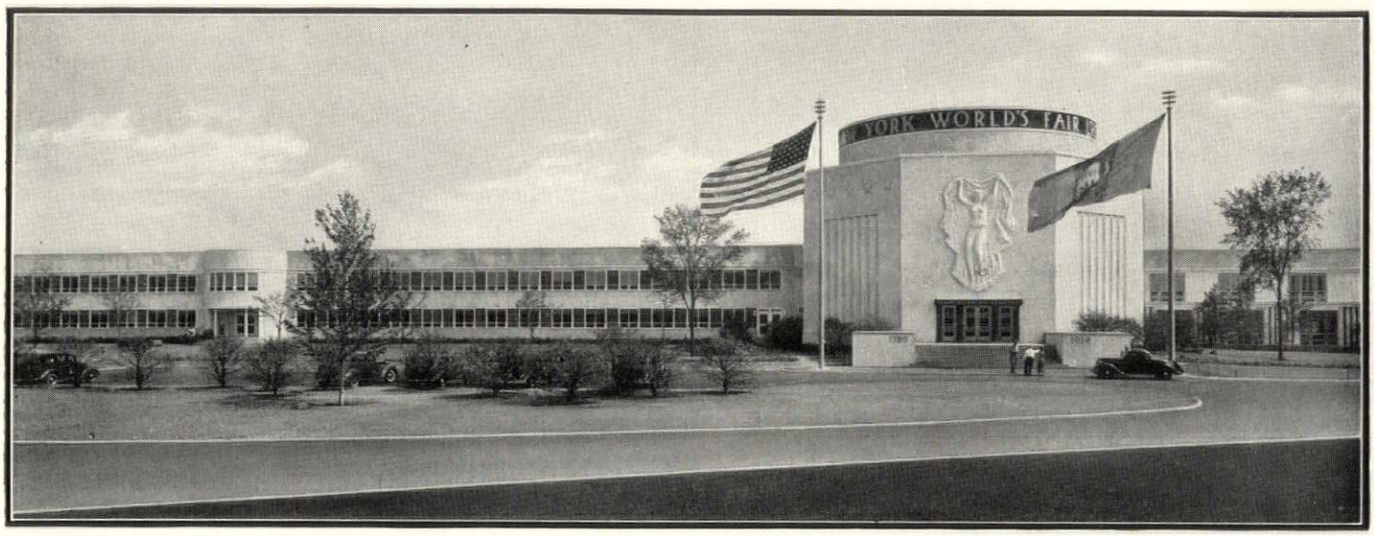
THE NEW BAUHAUS, American School of Design, 1905 Prairie Avenue, Chicago, Illinois, opens its spring semester to new students February 7 and continues to June 25, 1938. Registration takes place from February 2 to February 4. The curriculum for this semester follows: Basic workshop: L. Moholy-Nagy and Hin Bredendieck; Modeling: Alexander Archipenko; Music Experiments and Building of Musical Instruments: David Dushkin; Lettering: Hin Bredendieck and George Kepes; Life and Analytical Drawings: George Kepes; Geometrical Drawing: Hin Bredendieck; Photography: George Kepes and H. H. Smith; Physical Sciences: Prof. Carl Eckart, University of Chicago; Biological Sciences: Prof. Ralph W. Gerard, University of Chicago; Intellectual Integration: Prof. Charles W. Morris, University of Chicago. Students' lecture every Thursday. The students of this semester have the right to attend without charge twelve special lectures announced in the schedule of the night class. The night class will be opened in response to the requests of many persons who believe that the idea behind the New Bauhaus is more than a new principle in art education. They feel that not only those who are able to attend the day classes but also those who are employed in various fields of work and have a direct influence on practical life should participate in the Bauhaus training. Through it they hope to receive a changed outlook on many phases of life, an outlook which will be a new force in their daily work. Those persons, who have already received practical training, will not need the detailed technical instruction of the full-time curriculum presented in the day classes. But the basic shopwork in the preliminary course of the day class is the foundation for all advanced work. Therefore the New Bauhaus makes this the basis for the curriculum of the night class, too.

THE COLLEGE OF FINE ARTS, SYRACUSE UNIVERSITY, offers the following Architecture scholarships to Freshmen students: One $375.00 and four $187.50 scholarships to be granted by competition on Saturday, July 16. The competition will be in two fields—drawing and preparatory school record. (1) Contestants must send to the College of Fine Arts not later than Tuesday, July 5, a portfolio containing not more than 20 examples of their work in free-hand and mechanical drawing together with three letters of recommendation as to personality, character and general fitness. Judging the drawings by a committee of the Architecture Faculty will take place on Saturday, June 16. (2) The high school records of all contestants will be carefully examined by the Director of Admissions and the Architecture Faculty Committee to determine fitness for a course in Architecture. Special attention will be given to ability in high school mathematics. Each portfolio of drawings, etc., must contain the name and address of the student contestant and a statement from the student's high school principal that the drawings, etc., in the portfolio are the original work of the student submitting them. Stamps for the return and insurance of the portfolio must be sent to Dean H. L. Butler, College of Fine Arts, Syracuse, N. Y. Each contestant must be a graduate of an accredited high school, and must, on or before June 22, apply to the Director of Admissions for entrance to the College of Fine Arts as a regular student, and submit a recommendation from his high school principal as to his character, health and ability.

THE NEW YORK BUILDING SCHOOL, 67 West 44th Street, announces a special course of 20 lectures on the new Building Code to be given on Tuesday evenings beginning December 21. L. M. Bernfeld of the Department of Buildings, William A. Hoffberg and D. D. Kimball, Consulting Engineers, will be the instructors. The course will include a general analysis of the new Building Code and detailed study of its classification of buildings, materials and methods of construction, air conditioning and welding of steel.

STURTEVANT FANS
SERVE NEW YORK WORLD'S FAIR

Air Conditioned Administration Building



IN keeping with its thoroughly modern design, the Administration Building of the New York World's Fair has been scientifically air conditioned.

It is significant that Sturtevant Fans were chosen to circulate the conditioned air in this model project which houses 700 executive officers and staff.

Designed and engineered by the World's Fair architectural and engineering staff. Baker, Smith and Company of New York, Contractors.

B. F. STURTEVANT COMPANY, HYDE PARK, BOSTON, MASS.
Branch Offices in 40 Cities B. F. Sturtevant Co. of Canada, Ltd.—Galt, Toronto, Montreal

Sturtevant
REG. U. S. PAT. OFF.
Puts Air to Work

Fans, Blowers, Air Washers, Air Conditioning, Heating, Vacuum Cleaning, Drying, Mechanical Draft Equipment

OF THE OFFICES

Voorhees, Gmelin and Walker, Architects, announce that Max H. Foley and Perry Coke Smith have been made full partners in the firm. The full list of partners now consists of Stephen F. Voorhees, Ralph Walker and the two new members.

Beginning January 1, 1938, the office of Gaarwood M. Grimes, Architect, will be located at Room 905, Republic Building, Louisville, Kentucky.

Gilbert D. Fish and Elwyn E. Seelye have formed a partnership to practice consulting engineering in the welding field. This will include designs, inspections, estimating and details. The office of the new firm will be at 101 Park Avenue, New York City.

Paul W. Jones, A.I.A., has opened an office for the general practice of architecture at 111 9th Street South, Fargo, North Dakota.

GAS INDUSTRY

THE AMERICAN GAS ASSOCIATION announced today a nationwide program for the equipment of new homes and the modernization of old ones by gas appliances. This program will be effective in every city and town in the United States and the Dominion of Canada served by gas. It is the belief of the gas industry that a revival of building activity over the next several years will result in the construction of several million new homes, and that these new homes should be equipped with the latest and best in automatic gas cooking and refrigeration equipment, gas water heating, automatic gas house heating, incineration and air conditioning appliances.

Part of this wide gas industry's program will be to demonstrate such up-to-date equipped homes to millions of Americans and Canadians. This will be accomplished in conjunction with hundreds of gas utility companies, gas equipment manufacturers and building material manufacturers. In co-operation with local architects and builders, these model homes will be constructed fully equipped with gas appliances so that the millions of people may see in actual operation the latest and best which the gas equipment industry produces and be informed of the economical services which the utility companies give.

The gas industry will not furnish house plans but will refer all prospects to local architects and local builders. It will establish a service for architects and builders in all matters pertaining to gas appliance installations and through demonstration homes assist in interesting the general public in home construction and modernization.

It is the general belief that homes being built today should be constructed with full consideration to future gas equipment needs, thus eliminating many changes when such necessary equipment is later added. It is thought that by proper display the public may readily be brought up-to-date regarding the important developments that have been made toward comfort, livability, health, economy, and convenience which gas appliances provide.

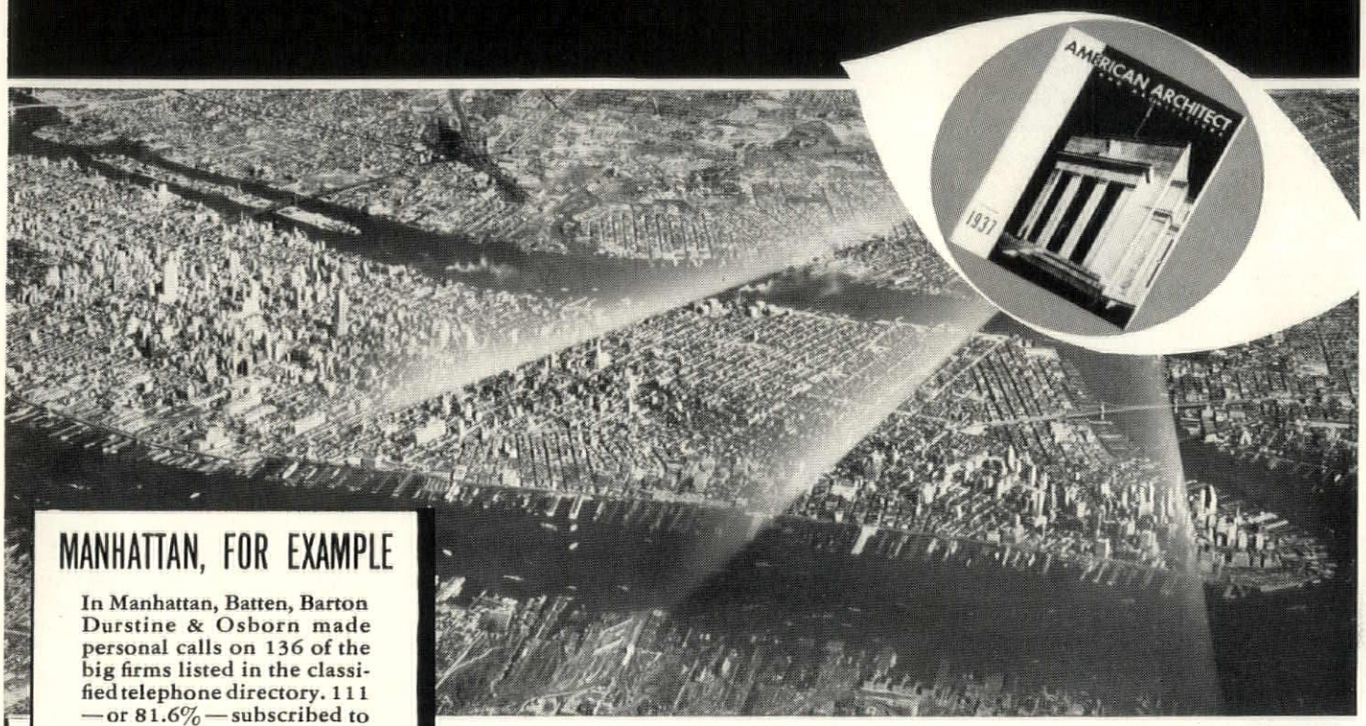
This program will be carried on vigorously for the benefit of the public, the building industry and the architectural profession. The American Gas Association will co-operate with the Canadian Gas Association, the Government, and all building material manufacturers and will stimulate nationwide interest in the construction of new homes built with primary consideration for up-to-date living.

A part of the program will be devoted to the modernization of existing homes and many old homes will be brought up-to-date by modern gas appliance equipment and displayed for public inspection.

Mr. J. F. Quinlan, formerly manager of the nationally known "New American" Demonstration Home Building Program, will direct this nationwide gas industry program and the new Home Appliance Planning Bureau.

(*Continued on page* 104)

SURVEY SHOWS AMERICAN ARCHITECT LEADS IN BULL'S EYE COVERAGE OF NATION'S BIGGEST BUILDING MARKET



MANHATTAN, FOR EXAMPLE

In Manhattan, Batten, Barton Durstine & Osborn made personal calls on 136 of the big firms listed in the classified telephone directory. 111 — or 81.6% — subscribed to AMERICAN ARCHITECT — more than subscribed to any other architectural magazine.

Manhattan in 1936 reported building permits totaling $63,335,651 (U. S. Dept. of Labor — Bureau of Labor Statistics).

Manhattan, as a building market, was exceeded in 1936 only by Los Angeles, where AMERICAN ARCHITECT showed an even greater lead over its nearest rival.

To increase your business in great building markets like these — all over the country — tie-up with the magazine which reaches the men who make the market.

"To which architectural magazines do you now subscribe?"

Seven of the country's leading advertising agencies last August put this question to 1400 practicing architects in the 38 cities which reported 1936 building permits of $5,000,000 or more (total for all 38—$600,000,000).

When the results were in, AMERICAN ARCHITECT led every other architectural magazine in number of subscribers.

The architect is the bull's eye of the building market in any city. And AMERICAN ARCHITECT is today THE medium to use for selling architects in the nation's fastest-building cities. Are YOU getting enough of this business?

AMERICAN ARCHITECT AND ARCHITECTURE

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PORTABLE LAMP COMPETITION

A competition for the design of table and floor lamps that is intended to bridge the present gap between plain science and more beauty has been announced by its joint sponsors, the Illuminating Engineering Society, the American Institute of Architects, and the American Institute of Decorators.

The competition, which will extend from January 15, 1938, to March 15, is open to architects, interior decorators, industrial designers, and students of architecture and interior decoration. It is not open to employes of incandescent lamp, portable lamp, lighting equipment and power companies.

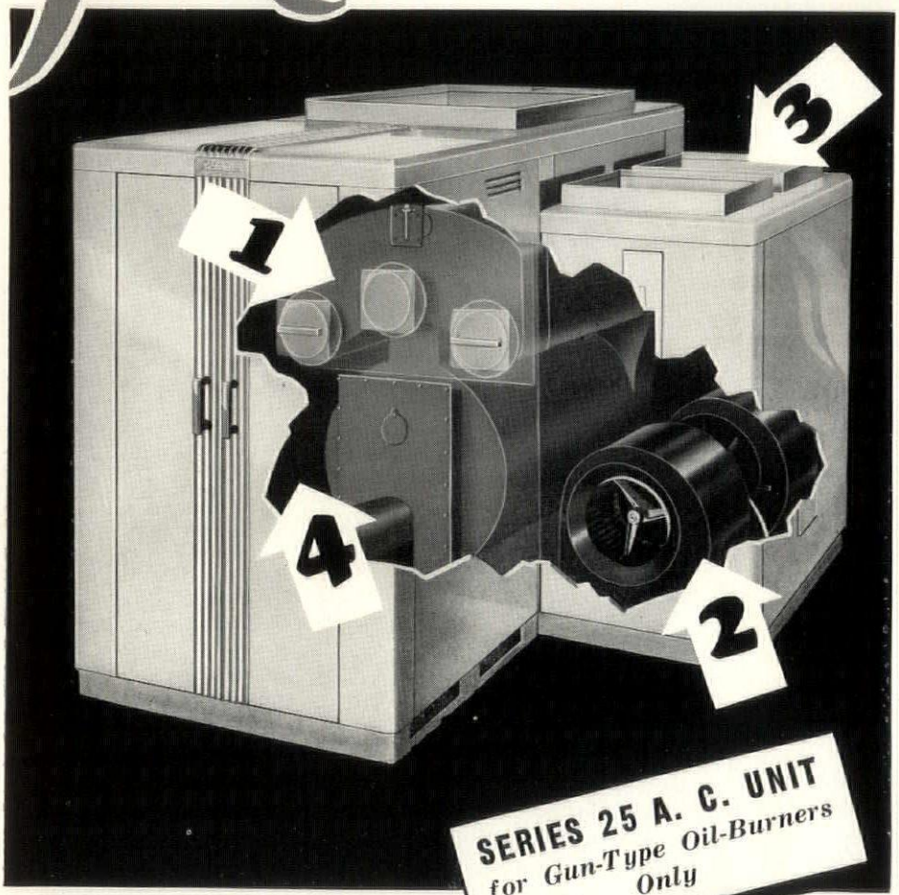
The purpose of the competition, according to the program issued by its co-sponsors, is "to stimulate improvement in the design of portable lamps by requiring that the essential specifications of the Illuminating Engineering Society as well as the standards of professional designers of interiors be met in products that will reflect the latest scientific as well as esthetic advancement."

Prizes totaling $1,600.00 will be awarded. There will be four classes, and in each class there will be awarded a first prize of $200 and two honorable mentions of $100 each. The four classes are: 18th Century English, Early American, 18th Century French and Contemporary Modern.

Following the contest, the winning designs will be offered for sale to manufacturers of table and floor lamps on a scaled-bid basis, with the proceeds going toward a fund designed to enable young designers without adequate financial means to have their creations tested without charge by an organized, well-equipped testing laboratory.

Competition programs may be obtained by addressing Harry V. Anderson, Publisher of "Interior Design and Decoration," who has been appointed Competition Advisor.

Richardson AIR CONDITIONING



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IMPORTANT FEATURES

1. Large heating surface . . . combustion chamber permanently sealed against leakage.
2. Quiet, direct-driven blower, multivane double-inlet type, statically and dynamically balanced.
3. Dustop air filters by Owens-Illinois Glass Co. . . . large reserve capacity sustains filter efficiency for many months.
4. Ample space for oil burner and controls, with wide access doors. Heating compartment entirely insulated with foil-faced air cell asbestos.

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THE COMPETITION MOVEMENT

A NATIONAL COMPETITIONS COMMITTEE for Architecture and the Allied Arts has been formed, based on the belief that Architectural competitions are the best method of selecting designs for, and architects to superintend the erection of, buildings where the expenditure of public funds is involved.

This statement of belief was put in the form of a resolution and adopted almost unanimously by a large meeting of the New York Chapter, American Institute of Architects, at a meeting held on November 15.

The purpose of our Committee is to secure, for ultimate use in Washington, the official support of organized groups and to work out sound methods of overcoming the objections advanced against competitions. To attain this purpose it is necessary to formulate recommendations for the satisfactory conduct of competitions for a variety of problems.

It is the further purpose of this Committee to use all available information in order to obtain federal legislation favoring competitions as the method of selecting architects for public works. The Committee has assurances that such a bill will be introduced if there is enough demand.

The Committee believes that architectural competitions need not be expensive to the architects or the clients. It believes that through competitions the quality of architecture improves, and that the public is made aware of the value of architectural services. It also believes that through competitions conducted frequently and properly many of the problems facing the profession today will be helped toward solution.

The Committee is propounding nothing new and startling. The competition system has been successfully demonstrated in England, France, Italy, Switzerland and the USSR, where it is accepted procedure.

Organizations in the Allied Arts are working with the Committee along similar lines for Competitions in their fields.

The Committee welcomes support from organizations and individuals interested in its program and will welcome their opinions. It will gladly furnish any further information regarding its activities.

The National Competitions Committee's membership: Henry S. Churchill, chairman; William Lescaze, secretary; Julian Whittlesey, treasurer; Julian Berla, Carl Feiss, Percival Goodman, Frederick Gutheim, Talbot F. Hamlin, John A. Hartell, Milton Horn, Joseph Hudnut, Ely Jacques Kahn, Alfred Kastner, Gerald L. Kaufman, A. Lawrence Kocher, Herbert Lippmann, Lorimer Rich, Morris B. Sanders, Albert C. Schweizer, Oscar Stonorov, Edgar I. Williams, Frederick Woodbridge, and Philip N. Youtz.

Garden Decoration and Ornament

for Smaller Houses

by G. A. Jellicoe

The author, who is well known as a town-planner and designer of houses and gardens, analyzes in this profusely illustrated volume the structural features and ornaments of gardens for small country houses, suburban and town houses. *The London Times Literary Supplement* praised it for its "beautifully chosen illustrations" and spoke of it as "of a quality rare in modern garden books . . . full of stimulating ideas." *Country Life* says "it should be of great value to home and estate owners and garden lovers all over the world." $6.00

The Supervision of Construction

by W. W. Beach

This book is perhaps the first comprehensive treatment of the supervision of construction to be published and is indispensable to architects, engineers, construction superintendents, technical libraries, students and all interested in architecture and engineering. Written by one of the best-known architect-engineers in the Middle West, it is an authentic, up-to-date handbook that fills a long-felt need. Within its 488 pages are included all the details of the superintendent's work; there are appendices, 20 diagrams and illustrations. $6.00

Contents

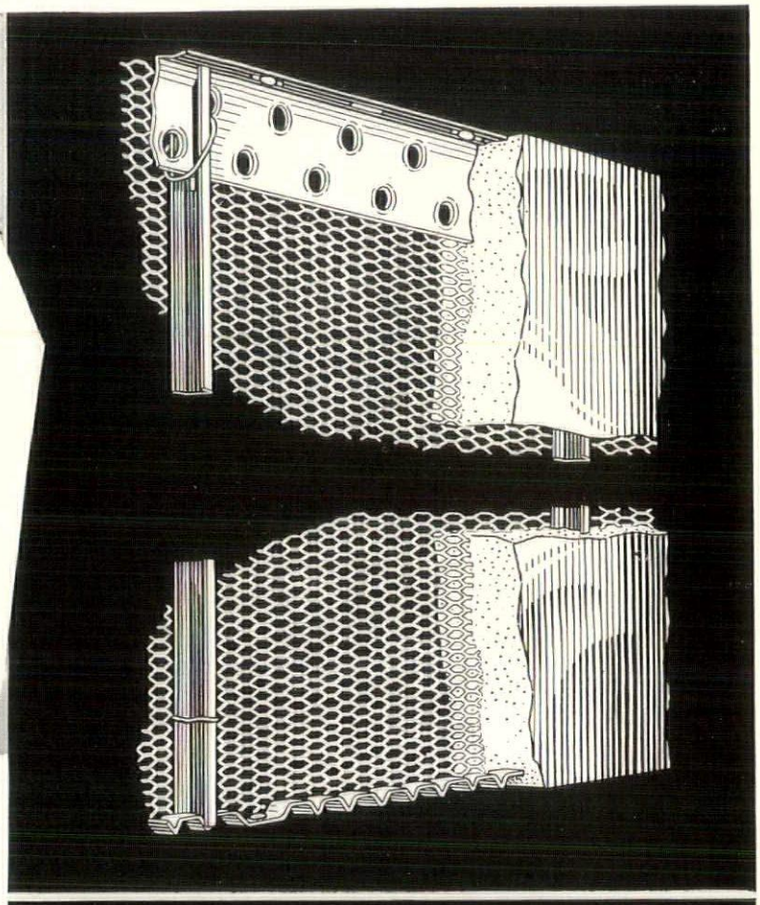
CHARLES SCRIBNER'S SONS

INDEX TO ADVERTISERS

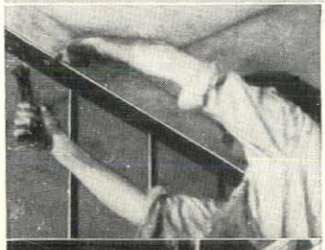
This index is an editorial feature, maintained for the convenience of readers. It is not a part of the Advertisers' contract and American Architect and Architecture assumes no responsibility for its correctness.

Presenting to the building industry the new MILCOR solid partition and furring system★

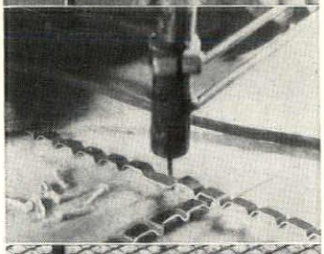
. . . the most important development in years in fireproof construction



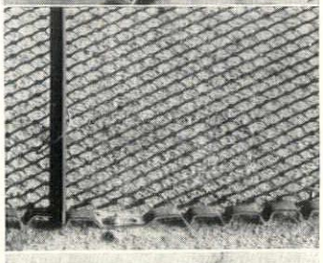
2" solid plaster partitions now erected with incredible speed with this exclusive Milcor system — bringing costs down sharply.



★ **Ceiling Angle Runner** — attached to ceiling with bolts, nails or Rawl Drives. Burr on holes prevents tipping of channels.



★ **Continuous Crimped Floor Runner**—with grooves for inserting channel studs at any point in the wall. Flat section every 12" for attachment to floor.



★ **Slotted Channel Studs** — notched at top for variations in ceiling heights. Slot slides over standing leg of Ceiling Angle Runner—bottom slips into place in grooves of Floor Runner. Metal lath tied to studs with tie wire.

★ **Standard Sheets of Metal Lath** — applied without any previous wiring of channels to either Ceiling or Floor Runner. Tying completely done in one operation with ordinary tie wire. Here is a real saving in time.

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Milcor here uses the word "system" in its true sense — not to signify a limited, inflexible set-up applicable only under certain conditions, but to represent so great a range of individual products, types, weights, metals, etc., that a *complete, coordinated metal backbone* can be designed to suit *any* condition of fireproof construction — all with Milcor products engineered to work together.

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This Milcor system is applicable to the erection of free-standing furring walls.

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★ *fully protected by patents pending.* F1

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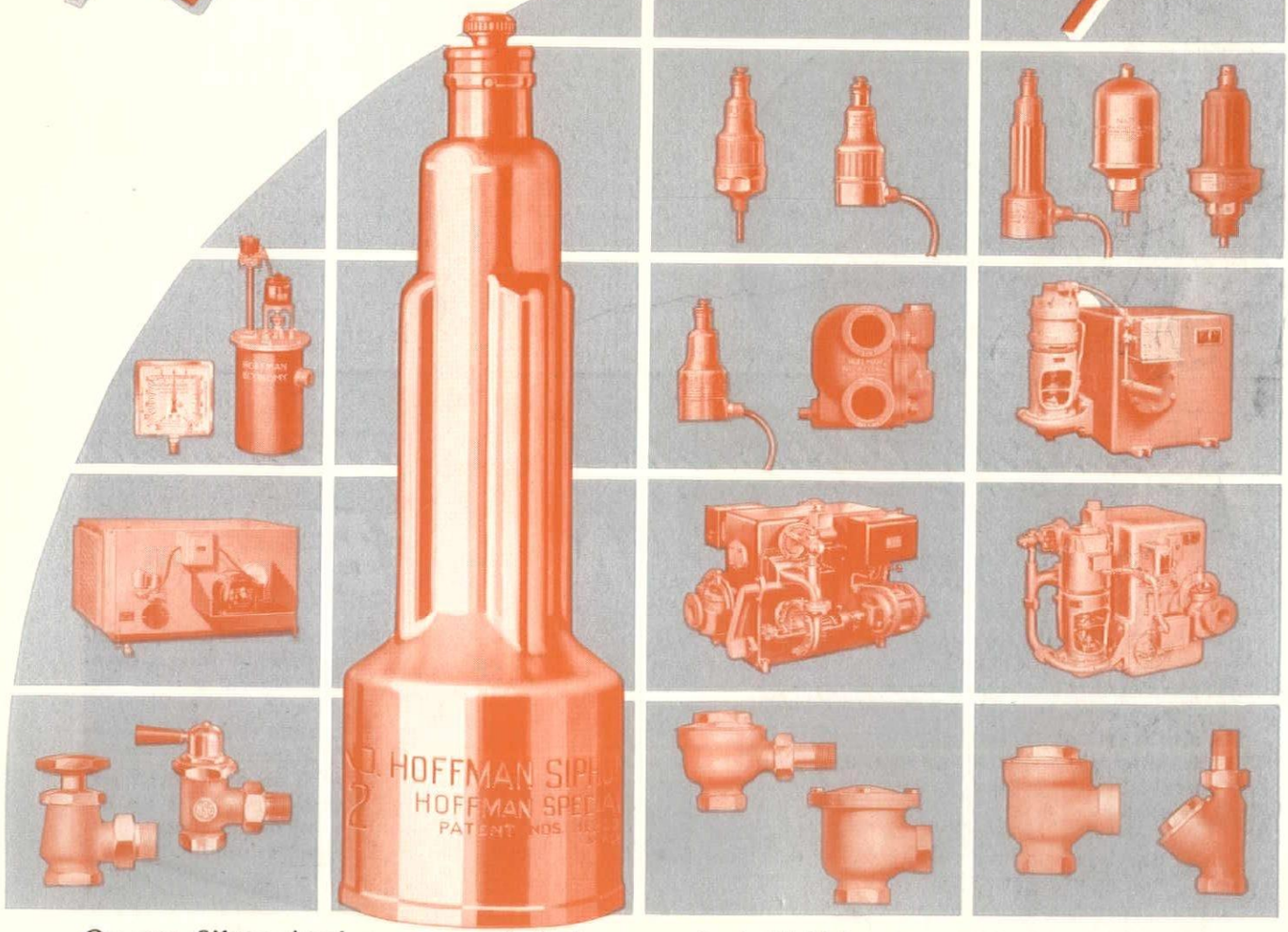
THE CIGARS ARE ON US... THIS IS OUR

Silver Anniversary



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